The ABB megawatt station is a turnkey solution designed for large-scale solar power generation. It houses all the electrical equipment that is needed to rapidly connect a photovoltaic (PV) power plant to a medium voltage (MV) electricity grid. All the components within the megawatt station are from ABB’s product portfolio.

**Turnkey-solution for PV power plants**

The ABB megawatt station design capitalizes on ABB’s long experience in developing and manufacturing of secondary substations for utilities and major end-users worldwide in conventional power transmission installations.

A station houses two ABB central inverters, an optimized transformer, MV switchgear, monitoring system and solar generator terminal boxes. The station 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 megawatt stations can be combined.

**Compact design eases transportation**

The steel-framed insulated container comes complete with a concrete foundation. Its thermal insulation enables operation in harsh temperature and humidity environments and is designed for at least 25 years of operation.

The hollow concrete foundation has a steel double floor within the inverter compartment. This provides easy access for cabling. Additionally the small inverter footprint makes the container easy to lift via a standard truck crane, thereby simplifying transportation.

The complete ABB megawatt station weighs only 20 tons. At 50 m³, the container’s volume is some 15 percent smaller than equivalent available solutions.

**Highlights**

- Proven technology and reliable components
- Compact and robust design
- High total efficiency
- Modular and serviceable system
- Double-stage air pre-filtering for reduced maintenance
- Global life cycle services and support
Solar inverters
ABB solar inverters are the result of decades of industry experience and the use of proven frequency converter technology. As such the solar inverters provide a highly efficient and cost-effective way to convert the direct current, generated by solar modules, into high-quality and CO₂-free alternating current. Two, 500 kW ABB central inverters are used in the ABB megawatt station. The inverters provide high efficiency conversion with low auxiliary power consumption.

Transformer
The ABB megawatt station features an ABB vacuum cast coil dry-type transformer. The transformer is designed to meet the reliability, durability, and efficiency required in PV applications. It is specifically designed and optimized for ABB solar inverters to provide the best performance throughout the lifetime of the plant.

The transformer is environmentally safe, having no volatile liquids that can leak and carries no fire or explosion risk. It provides excellent mechanical and short-circuit characteristics.

As a major global transformer manufacturer, ABB offers a wide range of liquid filled and dry-type transformers. Alternate power transformers are available to meet customer requirements. All ABB’s transformers are manufactured in accordance with the most demanding industry and international standards.

Switchgear
ABB offers a complete range of medium voltage switchgear for secondary distribution, including air insulated and gas insulated.

The ABB megawatt station is equipped, as standard, with the widely proven ABB SafeRing, SF₆-insulated switchgear. A sealed steel tank with constant atmospheric conditions ensures a high level of reliability as well as personnel safety. The virtually maintenance-free system comes in a compact and flexible design that allows for a versatile switchgear configuration. As an option ABB’s gas-insulated SafePlus and air insulated Unisec switchgear are also available.

Technical data and type

<table>
<thead>
<tr>
<th>Type code</th>
<th>PVS800-MWS-1000kW-20</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input (DC)</strong></td>
<td></td>
</tr>
<tr>
<td>Recommended max PV-power (Pₚₚ)</td>
<td>2 x 600 kW</td>
</tr>
<tr>
<td>Nominal DC power</td>
<td>2 x 515 kW</td>
</tr>
<tr>
<td>DC voltage range, mpp (U_DC)</td>
<td>450 to 750 V (– 825 V*)</td>
</tr>
<tr>
<td>Maximum DC voltage (U_DC&lt;sub&gt;max&lt;/sub&gt;)</td>
<td>900 V (1000 V*)</td>
</tr>
<tr>
<td>Maximum DC current (I_DC&lt;sub&gt;max&lt;/sub&gt;)</td>
<td>2 x 1145 A</td>
</tr>
<tr>
<td>Voltage ripple, PV voltage (ΔU&lt;sub&gt;PV&lt;/sub&gt;)</td>
<td>&lt; 3%</td>
</tr>
<tr>
<td>Number of protected DC inputs (parallel)</td>
<td>2 x 4 (+/-) / 2 x 16 ¹)</td>
</tr>
<tr>
<td>Number of mppt trackers</td>
<td>2</td>
</tr>
<tr>
<td><strong>Output (AC)</strong></td>
<td></td>
</tr>
<tr>
<td>Nominal AC output power (P&lt;sub&gt;N (AC)&lt;/sub&gt;)</td>
<td>1000 kW</td>
</tr>
<tr>
<td>Nominal AC current (I&lt;sub&gt;N (AC)&lt;/sub&gt;)</td>
<td>28.9 A</td>
</tr>
<tr>
<td>Nominal output voltage (U&lt;sub&gt;N (AC)&lt;/sub&gt;)</td>
<td>20 kV ²)</td>
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<tr>
<td>Output frequency</td>
<td>50 / 60 Hz</td>
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<tr>
<td>Harmonic distortion, current ³)</td>
<td>&lt; 3%</td>
</tr>
<tr>
<td>Power factor compensation (cosφ)</td>
<td>Yes</td>
</tr>
<tr>
<td>Transformer type ⁴)</td>
<td>ABB Vacuum cast coil dry-type</td>
</tr>
<tr>
<td>Medium voltage switchgear type ⁸)</td>
<td>ABB SafeRing type DeV with REJ603 protection relay (self-powered)</td>
</tr>
<tr>
<td><strong>Efficiency</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum ⁶) (including transformer)</td>
<td>97.4%</td>
</tr>
<tr>
<td>Euro-eta ⁶) (including transformer)</td>
<td>96.9%</td>
</tr>
</tbody>
</table>

¹) Max 1000 VDC input voltage as an option with mppt range 450 to 825 V. If DC is > 1000 VDC inverter is not damaged, but will not start
ABB megawatt station design and grid connection

1: PVS800-MWS-1000kW-20

Type code | PVS800-MWS-1000kW-20
---|---
**Power consumption** | 1 MW
- Own consumption in operation 7) | < 1200 W
- Standby operation consumption 8) | < 110 W
- External auxiliary voltage 6) | 230 V / 50 Hz

**Dimensions and weight**
- Width / Height / Depth, mm | W 6930 / H 2970 / D 2430
- Weight approx. | 20 t

**Environmental limits**
- Degree of protection IP54 (inverter) / IP23d (transformer and SWG)
- Ambient temperature range (nominal ratings) | -20 to +40 °C
- Maximum ambient temperature 9) | +50 °C
- Relative humidity, non condensing | 15 to 95%
- Maximum altitude (above sea level) 10) | 2000 m
- Cooling air flow | 7520 m³/h

**User interface and communications**
- Local user interface | ABB local control panel
- Fieldbus connectivity | Modbus, PROFIBUS, Ethernet

**Product compliance**
- Safety and EMC | CE conformity accordance to LV and EMC directives
- Grid compliance | According to country requirements
- Grid support | Reactive power compensation, Power reduction, Low voltage ride through 11)

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1) Optional MCB inputs, 80 A each
2) Voltages between 6 to 36 kV available as an option
3) At nominal power
4) Other ABB transformer types available as an option
5) Other ABB switchgear types available as an option
6) Efficiency without auxiliary power consumption, at U_{DC} 450 V with standard transformer
7) Without options
8) 115 V, 60 Hz optional
9) Power derating after 40 °C
10) Power derating above 1000 m. Above 2000 m special requirements.
11) Optional
MV switchgear standard configurations for ABB megawatt station

**Accessories**
- Solar array junction boxes with string monitoring
- Remote monitoring solutions
- Warranty extensions
- Solar inverter care contracts

**Options**
- MV AC output voltages (6 to 36 kV)
- Different MV switchgear configurations
- Air-insulated MV switchgear
- Higher efficiency dry-type transformers
- Liquid filled transformers
- Integrated DC input extension cabinets in inverters
- Cabinet heating
- I/O extensions
- Extended voltage range, 1000 VDC max.
- DC grounding (negative and positive)
- Fieldbus and Ethernet connections

**Support and service**
ABB supports its customers with a dedicated service network in more than 60 countries and provides a complete range of life cycle services from installation and commissioning to preventative maintenance, spare parts, repairs and recycling.

For more information contact your local ABB representative or visit:

www.abb.com/solar
www.abb.com

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