
SOLAR INVERTERS

Solar inverters and inverter solutions for power generation

Optimized levelized cost of energy over the complete plant lifetime



ABB has one of the widest portfolios of solar inverters ranging from single-and three-phase string inverters up to megawatt-sized central inverters. This extensive range of solar inverters is suitable for the smallest residential photovoltaic (PV) systems right up to multi-megawatt PV power plants.

For utility-scale power generation ABB is one of the most reliable suppliers standing behind the promises over the whole lifetime of the plant to maximize the return on your investment.

ABB solar inverters utilize our 50 years of experience and advances made in inverter and power converter technology that has contributed to ABB becoming the largest provider of power electronic solutions.

ABB plug and play solutions house all electrical equipment needed to rapidly and effortlessly connect the PV plant to any MV grid in the world, all components coming from ABB's own portfolio.

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ABB solar inverters and inverter solutions

Your brightest choice for industrial and utility-scale photovoltaic power plants

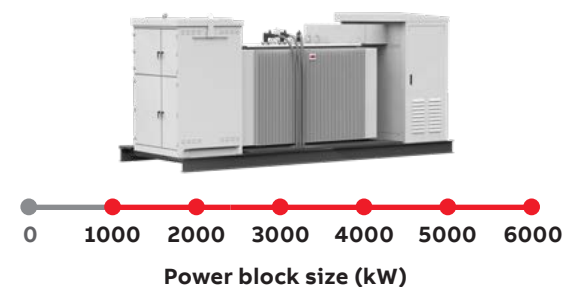
Central inverter solutions

In large ground-mounted multi-megawatt photovoltaic (PV) power plants the PV modules are typically installed uniformly mounted at ground level, either on fixed-tilted structures facing the sun or on tracking devices. For these land-based power plants ABB central inverters offer the most cost-effective and efficient solution for PV energy generation by feeding electricity directly to the medium voltage (MV) power distribution network (i.e. grid). ABB's offering for large plants includes a wide range of central inverter stations and turnkey solutions.



String inverter solutions

ABB string inverter solutions enable the smart and cost-effective designs for industrial and small utility-scale PV power plants by maximizing energy yields even in challenging land shapes and locations. ABB's offering for these plants includes complete plug and play inverter solutions and MV stations. The string inverter solutions can be utilized also in PV power plants of commercial and industrial buildings to minimize the needed investment.





Meet your bankability and profit targets with ABB solar inverter solutions

Maximize the return on your PV investment with solar inverter solutions designed for high total efficiency, reliability and ease of installation

Proven solutions with long-term reliability

ABB inverter solutions utilize decades of experience and advances in inverter and power converter technology as well as development and manufacturing of secondary substations and medium voltage (MV) components. Together with ABB's engineering know-how and complete product portfolio for PV power plants, ABB inverter solutions provide optimized plug and play experience for quick and reliable connection of the PV plant to the grid.

Global presence with local support

ABB solar inverters and inverter solutions are supported through a worldwide sales and services network. The high-performance all-ABB solutions provide highly reliable, cost-effective and bankable utility-scale PV power plants. Wherever your project is located, ABB is your reliable partner to support you over the whole lifetime of your plant.

ABB integrated solutions – features and benefits

- Plug and play solutions, designed for large-scale solar power generation – rapid installation with cost-effectiveness
- All-in-one design – ensuring maximum uptime of the plant with minimum total investment
- High reliability and efficiency with low auxiliary power consumption – high total performance
- Modular and serviceable systems
 - increased uptime
- Proven technology and reliable components
 - securing long operating life and attractive return on investment
- Smart connectivity with controllability
 - digital grid compatibility
- Global life cycle services and support
 - bankable solution
- Vertically integrated product offering – 100% ABB components for seamless functioning with each other



Central inverters

Highly cost-effective and performant,
for attractive return on investment

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01 Inside view
of ABB inverter
station, PVS800-IS.
The inverter
station houses
two PVS800-57B
central inverters

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02 The new high power
ABB central inverter,
PVS980-58 – an
outdoor inverter with
robust enclosure

Maximized total efficiency

ABB's central inverter portfolio is based on decades of experience with power converting technology, which has now been custom adapted for the PV business. Globally, an installed base of over 100 GW is built on the same power converting technology platform used in ABB central inverters. This ensures that the product itself, and the processes to support it over the plant lifetime, are optimized and offer a truly bankable solution.

The central inverter's industrial design and modularity combined with ABB's life cycle service approach simplify the operation of the inverters. This assures maximum uptime of the plant and highest return on your investment.

The all-in-one design approach of the ABB central inverters reduce the amount of external components needed. All the necessary alternating current (AC) and direct current (DC) side protections are included so the inverter can be directly connected to solar array junction boxes and the MV transformer. The high efficiency, together with high reliability and extremely low auxiliary power consumption give investors maximized total efficiency over the lifetime of the plant.

Highlights

- Indoor and outdoor inverters
- 1000 V and 1500 Vdc input voltage
- Power ratings up to 5000 kVA



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ABB central inverter (1000 Vdc)

PVS800-57B – up to 2078 kW

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01 ABB central inverter
PVS800-57B

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02 ABB central inverter
PVS800-57B,
doors open

ABB central inverters stand out as reliable, efficient and easy to install. As indoor inverters with high protection class, small footprint and optimized low power consumption ventilation, it is easy for EPCs to install the inverters for variety of site conditions.

The inverters are aimed at system integrators and end users who require high performance solar inverters for large photovoltaic (PV) power plants. Available now from 1645 kW up to 2078 kW, the inverters are ideal for maximizing the return on investment in multi-megawatt power plants.

World's leading inverter platform

The ABB central inverters have been developed on the basis of decades of experience in the industry and a proven technology platform. Unrivalled expertise from the world's market and technology leader in frequency converters is the hallmark of this solar inverter series.

Based on ABB's highly successful platform and the most widely used frequency converters on the market – the inverters are the most efficient and cost-effective way to convert the direct current (DC) generated by solar modules into high quality and CO₂-free alternating current (AC) that can be fed into the power distribution network.

Solar inverters from ABB

ABB central inverters are ideal for large PV power plants but are also suitable for large-sized power plants installed in commercial or industrial buildings. High efficiency, proven components, compact and modular design and a host of life cycle services ensure ABB central inverters provide a rapid return on investment.

High total performance

- High efficiency
- Low auxiliary power consumption
- Efficient maximum power point tracking
- Long and reliable service life of over 25 years

Full grid support functionality

- Reactive power compensation also during the night time
- Active power limitation
- Low voltage ride through with current feed in
- Grid code compatibility
- Wide country-specific grid code compliance
- Adjustability to various local utility requirements

Life cycle service and support

- ABB's extensive global service network
- Extended warranties
- Service contracts
- Technical support throughout the service life

Modular industrial design

- Compact and easy-to-maintain product design
- Fast and easy installation
- Integrated and flexible DC input cabinet

Extensive protections

- DC and AC side protection with built-in fuses, surge protection and filters
- Increased reliability and safety with DC and AC side contactors
- Heavy-duty surge protection

Proven technology

- Based on ABB's market-leading technology platform used in frequency converters

Wide communication options

- Complete range of industrial-type data communication options
- Ethernet/Internet protocol
- Remote monitoring

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ABB central inverter (1500 Vdc)

PVS980 – up to 2300 kVA

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01, 02 ABB central
inverter PVS980

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03 ABB central inverter
PVS980 doors open

ABB PVS980 central inverters raise reliability, efficiency and ease of installation to new levels. The inverters are aimed at system integrators and end users who require high-performance solar inverters for large photovoltaic (PV) power plants. PVS980 central inverters are available from 1818 kVA up to 2300 kVA, and are optimized for cost-effective, multi-megawatt power plants.

PVS980 central inverters from ABB

ABB PVS980 central inverters are ideal for large PV power plants. The high DC input voltage up to 1500 Vdc, high efficiency, proven components, compact and modular design and a host of life cycle services ensure ABB PVS980 central inverters provide a rapid return on investment.

PVS980 inverters feature a proven closed loop cooling system used already in other ABB industrial applications. This innovative, truly low-maintenance cooling solution is designed for demanding applications and harsh environments, cutting maintenance costs and ensuring outstanding endurance.

High total performance

- High efficiency
- Low auxiliary power consumption
- Innovative controlled cooling
- Efficient maximum power point tracking
- Long and reliable service life of at least 25 years

Outstanding endurance for outdoor use

- Water- and dustproof outdoor enclosure
- Designed to withstand the toughest environments
- Long and reliable service life following the ABB life cycle model

Modular industrial design

- Compact and easy-to-maintain product design
- Fast and easy installation
- Integrated and flexible DC input section

Life cycle service and support

- ABB's extensive global service network
- Extended warranties
- Service contracts
- Technical support throughout the service life

ABB self-contained, low-maintenance cooling system

- Closed loop cooling system based on phase transition and thermosiphon technology
- Liquid-cooled inverter power ratings with the simplicity of air cooling
- No fillable liquids, pumps, valves, inhibitors or leaks
- Low maintenance

Versatile design for largescale PV plants

- Integrated DC connection with variable number of inputs
- Wide standard option palette for tailoring
- Versatile AC connection methods

Minimizes system costs

- 1500 Vdc system voltage
- Wide ranged and highly efficient MPPT algorithm
- Integrated protection to minimize external components
- Fast and easy installation and commissioning

Wide communication options

- Complete range of industrial data communication options for SCADA connections
- Ethernet/Internet Protocol
- Remote monitoring

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ABB central inverter (1500 Vdc)

PVS980-58 – up to 5000 kVA

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01, 02 The new high power
ABB central inverter,
PVS980-58 – an
outdoor inverter with
robust enclosure

The new high power ABB central inverters raise the performance, cost efficiency and ease of installation to new levels. The inverters are aimed at system integrators and end users who require high-performance solar inverters for large photovoltaic (PV) power plants. PVS980-58 central inverters are now available from 4348 kVA up to 5000 kVA, and are optimized for multi-megawatt power plants.

World's leading inverter platform

Like other ABB central inverters, the PVS980-58 has been developed on the basis of decades of experience in the industry and proven technology platform. Unrivalled expertise from the world's market and technology leader in frequency converters is the hallmark of this solar inverter series.

The PVS980-58 inverter is one of the most efficient and cost-effective ways of converting the direct current (DC) generated by solar modules into high quality and CO₂-free alternating current (AC) that can be fed into the power distribution network.

PVS980-58 central inverters from ABB

ABB PVS980-58 central inverters are ideal for large PV power plants. The high DC input voltage, high efficiency, proven components, compact and modular design and a host of life cycle services ensure ABB PVS980-58 central inverters provide a rapid return on investment. New extended power range along with fast site installation raises the total cost efficiency to a new level.

Highlights

- High total performance
- Modular product design
- High DC input voltage up to 1500 V_{DC}
- Extensive DC and AC side protection
- Easy to commission, no separate chiller installation
- Fast and easy AC coupling to transformer by busbars
- Versatile design for large-scale PV plants to minimize system costs
- Complete range of industrial data communication options, including remote monitoring
- Life cycle service and support through ABB's extensive global service network



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Central inverter solutions

High performance optimized plug and play stations

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01 ABB solutions
for central inverters:
ABB compact skid
PVS980-CS, ABB inverter
station PVS800-IS
and ABB medium
voltage pad mounted
solution PVS980-MVP

For large multi-megawatt PV power plants
ABB central inverter solutions offer the most cost-effective solution by feeding electricity directly to the medium voltage (MV) grid.
ABB's offering for large plants includes complete plug and play stations with inverters and MV components, inverter stations for indoor inverters as well as separate MV solutions to supplement the outdoor inverters and inverter stations. Both complete stations and MV solutions are available in different designs, to provide the most feasible solutions for every weather and site condition.

ABB integrated solutions for central inverters

- Inverter stations with ratings from 1645 kW up to 4156 kW
- MV solutions for connecting outdoor inverters and inverter stations to the grid, with ratings from 1818 kVA up to 5000 kVA
- Turnkey stations with inverters, transformer and switchgear, with ratings from 1818 kVA up to 5000 kVA





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ABB inverter station (1000 Vdc)

PVS800-IS – up to 4156 kW

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01 ABB inverter station,
PVS800-IS, from
1645 kW up to 4156 kW
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02 Inside view of
ABB inverter station,
PVS800-IS, from
1645 kW up to 4156 kW

The ABB inverter station is a compact turnkey solution designed for large-scale solar power generation. It houses all equipment that is needed to rapidly connect ABB central inverters to a medium voltage (MV) transformer station.

Turnkey solution for photovoltaic (PV) power plants

The ABB inverter station design capitalizes on ABB's long experience in the development and manufacture of secondary substations for electrical authorities and major end-users worldwide in conventional power transmission installations. The station houses two ABB central inverters and embedded auxiliary power, monitoring and air filtration systems.

It enables easy and rapid connection to an MV transformer station. Depending on the size of the PV power plant, several ABB inverter stations can be used to meet the capacity need.

Proven design with long operating life

The housing is based on a standard, insulated, steel-framed shipping container. The total package weighs only 10-16 metric tons, depending on the power rating. The optimized shipping container solution ensures cost-effective and safe transportability to the site. The station's optimized air circulation and filtering system together with thermal insulation enable operation in harsh temperature and humidity environments. The inverter station is designed for at least 25 years of operation.

Highlights

- Proven technology and reliable components
- Standard and robust design
- Protected working interior
- Modular and redundant system
- Easy connection to any MV station
- Extendable manufacturing footprint with fast deliveries
- Embedded auxiliary power distribution system
- Double-stage air pre-filtering for reduced maintenance
- Life cycle service and support through ABB's extensive global service network

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ABB medium voltage pad (1000 and 1500 Vdc)

PVS800/980-MVP – up to 10000 kVA

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01 ABB medium voltage
pad mounted solution
PVS800/980-MVP for
PVS800-IS inverter
station and PVS980
central inverter

ABB medium voltage pad mounted solution is designed for large-scale solar power generation and to be compatible with PVS800-IS inverter station and PVS980 outdoor central inverter. The solution contains the medium voltage step-up transformer and the medium voltage switchgear equipment needed to rapidly install and connect the inverters to the medium voltage network of the photovoltaic plant. All components within the pad mounted solution come from ABB's product portfolio to meet the performance and quality standards required for solar applications.

Cost-efficient plug and play solution for PV power plants

The ABB medium voltage pad design capitalizes on ABB's long experience in developing and manufacturing secondary substations for utilities and major end users worldwide in conventional power transmission installations. The solution contains an optimized transformer, MV switchgear and signaling interfaces for the central inverter. PVS800-IS inverter station or PVS980 outdoor inverter together with the medium voltage pad mounted solution ensure easy and rapid connection of the central inverters to a plant's medium voltage network and its monitoring and communication system.

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02 ABB medium voltage
pad mounted solution,
PVS980-MVP, with two
PVS980 central inverters

Modular design for easy transportation

The pad mounted solution is designed for easiness of transportation and allowing to use in an optimum manner ABB production footprint. The solution is to be wired on-site. The pad mounted solution is available with oil type transformer. The design enables operation in harsh temperature and humidity environments and is designed for at least 25 years of operation. All components used come from the ABB product range to ensure compatibility. The pad mounted solution components can be lifted with a standard truck crane, thereby simplifying transportation and installation at the site with a minimal free footprint and installation area needed around the power block. The solution also allows to optimize timing of the solar

array cabling to the inverters as well as MV cabling before the transformer arrives. Pad mounted solution can utilize also more freely ABB's wide global manufacturing footprint.

Highlights

- Proven components from one supplier
 - reliability
- Compact and robust design
 - transportability
- Integrated signaling interfaces
 - plug and play
- Modular and serviceable system
 - increased uptime
- Global life cycle services and support
 - bankable solution

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ABB compact skid (1500 Vdc)

PVS980-CS – up to 4600 kVA

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01 ABB compact skid, PVS980-CS, with two PVS980 central inverters, MV transformer and MV switchgear

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02 ABB compact skid, PVS980-CS – a compact plug and play solution transportable inside a 40 feet High Cube container

The ABB compact skid is a compact plug and play solution designed for large-scale solar power generation. The station houses all the electrical equipment that is needed to rapidly connect a photovoltaic (PV) power plant to a medium voltage (MV) electricity grid.

All components within the ABB compact skid come from ABB's product portfolio to meet the performance and quality standards required for solar applications.

Turnkey-solution for PV power plants

The station houses two outdoor 1500 Vdc ABB central inverters, an optimized ABB oil immersed transformer and a MV switchgear (widely proven ABB SafeRing).

The ABB compact skid is used to connect a PV power plant to a MV electricity grid easily and rapidly. To meet the PV power plant's demanded capacity, several ABB compact skids can be used. All equipment is designed and optimized to provide the best performance throughout the lifetime of the plant. PVS980 turnkey solution ensures a very rapid, efficient and reliable connection to a plant's MV grid.

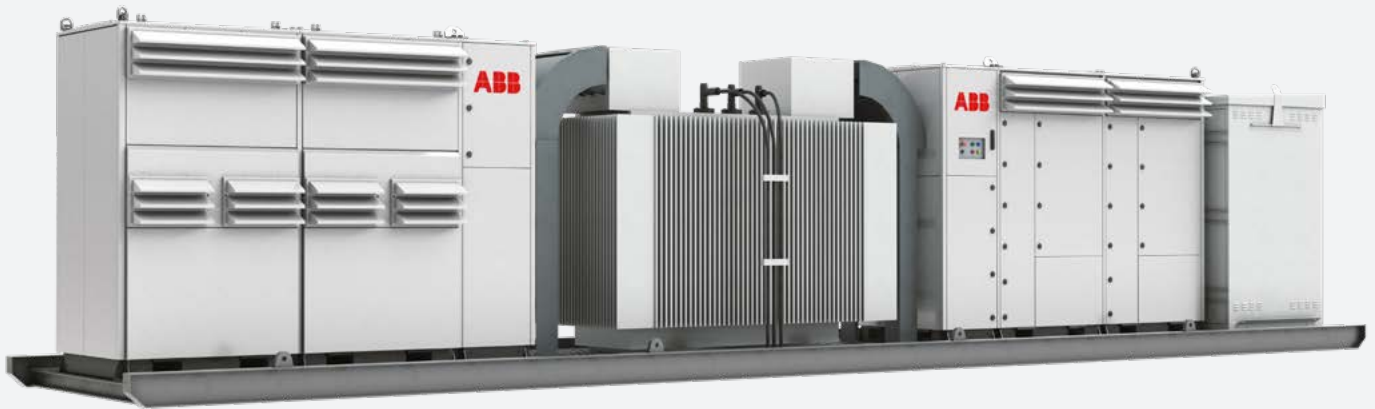
Compact design eases transportation

The compact skid solution has dimensions suitable for transportation inside closed 40 feet High Cube shipping container. The total package weighs less than 30 metric tons.

The standardized shipping dimensions ensure cost-effective and safe transportability to the site even overseas. Inverter's optimized air circulation and filtering system together with hermetically sealed oil immersed transformer enable installations to various ambient conditions, from harsh desert temperatures to cold and humid environments. The ABB compact skid is designed for at least 25 years of operation.

Highlights

- Proven technology and reliable components
- Compact and robust design – transportability
- High total efficiency
- Outstanding endurance for outdoor use
- High DC input voltage up to 1500 Vdc
- Extensive DC and AC side protection
- Self-contained cooling system for inverters
- Embedded auxiliary power distribution system
- Modular and serviceable system
- Global life cycle services and support
 - bankable solution



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ABB compact skid for US market (1500 Vdc)

PVS980-CS-US – up to 4400 kVA

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01 ABB compact skid,
PVS980-CS-US,
for US markets

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02 ABB compact skid,
PVS980-CS-US, for rapid
MV network connection

The ABB medium voltage compact skid is a cost-efficient and robust US market solution designed for large-scale solar power generation using PVS980 outdoor inverters. It includes the medium voltage transformer and protections needed to connect the inverters to the medium voltage network of the photovoltaic plant. All components within this medium voltage skid come from ABB's product portfolio to meet the performance and quality standards required for solar applications.

Solution

The ABB medium voltage skid mounted design capitalizes on ABB's long experience in developing and manufacturing medium voltage components for utility-scale solutions for major end-users worldwide. The solution contains an optimized transformer with integrated medium voltage side fusing, optional DC disconnection cabinet and signaling interfaces for the PVS980 inverter.

The solution is made to meet the safety and electrical installation standards for USA markets. All components used are from the ABB product range to ensure compatibility. LV connection is made with close coupling to inverter to minimize on-site installation. The design is optimized to provide cost-effective transportation as well as fast and easy installation on site.

The pre-designed skid type foundation layouts for the outdoor type ANSI ONAN type oil transformer optimize the foot print needed and also minimize the cost and on-site works needed. The compact skid structure can serve also as a leakage reservoir for the transformer oil.

The transformer is designed and optimized for PVS980 central inverters and for photovoltaic plant load profile to provide the best performance throughout the lifetime of the plant.

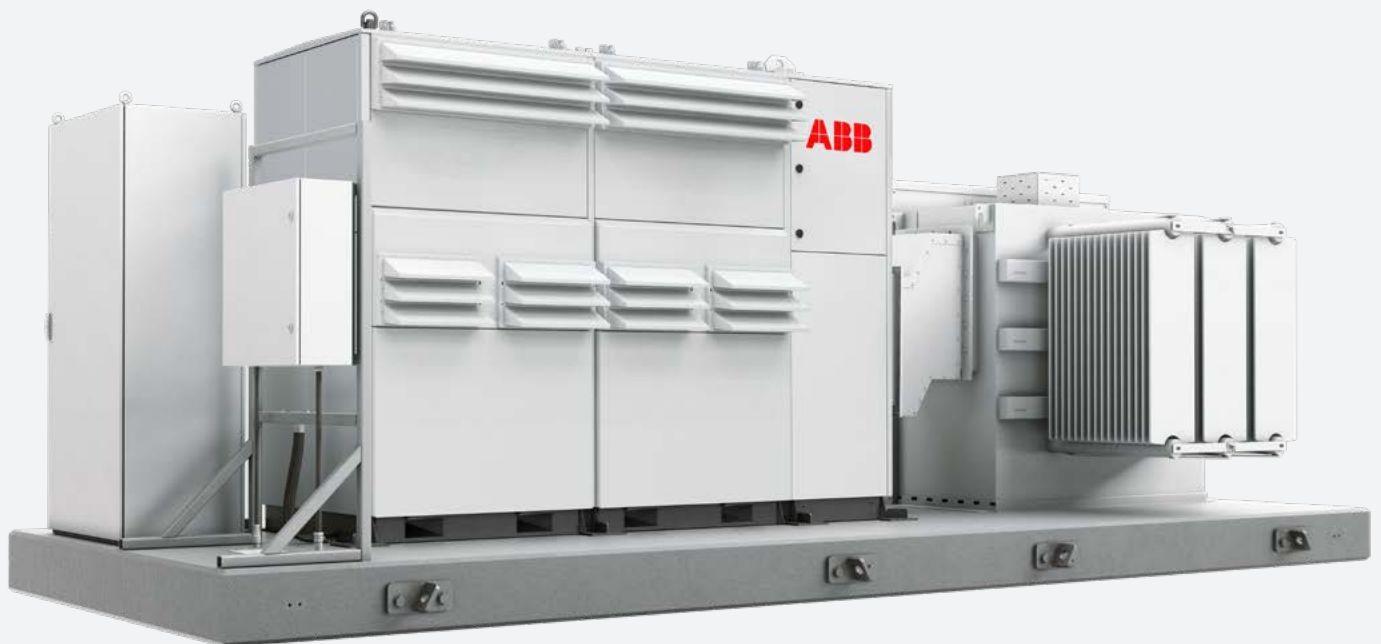
The transformer is also designed to meet the reliability, durability, and efficiency required in PV applications. Transformers are available in standard sizes that are based on optimized power ratings to meet different climatic conditions and inverter station sizes. The transformers as well as the general design provide excellent mechanical and short-circuit characteristics. All ABB's transformers are manufactured in accordance with the most demanding industry and ANSI standards.

Compact and robust design for harsh environments

This skid mounted solution is pre-assembled on a factory built steel or concrete foundation. The design enables operation in harsh temperature and humidity environments and is designed for at least 25 years of operation. The ABB medium voltage skid mounted solution supports fast on-site installation and it is easy to transport. Transport of the skid can be done with a standard truck and lifted to site as one transport unit, which simplifies the installation. Together with pre-configured layout options a minimal footprint and optimum cabling can be achieved.

Highlights

- Reliability – proven components from one supplier
- Transportability – compact and robust design
- Plug and play – integrated signaling interfaces
- Increased uptime – modular and serviceable system
- Bankable solution – global life cycle services and support

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String combiners for solar photovoltaic systems

A plug and play solution for photovoltaic solar installations

01 String combiners range

02 1500 Vdc string combiner with monitoring

In a photovoltaic system the modules are arranged in strings and fields depending on the type of inverter used, the total power and the technical characteristics of the modules. The connection of modules in series is made on the modules themselves, while the parallel connection of the strings is made inside string boxes that accommodate, along with the interconnection systems, also the overcurrent protection devices, disconnectors and surge protection devices. The string boxes form subsystems that can be standardized according to the number of strings, voltage and rated current. ABB offers different product ranges, each dedicated to specific installation conditions with typical configurations.

String boxes without monitoring

The installation of a photovoltaic system often occurs in complex logistic situations, critical from the environmental and time perspective. The availability of tested and certified pre-assembled components allows the installer to avoid unnecessary on-site assembly, wiring and certification activities for the string boxes. String boxes enclose functions such as string protection, protection against overvoltage and disconnect, with components suitable for the string's various voltage levels and the number of connected strings.

String boxes with monitoring

The string monitoring is an important function in running medium and large size installations, since it allows to improve the efficiency and

maintenance of the system. ABB offers a series of pre-wired string boxes for all installation conditions: they are equipped both with devices necessary for string protection, surge protection and disconnection, and with components for string current and monitoring as standard. Optionally we can also integrate to measure voltage inside the combiners.

Design, production, quality and service

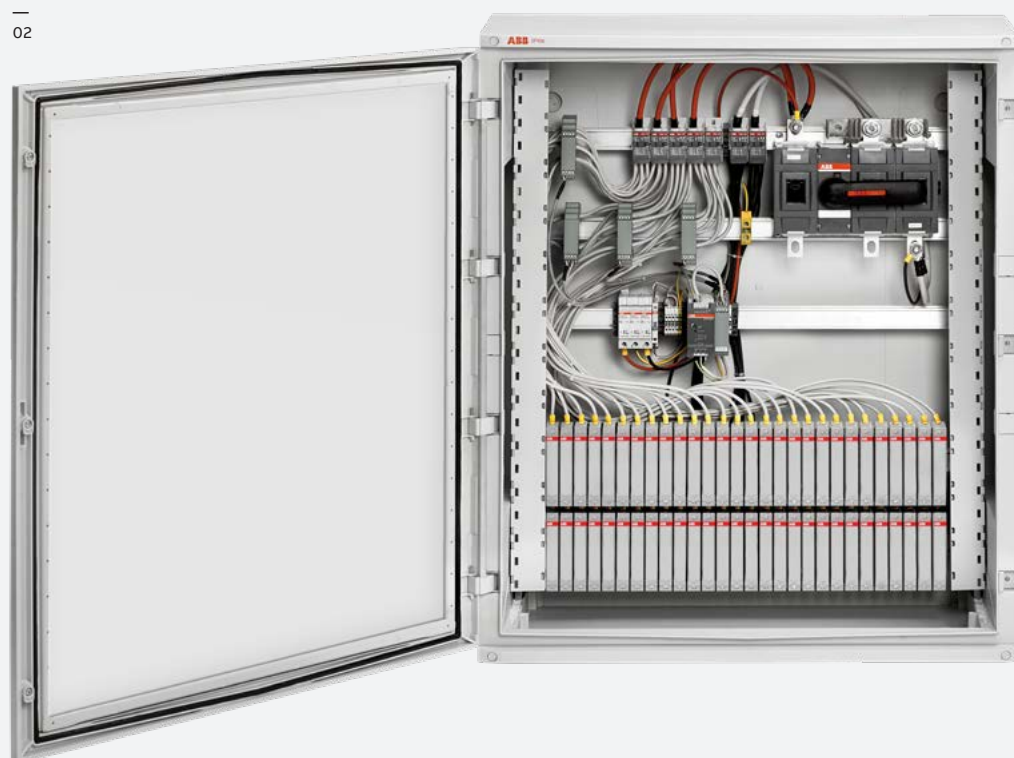
An essential factor in determining the success of a photovoltaic system is the accurate selection of its components, with particular attention to connections, and protections from the modules to the inverters. As the photovoltaic system has to perform for more than 25 years in harsh environments, the products used should be considered of high quality and as a good investment for long lasting performance.

The string combiners are particularly important as they are usually installed under the photovoltaic panels and therefore exposed to the most harsh environment.

- ABB combiners host ABB components specifically made for photovoltaic applications, making it easy during maintenance to rely on one single producer and supplier, from components to the whole system
- Capacity to deliver all over the world at your site
- Comprehensive documentation for easy assembly at site
- Service and support through ABB local sales organization worldwide



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String inverters and inverter solutions

Smart quality at work for you

The future of energy is anchored to renewable energy sources like photovoltaics that have already driven the transformation in the way energy is produced, consumed and provided through modern distribution grids. Photovoltaics are already one of the most cost-effective energy sources in many regions of the world. When they complement with digital technologies the benefits for users are at the maximum scale.

ABB's offering includes three-phase string inverters as well as string inverter solutions with MV stations. The string inverter solutions can be used in PV power plants of commercial and industrial buildings as well as in ground mounted applications.

String inverters for commercial and industrial building applications – bright future ahead for decentralized power generation

Designed to optimize the total cost of ownership in PV projects, our inverters guarantee high total efficiency and reliability. The high power density and reduced installation and maintenance efforts enhance overall cost efficiency.

Thanks to their modularity and flexibility, our commercial and industrial inverters are the ideal solution for simplified system planning and design.

Complete string inverter solutions

– decentralized energy at its full potential

Economically attractive solutions can also be built in remote locations or places where land shapes create additional challenges for the plant design. Even multi-megawatt size installations can be designed with technically and economically cost-effective results, thanks to our complete string inverter solutions. They include all MV components as well as a series of cloud based advanced communications services, which simplify the integration in smart environments. Thanks to our string inverter solutions for decentralized commercial and industrial applications, many companies can achieve greater efficiency and sustainable growth, today and tomorrow.

ABB string inverter solutions

– features and benefits

- Configurable all-in-one design with built-in and monitored protection devices
 - reduced system cost
- Wide input voltage range with multiple MPP trackers
 - flexibility for system designers
- High total efficiency
 - rapid return on investment
- Advanced grid support functions
 - compatibility with grid codes
- Safe and intuitive user and service interface
 - fast and easy commissioning
- Robust enclosure, with IP65 rating
 - suitable for outdoor installation



ABB string inverter (1000 Vdc)

PVS-100/120-TL – up to 120 kW

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01 ABB string inverter
PVS-100/120-TL

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02 ABB string inverter
PVS-100/120-TL
communication
principle

The PVS-100/120-TL is ABB's cloud connected three-phase string solution for cost efficient decentralized photovoltaic systems for both ground mounted and large commercial applications.

This completely new platform, for extreme high power string inverters with power ratings up to 120 kW, maximizes the ROI for decentralized ground-mounted and large rooftop applications. With six MPPT energy harvesting is optimized even in shading situations.

Extreme power with high integration level

The extreme high power module up to 120 kW saves installation resources as less units are required. Due to its compact size further savings are generated in logistics and in maintenance. Thanks to the integrated DC/AC disconnection, 24 string connections, fuses and surge protection no additional boxes are required.

Ease of installation

The horizontal and vertical mounting possibility creates flexibility for both ground-mounted and rooftop installations. Covers are equipped with hinges and locks that are fast to open and reduce the risk of damaging the chassis and interior components when commissioning and performing maintenance actions.

Standard wireless access from any mobile device makes the configuration of inverter and plant easier and faster. Improved user experience thanks to a built-in User Interface (UI) enables access to advanced inverter configuration settings.

The installer mobile APP, available for Android/iOS devices, further simplifies multi-inverter installations.

The design supports both copper and aluminum cabling even up to 185 mm² cross section to minimize the energy losses.

Fast system integration

Industry standard Modbus/SUNSPEC protocol enables fast system integration. Two ethernet ports enable fast and future proof communication for PV plants.

ABB plant portfolio integration

Monitoring your assets is made easy as every inverter is capable to connect to ABB plant portfolio manager to secure your assets and profitability in long term.

Design flexibility and shade tolerance

The double stage conversion topology and six MPPT guarantee maximum flexibility for the system design on rooftops or hilly ground. With this technological choice energy harvesting is optimized even in shading situations.

Highlights

- 6 independent MPPT
- Transformerless inverter
- 120 kW for 480 Vac and 100 kW for 400 Vac
- Wi-Fi as standard for configuration
- Two ethernet ports for plant level communication
- Large set of specific grid codes available which can be selected directly in the field
- Double stage topology for a wide input range
- Both vertical and horizontal installation
- Separate wiring compartment for fast swap and replacement
- IP66 environmental protection
- Maximum efficiency up to 98.9%



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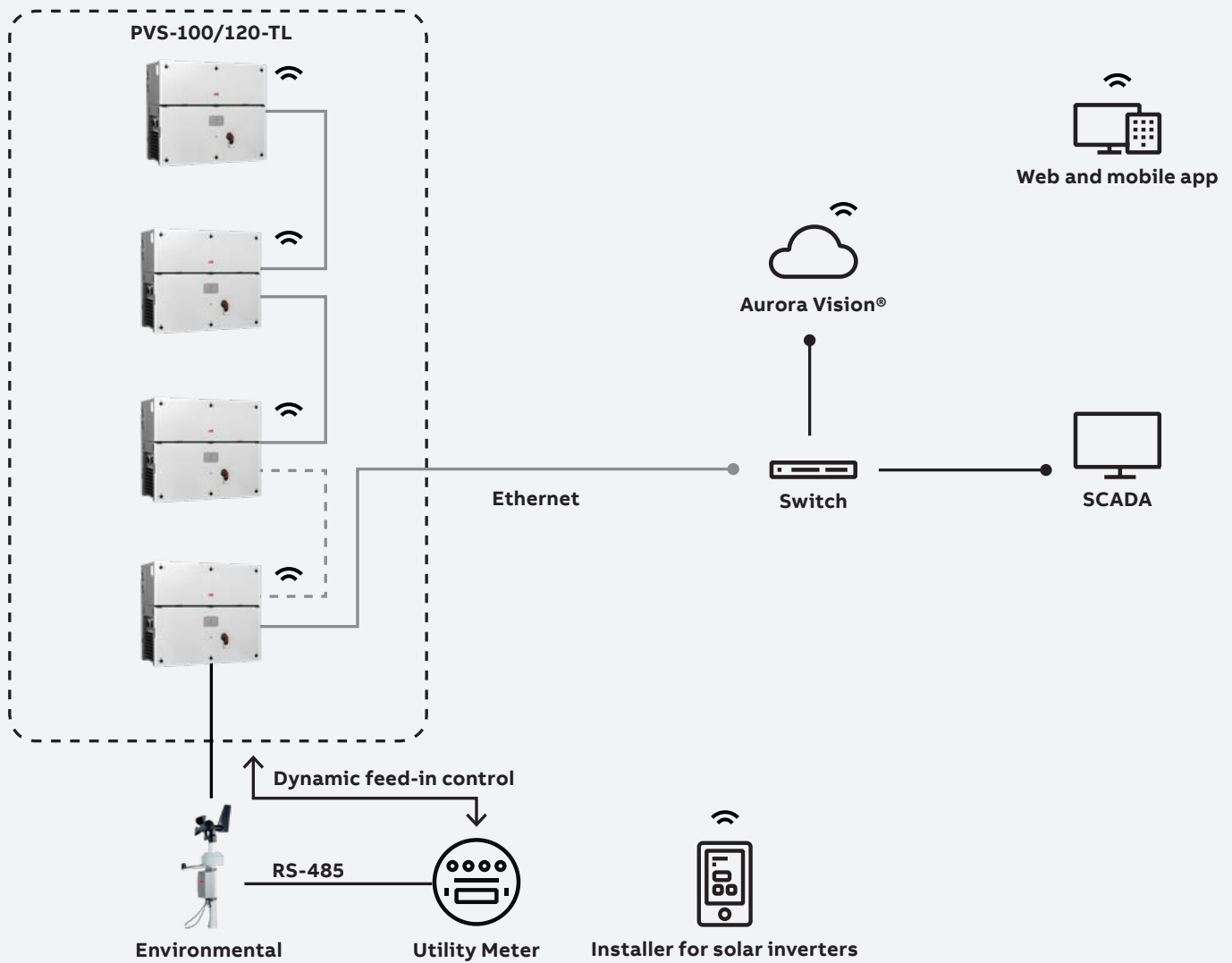


ABB string inverter (1500 Vdc)

PVS-175-TL – up to 185 kW

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01 ABB string inverter
PVS-175-TL

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02 ABB string inverter
PVS-175-TL
communication
principle

The PVS-175-TL is ABB's innovative three-phase string inverter, delivering a six-in-one solution to enhance and optimize solar power generation for ground-mounted utility scale applications.

High power density

This new high-power string inverter with the highest power density within the 1500 Vdc segment, delivers up to 185 kVA at 800 Vac. This not only maximizes the ROI for ground-mounted utility-scale applications but also reduces Balance of System costs (i.e. AC side cabling) for small to large-scale, free field ground-mounted PV installations.

Design flexibility

The inverter comes equipped with 12 MPPT, the highest available in the market, assuring maximum PV plant design flexibility and increasing yields also in case of complex installations.

Installer friendly design

Quick and easy installation, thanks to plug and play connectors, as the existing PV module's mounting systems can be used to install the inverters, thus saving time and cost on site preparation and hire of plant.

The fuse and combiner free design eliminates the need for external components, such as separate DC combiner boxes and AC first level combiners, thanks to the integrated DC disconnect and AC wiring compartment with optional AC disconnect.

The Advanced Cooling Concept preserves the lifetime of the system and minimizes O&M costs thanks to internal heavy-duty inverter cooling fans. These can be easily removed during scheduled maintenance cycles whilst the power module can be easily replaced without removing the wiring box.

Advanced communication for O&M

Standard wireless access from any mobile device makes the configuration of inverter and plant easier and faster. Improved user experience thanks to a built-in User Interface (UI) enables access to advanced inverter configuration settings.

The Installer for Solar Inverters mobile APP and configuration wizard enable a quick multi-inverter installation and commissioning thus reducing the time spent on site.

Fast system integration

Industry standard Modbus (RTU/TCP)/SUNSPEC protocol enables fast system integration. Two Ethernet ports enable fast and future-proof communication for PV plants.

Protect your assets

Monitoring your assets is made easy, as every inverter is capable to connect to ABB cloud platform and thanks to the state-of-the-art cybersecurity and Arc Fault Detection option, your assets and profitability are secure in the long term.

Highlights

- Up to 185 kW power rating, highest in class
- All-in-one combiner and fuse free design
- Separate power module and wiring compartment for fast swap and replacement
- Easy access to consumables for fast inspection and replacement
- 12 MPPT and wide input voltage range for maximum energy yield
- WLAN interface for commissioning and configuration
- Remote monitoring and firmware upgrade via ABB cloud platform (logger free)
- Free of charge standard access to Aurora Vision® cloud



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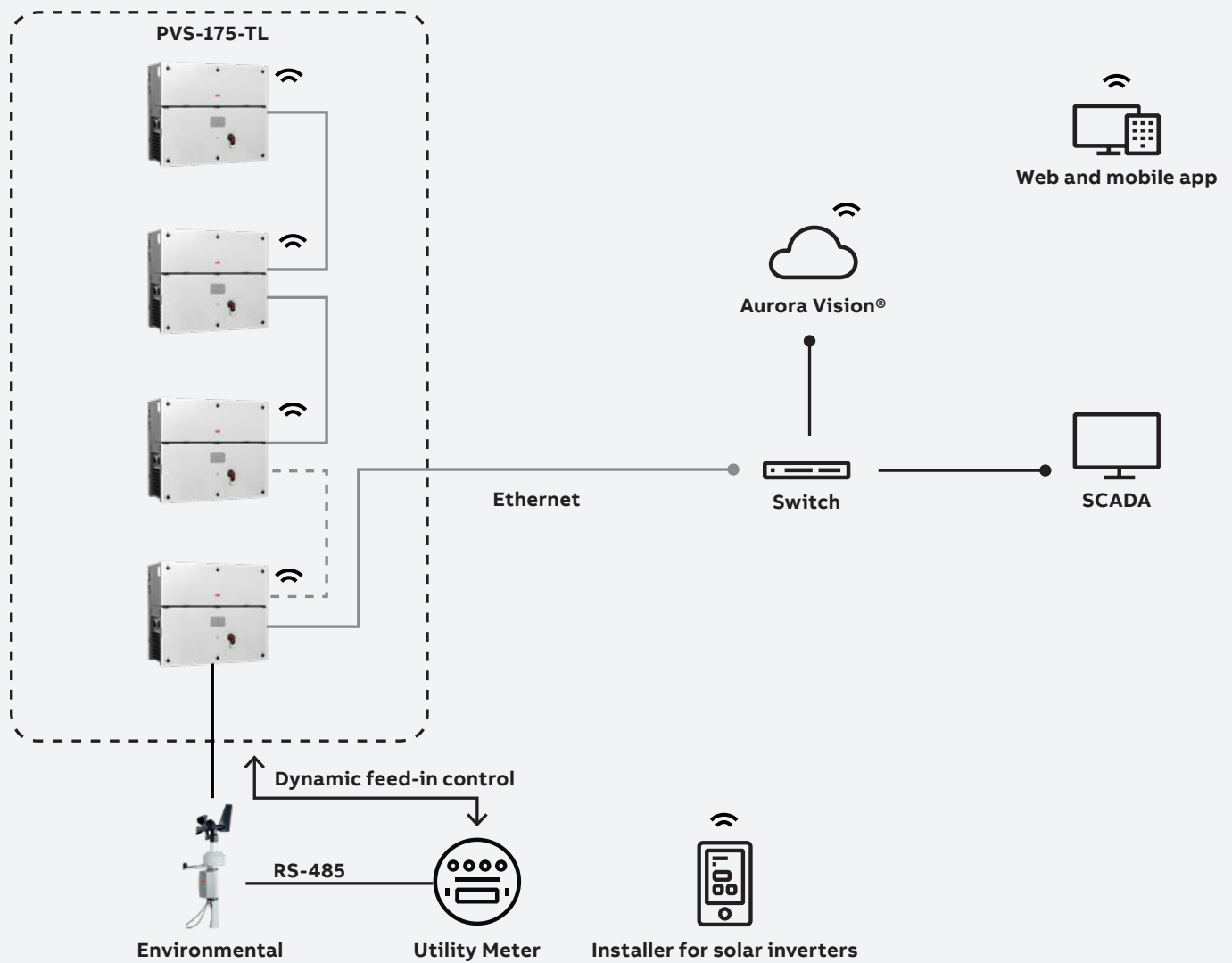


ABB medium voltage compact skid (1000 Vdc)

PVS-100/120-MVCS – up to 3120 kW

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PVS-100/120-MVCS

The ABB medium voltage compact skid is a plug and play solution designed for large-scale solar power generation using PVS-100/120 high-power string inverters. It includes the medium voltage transformer, the medium voltage switchgear and all low voltage protections needed to connect the inverters to the transformer.

The PVS-100/120-MVCS is an integrated product specifically engineered for decentralized solar plants realized with ABB PVS-100/120 string inverters. The solution allows to connect up to 26 inverters for a maximum power of 3120 kW.

The MVCS includes an optimized MV oil-immersed transformer, MV gas-insulated switchgear, all necessary LV protections and connections to attach the solar array and a set of available auxiliary services with independent auxiliary power.

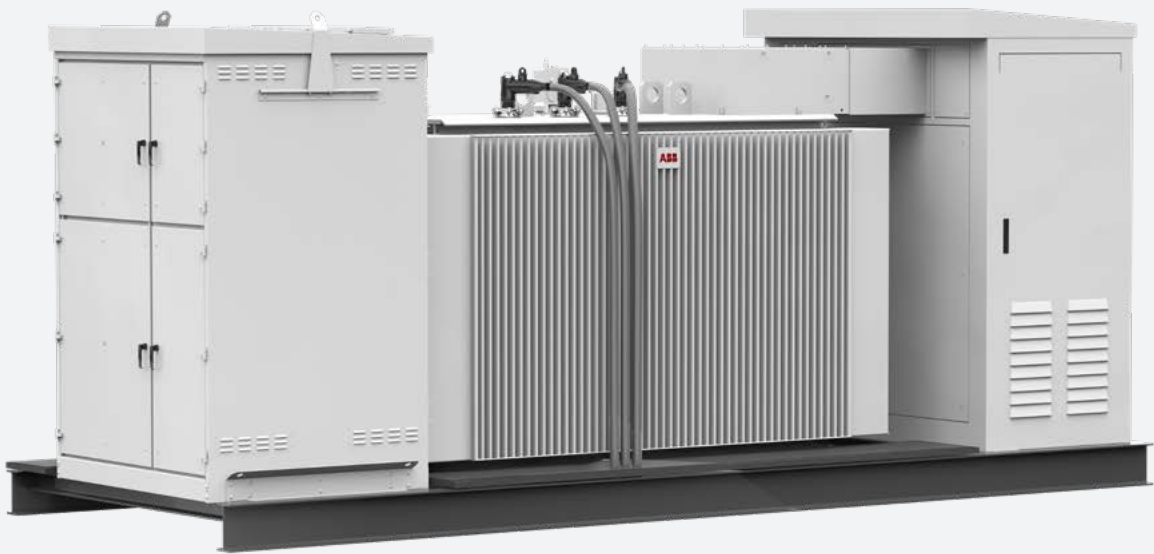
Components are part of ABB's portfolio, ensuring the highest standards of quality, performance and durability.

This medium voltage compact skid is used to connect a PV power plant to a MV electricity grid easily and rapidly. To meet the PV power plant's demanded capacity, several ABB compact skids can be used and connected in any possible manner thanks to the versatility of the integrated ABB SafePlus MV switchgear.

The compact skid solution has dimensions suitable for transportation inside a closed 20 feet high cube shipping container. The standardized shipping dimensions ensure cost-effective and safe transportability to the site, even overseas. The solution's optimized cooling, filtering and high environmental protection degree enable installations in a wide span of ambient conditions, from harsh desert temperatures to cold and humid environments. The ABB medium voltage compact skid is designed for at least 25 years of operation.

Highlights

- Designed for decentralized systems based on the 1000 Vdc string inverter PVS-100/120-TL
- Integrated low voltage distribution panel for a simplified and cost optimized Balance of System (BoS) without the need of additional recombiners
- Quick individual isolation of each feeder, even on-load, for easy and cost-effective maintenance, ensuring maximum uptime
- Individually-protected feeders, enabling separate inverters to be serviced without disrupting the rest of the units connected to the same cluster
- Optimized and very compact layout for integration of all components necessary for medium voltage connection
- Standardized shipping dimensions ensure reduced logistic costs
- Made in Europe product, compatible with most of the world-wide structural regulations and standards
- Vertically integrated product from ABB, guaranteed by ABB



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ABB medium voltage compact skid (1500 Vdc)

PVS-175-MVCS – up to 6660 kW

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PVS-175-MVCS

The ABB medium voltage compact skid is a plug and play solution designed for large-scale solar power generation using PVS-175 high-power string inverters. It includes the medium voltage (MV) transformer, the medium voltage switchgear and all low voltage (LV) protections needed to connect the inverters to the transformer.

The PVS-175-MVCS is an integrated product specifically engineered for decentralized solar plants realized with ABB PVS-175 string inverters. The solution allows to connect up to 36 inverters for a maximum power of 6660 kW.

The MVCS includes an optimized MV oil-immersed transformer, MV gas-insulated switchgear, all necessary LV protections and connections to attach the solar array and a set of available auxiliary services with independent auxiliary power.

Components are part of ABB's portfolio, ensuring the highest standards of quality, performance and durability.

This medium voltage compact skid is used to connect a PV power plant to a MV electricity grid easily and rapidly. To meet the PV power plant's demanded capacity, several ABB compact skids can be used and connected in any possible manner thanks to the versatility of the integrated ABB SafePlus MV switchgear.

The compact skid solution has dimensions suitable for transportation inside a closed 20 feet

high cube shipping container. The standardized shipping dimensions ensure cost-effective and safe transportability to the site, even overseas. The solution's optimized cooling, filtering and high environmental protection degree enable installations in a wide span of ambient conditions, from harsh desert temperatures to cold and humid environments. The ABB medium voltage compact skid is designed for at least 25 years of operation.

Highlights

- Designed for decentralized systems based on the award-winning 1500 Vdc string inverter PVS-175-TL
- Integrated low voltage distribution panel for a simplified and cost optimized Balance of System (BoS) without the need of additional recombiners
- Quick individual isolation of each feeder, even on-load, for easy and cost-effective maintenance, ensuring maximum uptime
- Individually-protected feeders, enabling separate inverters to be serviced without disrupting the rest of the units connected to the same cluster
- Optimized and very compact layout for integration of all components necessary for medium voltage connection
- Standardized shipping dimensions ensure reduced logistic costs
- Made in Europe product, compatible with most of the world-wide structural regulations and standards
- Vertically integrated product from ABB, guaranteed by ABB



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Control and monitoring solutions

Connecting your needs with our experience

ABB's solar inverter solutions are complemented with control and monitoring solutions based on decades of knowledge and practical experience in vast variety of applications.

This vast experience is channeled now to create dedicated and optimized products for different types of monitoring and control needs. Thus, control and monitoring solutions can be easily utilized with ABB solar inverters for large and medium size solar power systems. Furthermore, the modular design of the control and monitoring solutions means that the options can be fitted to the system during the initial installation or any time.

Selection of options

Control, monitoring, configuring or diagnosing the status of the solar power plant is easily carried out within an ABB monitoring system, either locally on site or remotely, via various levels. At its simplest, an ABB solar inverter can be accessed via its control unit to undertake configuration changes or performance evaluations locally. ABB's sophisticated SCADA solutions allow large multiple inverter systems to be monitored and controlled from local control room or via remotely.

Centralized monitoring room

ABB SCADA with remote monitoring options integrates PV power plants located in remote, inaccessible or unmanned areas making asset management and service actions easier to plan and follow. Users with multiple sites benefit by being able to view performance of each solar site from one central location. It also allows OEMs and system integrators to offer their customers the ability to check up on any plant, anywhere in the world at any time of the day. Smooth integration with ABB remote monitoring options enables rapid commissioning for system integrators and saves installation costs.

Plant under control

Scalable ABB solar power plant controllers are programmed to acquire information at all levels of the plant including plant's point of connection, MV stations and inverters. Controller features all the most common control algorithms and covers all the required grid code functions which together with ABB solar inverters secure the plant compatibility with local requirements.

Secure performance

Included among the data that can be monitored, configured or analyzed are inverter parameters, module string performance, energy production and weather data. All of this helps the user to improve performance of the power plant and maximize the return on investment, whatever form of data communication is chosen.





Control and monitoring solutions

For medium and large power plants



ABB offers a range of automation solutions and plant controllers for solar power plants. For medium and large-scale solar power plants, the versatile and scalable automation solutions span from plant automation including panel position control, plant diagnostics and power management, going up to enterprise SCADA to enabling remote operations & management of PV plants. For smaller plants, simpler cost-effective ABB monitoring solutions are available. ABB inverters are also compatible with major 3rd party monitoring and control solutions.

Plant automation solutions

ABB monitoring solution for solar provides a SCADA system for monitoring all key plant components, from PV panels (with and without tracking systems) to the inverters, transformers and switchgear, grid connection and meteorological stations. It supports a broad range of communication protocols like Modbus TCP, OPC, IEC 6087-5-104, enabling it to connect and exchange data with all plant components. With a real-time database and a historian, relevant plant data can be acquired and either stored on site, or forwarded to a remote management center.

One of the key differentiators of ABB monitoring solutions is the capability to monitor and control plant and substation equipment using the IEC 61850 protocol. This enables ABB's solution to integrate generation and electrical components into a single information and control system. With the built-in interlocking schemes, secure and easy operation of the protection equipment in the plant or at the grid, connection is achieved, from site or remote.

An ergonomic human-machine interface (HMI) designed by our scientists together with our customers facilitates immediate observations of field problems and enables fast operator reactions. The HMI allows operation of all plant equipment and increases effectiveness due to its real time update features.

Power management

The heart of the automation solution is the power plant controller that secures the grid code compliance and seamless integration of the plant into the grid. ABB plant controller controls the power production of the plant according to grid codes applicable in the country where the plant is located. ABB's control solution for PV solar plants manages active and reactive power, power factor and also provides voltage and frequency control.

A high-performance controller is connected to all relevant actuators (inverters, tracking systems and – if applicable – capacitor banks, STATCOMs or energy storage), and performs real-time calculations to regulate the plant's power production in accordance with the specifications.

Power management features:

- Central plant controller coordinates all inverters to achieve the required control procedure
- Provides reactive power, power factor or voltage control at the point of connection to the utility grid
- Limits power production of the plant according to required set-point
- Accounts for outages and scheduled maintenance of the inverters.

Remote monitoring and asset management

Plant owners need to minimize O&M costs by quickly identifying underperforming components, use predictive maintenance to reduce downtime, extend equipment life cycles and evaluate the impact of equipment failure. They also require speedy access to service engineers and product experts.

ABB automation solution support these requirements through following features:

- Alarms and notifications
- Dynamic presentation of collected data
- Predictive maintenance
- Production and performance cockpits reporting and ticketing system security.

Life cycle services for solar inverters

Optimizing the performance of your solar plant

The ABB solar service offering spans over the whole lifetime of the solar power plant. To support this, ABB has developed a life cycle management model aimed at providing proactive services to maximize availability and performance. This model provides optimum support to end users over the whole lifetime of the solar power plant securing the value of solar power plant assets to the owner.

Pre-purchase

ABB pre-sales support helps our customers to select the right inverter and services for their applications. This ensures higher yield and performance of the entire system and compatibility with customer requirements.

Order and delivery

Orders can be placed through any ABB office, and spare parts can also be ordered online through the web. Our sales and service network offers timely deliveries worldwide.

Installation and commissioning

ABB certified engineers can advise or undertake the commissioning of the solar inverters and supervise the installation.

Operation and maintenance

ABB helps to ensure a long lifetime for its solar inverters by providing on-site preventive maintenance. Preventive maintenance consists of annual inspections and component replacements according to specific maintenance schedules. Reconditioning provides more in-depth maintenance which is carried out at ABB's authorized service workshops. Reconditioning of the solar inverter includes full inspection, thorough cleaning, individual component analysis and replacement, and complete testing.

Upgrade and retrofit

We can advise on the latest hardware and software upgrades that can continue to maximize the performance of your solar inverters even if the grid codes change.

Life cycle model

The Life cycle model divides a product's life cycle into four phases: active, classic, limited and obsolete. Each phase has different implications for the end user in terms of services provided.

Benefits of life cycle management

Life cycle management maximizes the value of the solar inverter and its maintenance investments by:

- Ensuring spare parts and ABB competence availability throughout the lifetime
- Enabling efficient product support and maintenance for improved reliability
- Adding functionality to the initial product by upgrading or retrofitting
- Providing a smooth transition to new technology at the end of the product lifetime

ABB Solar Care is a modular set of services for predictable care of your asset and peace of mind over the full lifetime of the solar plant.

The offering includes:

- Availability of spares
- Extended warranties
- Preventive maintenance
- Corrective maintenance
- Response time
- Uptime guarantee
- Training
- Technical support



Why ABB?



Our solar solutions are backed by decades of expertise...



We have more than

135 yrs

of technological leadership



with over

50 yrs

experience in power conversion



and over

25 yrs

in solar

Wherever you are, we are on hand for you with our expertise and experience...



We operate in over

100 countries



have around

147,000 team members



and dedicated sales and service solar specialists in more than

35 countries



We have

2 manufacturing facilities and **4** R&D centers globally dedicated to solar inverters

Your customers count on you for reliable solar energy.

So count on us for the resources, service, experience and expertise to help you achieve even more with your solar projects.



and more than

800

solar service engineers supporting ABBs installed inverter base globally



supported by a global service infrastructure of

10

repair centers



We have the broadest portfolio for all applications and business models, with

6

new products and solutions in 2018

Whatever your solar needs, we offer state-of-the-art, future-proof solutions, service and support



with more than

2 million

inverters worldwide



and an installed solar inverter base of more than

35 GW

ABB – your trusted solar partner

The size, history, reputation, financial foundation, and product portfolio are key variables that influence the credibility of any company in the PV sector. As one of the largest engineering companies in the world and a recognized leader in the power and automation technology business, ABB as a company has very strong credentials in all of these categories to fulfill the requirements of a trusted solar inverter partner.

Size, history and brand reputation

ABB has a truly international footprint, operating in over 100 countries worldwide and employing around 147,000 coworkers. It has a history of more than 135 years of technological leadership and a long and illustrious record of innovation in numerous industries. The ABB brand is today recognized as standing for quality, performance and innovation.

Financial strength and diversity

In terms of financial strength, the ABB group is very robust, with annual revenues of around \$34 billion in 2017 and R&D investments of more than \$1.4 billion annually. It is also a diversified company with four major businesses which are further structured into business lines. This diversification means that ABB has many legs to stand on instead of being concentrated in only one business.

Complete product portfolio for PV market

ABB offers the PV business a complete product portfolio, with the exception of solar modules and module mounting systems. The product program includes solar inverters, low voltage products, transformers, switchgear and substations for medium and high voltage grid connection. ABB can also offer optimized packaged solutions to support variety of project and customer needs. On top of this, world-class plant automation and monitoring systems are also part of ABB's portfolio.

Global company with local presence

ABB as your partner can support you – our trusted partner – globally, wherever your project is, with expertise and a local presence. Together we can build a lasting success story for years to come.

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www.abb.com/solarinverters
www.abb.com

