Hardware manual
PVS800-IS inverter stations
Hardware manual

PVS800-IS inverter stations

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Further information
Safety instructions

Contents of this chapter

This chapter presents the use of warnings in the manual and gives instructions for safe installation, start-up, use and maintenance of PVS800-IS inverter stations.

Use of warnings

Warnings caution you about conditions which can result in serious injury or death and/or damage to the equipment, and advise on how to avoid the danger. The following warning symbols are used in this manual:

- **Electricity warning** warns of hazards from electricity which can cause physical injury and/or damage to the equipment.

- **General warning** warns about conditions, other than those caused by electricity which can result in physical injury and/or damage to the equipment.
Safe installation, start-up and maintenance

This section contains the safety instructions which you must follow when installing, commissioning and maintaining the inverter station. If ignored, physical injury or death may follow, or damage may occur to the equipment.

Only authorized electricians are allowed to install, start-up and maintain the inverter station. Working methods, tools, components etc. must follow the IEC regulations.

Always follow the local safety regulations concerning the inverter stations.

PVS800-IS is a low voltage (LV) device which is connected via a step-up transformer to the medium voltage (MV) grid. The PVS800-IS inverter station may only be energized and de-energized by an authorized person who has task-specific instructions for the operation of an MV substation and permission from the on-site foreperson in charge of electrical work.

If other people must be in the vicinity while the door is open, warn them, and if required, provide supervision and guidance.

- General safety instructions

⚠️ WARNING! Before any work, perform the seven safety precaution steps described below.

1. Clearly identify the work location.
   Read the safety instructions of the work area and the component you are working on. See the subsections below and component-specific manuals.

2. Disconnect and secure against reconnection.
   Disconnect all possible power supplies. Lock the disconnectors in the open position and attach a warning notice to them. After disconnection of the inverters, always wait for 5 minutes to let the intermediate circuit capacitors discharge.

3. Protect against any other live parts.

4. Take special precautions when close to exposed conductors.

5. Check the installation is dead.
   Always measure to ensure that there is no voltage connected.

6. Carry out earthing (grounding) and short circuiting.

7. Issue a permit to work.
**Safety instructions for the inverter compartment**

**WARNING!** Perform the procedure below before starting work on the inverters. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

1. Identify the inverter which you need to work on. Read the inverter safety instructions. See *Related documents* on page 14.

2. Disconnect both inverters from all power supplies (PV generator, transformer and AUX), and secure by locking and tagging.
   i. Stop the inverters. Open the DC disconnecting switches \[Q2\] in both inverter units ([PVS1] and [PVS2]), lock and add a warning notice.
   ii. Open the AC disconnecting switch \[Q1\] of both inverter units ([PVS1] and [PVS2]), lock and add a warning notice. After disconnection of the inverter, always wait for 5 minutes to let the intermediate circuit capacitors to discharge.
   iii. Switch off auxiliary power to both inverters from the auxiliary cabinet. If the auxiliary system requires work, switch off the power supply for the auxiliary cabinet. Lock and add warning notices.
   iv. Open the MV breaker or switch fuse combination at the transformer side of the switchgear. Lock and add a warning notice.
   v. Turn the disconnector switch (if any) at the transformer side of the switchgear to open position. Lock and add a warning notice.
   vi. Disconnect all inverter DC supplies. The DC disconnectors are usually located in the junction boxes on the solar field. Lock and add warning notices.

3. Check that all shrouds and screens are in place. A shroud or screen may only be removed if it is a requirement to reach the parts which you are currently working on.

4. Check that you will not be near to any live parts while working. Disconnect live circuits or protect with shrouds/screens.

5. Check that the circuit is dead at AC and DC terminals of the inverters and other accessible parts in the main circuit. Use a multimeter with suitable testing heads.

6. Temporarily ground the inverter.
   i. Temporarily ground both inverters’ ([PVS1] and [PVS2]) AC and DC sides with an appropriate temporary grounding set.

7. Issue a work permit.

**Safe operation**

This section contains the safety instructions which you must follow when operating the inverter station. If ignored, physical injury or death may follow, or damage may occur to the equipment.

---

**WARNING!** Keep the door of the inverter station locked while the inverter station is operating. Allow access to the keys to authorized personnel only.
Introduction to this manual

Contents of this chapter
This chapter provides information about the manual such as applicability, audience and contents. It also lists the related documents.

Applicability
This manual is applicable to PVS800-IS inverter stations.

Target audience
This manual is intended for persons who transport, store, plan the installation, install, commission and maintain PVS800-IS inverter stations.

Read this manual before working on the inverter station. You are expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.

The manual is written for readers worldwide.

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Safety instructions
Introduction to this manual
Hardware description
Storing, lifting and transporting
Mechanical installation
Electrical installation
Checking the installation

Start-up

Maintenance

Technical data

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<tr>
<td>Manuals</td>
<td></td>
</tr>
<tr>
<td>PVS800-IS inverter station hardware manual</td>
<td>Whole inverter station</td>
</tr>
<tr>
<td>(3AXD50000009549 [English])</td>
<td></td>
</tr>
<tr>
<td>PVS800-57 hardware manual</td>
<td>Inverters</td>
</tr>
<tr>
<td>(3AUA0000053689 [English])</td>
<td></td>
</tr>
<tr>
<td>PVS800 central inverters firmware manual</td>
<td>Inverters</td>
</tr>
<tr>
<td>(3AUA0000058422 [English])</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Main circuit diagram of the inverter station</td>
<td>Whole inverter station</td>
</tr>
<tr>
<td>Main circuit diagrams of the inverters</td>
<td>Whole inverter station</td>
</tr>
<tr>
<td>Commissioning checklist</td>
<td>Whole inverter station</td>
</tr>
<tr>
<td>PVS800 test report</td>
<td>Inverters</td>
</tr>
<tr>
<td>Accessory documents</td>
<td>Accessory</td>
</tr>
</tbody>
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Terms and abbreviations

<table>
<thead>
<tr>
<th>Term/Abbr.</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>Alternating current</td>
</tr>
<tr>
<td>AUX</td>
<td>Auxiliary</td>
</tr>
<tr>
<td>DC</td>
<td>Direct current</td>
</tr>
<tr>
<td>EMC</td>
<td>Electromagnetic compatibility</td>
</tr>
<tr>
<td>IEC</td>
<td>International Electrotechnical Commission</td>
</tr>
<tr>
<td>LV</td>
<td>Low voltage (50 - 1000 V AC)</td>
</tr>
<tr>
<td>MPP</td>
<td>Maximum power point. The current and voltage values of the photovoltaic module, string or array which will produce the highest power output under the prevailing operating conditions. See also MPPT.</td>
</tr>
<tr>
<td>MPPT</td>
<td>Maximum power point tracking. This is an inverter software function which automatically operates the solar generator, array, string or module at its maximum power point.</td>
</tr>
<tr>
<td>MV</td>
<td>Medium voltage (1 - 35 kV AC)</td>
</tr>
<tr>
<td>TN-S</td>
<td>Earthed network</td>
</tr>
</tbody>
</table>
Hardware description

Contents of this chapter
This chapter provides an introduction to the PVS800-IS inverter station.

Overview
The PVS800-IS inverter station provides the DC to AC power conversion equipment required to connect a photovoltaic power generator (DC) to medium voltage substation equipment (AC) and ultimately to the MV power grid.

The rugged inverter station consists of:
• a modified and insulated 20 foot high cube (HC) sea container housing
• two inverters with comprehensive protection, control and monitoring functions
• air filtration system
• auxiliary power system
Main components:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Exit door</td>
</tr>
<tr>
<td>2</td>
<td>Inverters, PVS1 and PVS2</td>
</tr>
<tr>
<td>3</td>
<td>Air intakes with filtering systems with sand collection boxes</td>
</tr>
<tr>
<td>4</td>
<td>Air outlets with weather protection hoods</td>
</tr>
<tr>
<td>5</td>
<td>Local power enclosure, see <em>Local power enclosure</em> on page 38.</td>
</tr>
<tr>
<td>6</td>
<td>Auxiliary voltage transformer (option +G344)</td>
</tr>
<tr>
<td>7</td>
<td>Installation area for post assembled components (for example, monitoring), 800 x 1000 + 600 x 1300 (w x h)</td>
</tr>
<tr>
<td>8</td>
<td>Main earthing bar, MEB (located below the floor in the cabling tunnel)</td>
</tr>
<tr>
<td>9</td>
<td>Container doors</td>
</tr>
</tbody>
</table>
Main circuit diagram

The diagram below shows the main circuit of the PVS800-IS inverter station and an example MV substation with medium voltage switchgear and transformer. It also shows the alternative auxiliary power supplies for the inverter station.

A MV switchgear compartment of MV substation
B MV transformer compartment of MV substation
C PVS800-IS Inverter station
1 DC input
2 Inverters
3 MV transformer
4 MV switchgear
5 Power grid (AC) connection (and to parallel inverter stations if there are any)
6 External auxiliary power supply (standard)
7 Internal auxiliary power supply / transformer (option +G344)

Inverter

See the inverter manuals for information on the inverters. See Related documents on page 14.
Type designation label

The figure below shows the type designation label. The label contains the basic data of the inverter station. It is located inside the inverter compartment door.

![Type designation label](image)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial nr</td>
<td>Serial number. Each inverter station has a unique serial number. For example: CG201341001</td>
</tr>
<tr>
<td></td>
<td>CG = ABB factory identification code</td>
</tr>
<tr>
<td></td>
<td>2013 = Manufacturing year</td>
</tr>
<tr>
<td></td>
<td>41 = Manufacturing week</td>
</tr>
<tr>
<td></td>
<td>001 = Manufacturing unit number</td>
</tr>
<tr>
<td>Type</td>
<td>Type designation key. For example: PVS800-IS-1750kW-B+G344</td>
</tr>
<tr>
<td></td>
<td>PVS800 = Product series</td>
</tr>
<tr>
<td></td>
<td>IS = Construction: inverter station</td>
</tr>
<tr>
<td></td>
<td>1750kW = Nominal AC power</td>
</tr>
<tr>
<td></td>
<td>B = Nominal AC voltage</td>
</tr>
<tr>
<td></td>
<td>+G344 = Option (plus) code</td>
</tr>
<tr>
<td>Order no</td>
<td>Order number</td>
</tr>
</tbody>
</table>

For more information, see section *Type designation key* on page 19.
Hardware description

Type designation key

The type designation describes the composition of the inverter station. The type designation is visible on the type designation label which is attached to the inverter station. The complete type designation is divided into sub codes:

- The first 1…18 digits form the basic code which describes the basic construction of the inverter station. The fields in the basic code are separated by hyphens.
- The option codes follow the basic code. Each option code starts with an identifying letter (common for the whole product series), followed by descriptive digits. The option codes are separated by plus signs.

The following table describes the fields of the basic code.

<table>
<thead>
<tr>
<th>Digit no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 … 6</td>
<td>PVS800 product series</td>
</tr>
</tbody>
</table>
| 7 … 10    | Construction. -IS = Inverter station  
            - Steel frame container built, IP54 inverter compartment, C4 corrosion class, double-staged air filtering, G4 filter class.  
            - 2 x PVS800-57 central inverters +G300 cabinet heater, +12H382 12 x fuse protected DC input connections, +Q951 Emergency stop. |
| 11 … 17   | Nominal AC power.  
            - xxxkW  
            - See Technical data on page 54. |
| 18 … 20   | Nominal AC voltage  
            - B = 350 VAC  
            - C = 400 VAC |

The table below describes the option codes.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
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<tr>
<td>G312</td>
<td>Upgrade to corrosion class C5 and filtering class F7. Required for near coastal installation locations (site located more than 1 km and up to 10 km distance from medium to high saline coastal line).</td>
</tr>
<tr>
<td>G344</td>
<td>6 kVA auxiliary power transformer supplied from main AC side of an inverter (external auxiliary power supply connection is not needed)</td>
</tr>
<tr>
<td>P902</td>
<td>Customized (see the project-specific documentation)</td>
</tr>
</tbody>
</table>
Hardware description
Contents of this chapter
This chapter provides instructions for storing, lifting and transporting the PVS800-IS inverter station.

Storing

- To avoid condensation inside the inverter station, store it indoors in a dry (heated) warehouse. If that is not possible, supply and switch on internal heaters to keep the inside temperature above the outside temperature.
- Protect the interior of the inverter station from rainwater and dust. Use covers over the air inlet and outlets. Avoid opening the doors unnecessarily during storage.
- If power is not available for electric heaters, add humidity desiccant bags inside the inverter station. Desiccant bags must be used if the unit will be stored for more than two weeks without using electric heaters. Hang fresh desiccant bags about 1 m above the floor. Use 500 g desiccant per week of storage to ensure dry conditions inside the inverter station during storage. For example, for four weeks of storage, use 2 kg of desiccant bags. Replace the bags with fresh bags every four weeks and avoid opening the doors unnecessarily during the storage period. Examples of suitable container desiccants: Xdry desiccants “H model” or Clariant “Container Dri®Il-Pole”.
- The ground underneath the inverter must be solid, flat, dry and vegetation-free. The ground must support the inverter station evenly from below; there must be no twisting or stress. Do not place the inverter directly onto bare ground because this could lead to paint damage and corrosion.
- Place the inverter station on wooden support beams. Locate the beams under the four corner points.
Lifting

Obey these instructions and the additional information given in section Lifting drawing on page 60:

• Protect the corners of the inverter station against shock.
• Lift the inverter station from the four lifting eyes located in the upper corners.
• The minimum rated loading capacity of each sling is 5 tons.
• The minimum length of each sling is 5 m.
• Adjust the lengths of lifting slings so that the inverter station does not tilt during the lifting.
• Do not allow lifting slings to scratch the walls or roof. Damaged paint can lead to corrosion.
• Use a guide wire attached to a lower corner of the inverter station to prevent rotation.

⚠️ WARNING! Ignoring the following instructions can cause physical injury or death, or damage to the equipment:

• Use only authorized lifting equipment and personnel.
• Prevent anybody getting under the load.
• Do not stand on the roof while fastening the lifting slings or while lifting.
• Do not throw slings or hooks onto the roof.
Transporting

Obey these instructions and the additional information given in section *Dimensions and layout* on page 58:

- Protect the inverter station with wooden corners, plastic film, etc. The inverter station is delivered unpacked from the factory as standard.
- Protect the interior of the inverter station from rainwater by using temporary protection plates on air intakes and outlets.
- The PVS800-IS inverter station is built into a 20' HC (high cube) form. The inverter station can be transported on a dedicated sea container trailer using the standard container attachment system.
- If not using a dedicated sea container trailer: Lay the inverter station directly on the transportation chassis to prevent sliding and to keep the height as low as possible. Use friction enhancement mats (rubber) below the inverter station. The maximum thickness of the mat is 3 cm. Fasten the inverter station firmly onto the chassis with heavy-duty transport straps.

**Warning!**

Transport the inverter station on an open heavy-duty chassis. Do not use an enclosed trailer because the inverter station could easily get scratched if it comes into contact with the walls of the trailer.

Keep the transportation height as low as possible. Make sure that the total height of the transportation is not above the maximum allowed height for the planned route.

Do not throw hooks over the roof. This can damage the paint and lead to corrosion.

**Incoming inspection at arrival**

Visually check for potential transportation damage. Mark and record any damage carefully and inform the local ABB or ABB sales contact immediately. Repair any damaged paint. See section *Checking and repairing painted surfaces* on page 50.

Check that the unit corresponds to the delivery list and order. Record deviations carefully and inform the local ABB or ABB sales contact immediately.
Mechanical installation

Contents of this chapter

This chapter provides instructions for selecting the location, and constructing the foundation for the PVS800-IS inverter station. These instructions do not substitute the local regulations which you must always obey.

General guidelines

- **Constructing the foundation for the inverter station**

  Place the inverter station a little higher than its surroundings so that surface water will not collect around the inverter station and cause corrosion.

  - Tilt the surface of the surrounding ground at least 5 cm per meter. This ensures that surface water flows away from the inverter station properly.
  - The height of the column foundations used with the station should be at least 80 cm but may need to be taller to secure a frost proof depth. In the completed installation there must be 15 cm gap between the ground and the bottom of the container.
  - Consider local conditions such as frost, rain, humidity, and drought.

Pay attention to the proper planning and constructing of the foundation. For example, an improper foundation may cause settling of the inverter station or difficulty opening the door.

Support the inverter station at its four corners by using concrete or steel column foundations. The columns are not part of the inverter station delivery. Select the columns to match the local soil conditions.
When selecting the columns, check the load carrying capacity of the ground and potential local special requirements (for example, earthquake or typhoon anchoring) of the construction area. Use columns suitable for the local conditions and requirements.

The following picture shows an example of a concrete column foundation suitable for 100 kPa ground load carrying capacity.

Start by making a deep enough hole for the foundation. Always dig down to a frost proof depth and drain the hole. If needed, connect the foundation hole to the general drainage network or lead drainage pipes to a well-drained terrain where the water does not cause harm.

Construct proper support for the inverter station:

- **On sandy soil:** Gravel is usually enough below the column foundations. Fill the foundation hole with gravel according to normal construction practices. Use geotextile to prevent mixing of fill gravel with the surrounding soil. Start by filling with crushed stone or coarse gravel, and continue with finer material. Compress the filling. Use fine gravel (size 2 - 5 mm) for the surface layer below the column foundations. Smooth and compress the surface before adding or molding the column foundations.

- **On non-sandy soil:** Follow the same practices as for sandy soil. Depending on frost sensitivity and loading capacity of base soil, you may need to add a thicker layer of gravel below the column foundations and/or to use foundations with a larger surface area. Add insulation around the column foundations if there is a risk of frost.
**Preparation of the ground**

1. Dig a hole for the foundation and cables.
2. Use geotextile to prevent the mixing of gravel with surrounding soil.
3. Put coarse gravel at the bottom of the hole and fine gravel at the top.
4. Compress the gravel and soil below the foundation area.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Fine gravel on top</td>
</tr>
<tr>
<td>2</td>
<td>Coarse gravel</td>
</tr>
<tr>
<td>3</td>
<td>Geotextile</td>
</tr>
<tr>
<td>4</td>
<td>Compressed area, minimum 7500 x 4000 mm</td>
</tr>
<tr>
<td>5</td>
<td>Maximum 560 mm after compression</td>
</tr>
</tbody>
</table>

**Layers of gravel:**
- from coarse to fine

**Preparing ground for the inverter station**
Adding column foundations

1. Add or mold four steel reinforced concrete column foundations.
2. Check locations and heights carefully. The tops of the foundation columns must be at least 240 mm above the surrounding base ground.
3. Place bitumen sheets on top of the foundation columns.
4. If desired, you can add ground between the foundations. This will minimize the need for post filling under the station later on.

![Diagram of column foundations]

<p>| | |</p>
<table>
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<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>800 mm</td>
</tr>
<tr>
<td>2</td>
<td>2260 x 5855 mm</td>
</tr>
<tr>
<td>3</td>
<td>600 x 600 mm (with 100 kPa loading capacity)</td>
</tr>
<tr>
<td>4</td>
<td>240 mm</td>
</tr>
<tr>
<td>5</td>
<td>Bitumen sheet</td>
</tr>
</tbody>
</table>

Placing the inverter station on the foundation

**WARNING!** Before lifting the unit onto the column foundations, check that the foundations are well aligned, hardened and stable. Then follow the lifting instructions.

1. Measure the level of the foundation and the tilting of the surface of the surrounding ground around the foundation. Make sure that you obey the rules in section Constructing the foundation for the inverter station on page 25. Do not place the inverter station too low! Adding gravel around a inverter station which is placed too high is much easier than reinstalling the inverter station.
2. Check that the foundation is level. Maximum inclination of the foundation below the inverter station is 0.1 degrees.
3. Lift the inverter station onto the foundation. Obey the instructions in section Lifting on page 22. Check that the column foundations do not move during lifting and that they remain vertical. The inverter station must be stable and in direct contact with all of the foundation columns.
4. After placing the inverter station on the foundation, measure the height and inclination of the inverter station again, and check the slope of the surface of the surrounding ground around the inverter station. See section Constructing the foundation for the inverter station on page 25.
**WARNING!** Do not enter the inverter station or start cabling before checking that the installation is stable.

- **Constructing earthing electrode and earthing**

The main earthing busbar of the inverter station must be connected to the earthing busbar of the MV station and to an earthing electrode. See *Earthing* on page 36.

- **Adding the cables**

Add cables and cabling protection. See *Foundation and external cabling layout* on page 61 and *Electrical installation* on page 35.
Filling the pit and finalizing the surroundings

1. If required for local frost conditions, add insulation around the column foundations.
2. Fill the hole with fine gravel with a 5 cm/m tilting angle. Leave a 15 cm air gap underneath the inverter station.
3. To minimise growth of grass, the use of fiber around the station is recommended. Put the fiber 20 cm below the station and about 80 cm around the station.
4. Construct two rows of 500 x 500 mm concrete tiles around all four sides of the inverter station. The tiles will provide a dry standing place for service personnel and will prevent the removal of gravel. The inverter station should overlap the adjacent tiles by 10 cm to guide surface water away properly.

**WARNING!** Take care not to damage cables when filling the pit. If necessary, use wood or metal shields to provide temporary additional protection.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 cm/m tilting angle for ground level</td>
</tr>
<tr>
<td>2</td>
<td>15 cm air gap</td>
</tr>
</tbody>
</table>

Do not plant trees near the inverter station. If bushes will be planted, ensure that the planting compost base is at least one meter from the inverter station housing and that fully-grown bushes will not prevent maintenance access to the inverter station. Ensure that the plantation does not discharge dust or seeds that could hinder the cooling air flow.
Adding weather protection hoods

1. Remove the temporary protectors (1)
2. Add weather protection hoods (2)
32 Mechanical installation
Checking the installation

Contents of this chapter
This chapter describes how to check the installation of the PVS800-IS inverter station.

WARNING! Only an authorized electrician is allowed to check the installation. Follow the safety instructions. See chapter Safety instructions on page 9, and the local safety regulations. If ignored, physical injury or death may follow, or damage may occur to the equipment.

Checking that the installation is clean and undamaged
Clean the inverter station of all dirt.
Repair any damage caused to the exterior painting during installation. See section Checking and repairing painted surfaces on page 50.
## Checking the installation of the inverter station

<table>
<thead>
<tr>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check all mechanical operating functions by operating them twice.</td>
</tr>
<tr>
<td>Check that the paint is not damaged. Damaged areas must be repaired according to the instructions.</td>
</tr>
<tr>
<td>Check that all cable inlets are securely installed. Check that unused cable openings are protected with protection caps.</td>
</tr>
<tr>
<td>Check that the weather protection hoods are installed and that nothing is restricting airflow through air inlets and outlets.</td>
</tr>
<tr>
<td>Check the earthing (grounding) of the inverter station and its components against the earthing (grounding) schematic. Pull the earthing wires at the terminals to ensure that the connections are tight.</td>
</tr>
<tr>
<td>Remove all foreign objects such as loose fastenings or tools from the station. They can cause short-circuit faults or other damage.</td>
</tr>
<tr>
<td>Check that the station is clean. Mud on painted surfaces will increase the risk of corrosion. See chapter <em>Maintenance</em>.</td>
</tr>
<tr>
<td>Check the main circuit clearance distances, cable terminations and connections against the main circuit diagram. Check that all connections have been tightened.</td>
</tr>
<tr>
<td>Check that all necessary warning labels have been attached to the inverter station. For example, labels in the local language or required by local regulations.</td>
</tr>
<tr>
<td>Check that the insulation resistances of the external power cables have been measured. See <em>Measuring the insulation resistance of the cabling</em> on page 36.</td>
</tr>
<tr>
<td>Perform the installation checks detailed in the device specific manuals. See subsection <em>Related documents</em> on page 14 for a list of manuals.</td>
</tr>
<tr>
<td>Carry out the inspection procedures required by the respective authorities.</td>
</tr>
</tbody>
</table>
Electrical installation

Contents of this chapter

This chapter contains general instructions for earthing and cabling of the PVS800-IS inverter station. The instructions do not substitute the local regulations which must always be obeyed.

**WARNING!** Only an authorized electrician is allowed to install the cabling to the inverter station. Follow the safety instructions. See chapter *Safety instructions* on page 9, and the local safety regulations. If ignored, physical injury or death may follow, or damage may occur to the equipment.

Routing the cables

Route the input DC power cables, AC power cables and control cables in separate paths. The minimum distance between control cables and DC (or AC) power cables is 500 mm when run in parallel.

Do not install the control cables in the same cable trenches with DC cables.

Where control cables must cross power cables, ensure they are arranged at an angle as near to 90 degrees as possible.

Use separate cable lead-through holes for different cable types.

Do not run extra cables through the inverter station.

Locations of the cable entries

See the chapter *Drawings* for the location of the cable entries.
Earthing

The PVS800-IS inverter station has a main earthing busbar for container earthing. Connect the inverter station to the earthing busbar of the MV station.

Construct an earthing electrode for the MV substation according to the local regulations. Lead the copper connection wire from the MV substation’s earthing busbar to the main earthing busbar (MEB) of the inverter station. The MEB of the inverter station is located below the floor beside the main exit door.

Check that the inverter station is properly connected to earth.

Measuring the insulation resistance of the cabling

Check that the insulation resistances of the external power cables have been measured according to local regulations. See PVS800-57 hardware manual (3AUA0000053689 [English]).
Connecting AC and DC cabling

See PVS800-57 hardware manual (3AUA0000053689 [English]) and the wiring diagrams delivered with the unit.

1. Dig suitable cable trenches and protect the cables according to the local requirements. Use pipes, ducts, etc.

2. Dismantle the covers of the cable lead-through holes.

3. Lead the cables into the inverter station via the cable lead-throughs which are located in the bottom of the inverter station. The lead-throughs are equipped with cable glands. You may temporarily remove the cable supports and lead-throughs in the bottom of the inverter cabinets to enable cabling.

**WARNING!** Make sure that unused holes and glands are covered. Check this carefully after adding the cables. There must be no unprotected holes in the bottom of the container after cable installation.

4. Connect the cables to the appropriate terminals in the inverters. Tighten the connections to the torques specified in the inverter manual.

5. Fill the cable trenches.
Connecting alarm and trip signals from MV substation to inverter station

Route the alarm and trip signals from the MV substation to the local power enclosure of the PVS800-IS inverter station as follows:

1. Dismantle the covers of the cable lead-through holes.
2. Dig suitable cable trenches and protect the cables according to the local requirements. Use pipes, ducts, etc.
3. Lead the cables inside the inverter station through a cable lead-through located in the bottom of the inverter station next to the exit door. Tighten the cable gland. Make sure that unused holes and glands will be covered.
4. Connect the cables to the appropriate terminals in the local power enclosure cabinet.
5. Fill the cable trenches.

Note! A ready made PVS800-IS application program template is part of the delivery. The program can be used as a template for load control functionality during MV substation alarm and trip situations. Contact your local ABB representative for more information.

Local power enclosure

<table>
<thead>
<tr>
<th></th>
<th>Local power enclosure door closed. Metal enclosure, membrane cable glands, sockets on the door.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Terminals to connect auxiliary power supply from PVS800-IS to MV substation</td>
</tr>
<tr>
<td>3</td>
<td>Terminals to connection transformer IO alarm and trip signals from MV substation</td>
</tr>
</tbody>
</table>

Note:
The locations of switches and terminals may vary by delivery. Check details from the circuit diagrams delivered with the PVS800-IS unit.
Connecting auxiliary power supply from inverter station to MV substation

The local power enclosure also includes 3-phase power supply terminals reserved for a MV substation. If required you can use these terminals to supply power from PVS800-IS inverter station to the MV substation. The cable lead-through for the power supply is located in the bottom of the container next to the exit door.

Check the Main circuit diagram on page 17, Technical data on page 54, and Foundation and external cabling layout on page 61 for further information. Also check the PVS800-IS circuit drawings delivered within the unit.

Connecting the control cabling

See section Foundation and external cabling layout on page 61 and inverter manuals.
Start-up

Contents of this chapter

This chapter provides instructions for start-up of the PVS800-IS inverter station.

WARNING! Only an authorized electrician is allowed to install, start up and maintain the inverter station. Follow the safety instructions. See chapter Safety instructions on page 9, and the local safety regulations. If ignored, physical injury or death may follow, or damage may occur to the equipment.

Tools needed

• Computer with the Drive window PC tool installed (for the inverter diagnostics and settings)
• Multimeter

Start-up tasks

Note! These instructions are valid for a typical system (solar plant, inverter station and MV substation) such as the one presented in the example Main circuit diagram on page 17. The symbols in square brackets, for example [U1], refer to the device designations used in the circuit diagrams.

<table>
<thead>
<tr>
<th>Task</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-checking the switchgear (voltage not connected)</td>
<td>See the switchgear manufacturer’s instructions.</td>
</tr>
</tbody>
</table>
### Pre-checking the transformer (voltage not connected)

- See the transformer manufacturer’s instructions.

### Pre-checking the inverters (voltage not connected)

- Perform the inverter commissioning tasks/checks to be done before power-up. 
  - See the PVS800-57 hardware manual (3AUA0000053689 [English]) and PVS800 central inverters firmware manual (3AUA0000058422 [English]).

### Connecting the solar power generator and commissioning the inverters

<table>
<thead>
<tr>
<th>Task</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close any disconnecting devices between the solar generator and the inverter DC input terminals.</td>
<td></td>
</tr>
<tr>
<td>Measure the DC supply voltage level at each input terminal of the inverter [PVS1] to verify polarity and voltage range conforms to inverter technical data.</td>
<td></td>
</tr>
<tr>
<td>Close the DC disconnector [Q2] of the first inverter [PVS1].</td>
<td></td>
</tr>
</tbody>
</table>
| Perform the inverter commissioning tasks/checks that can be done with only the DC supply connected. | See the PVS800-57 hardware manual (3AUA0000053689 [English]) and PVS800 central inverters firmware manual (3AUA0000058422 [English]).
| Repeat the above commissioning tasks for the second inverter [PVS2]. | 
| Simulate transformer faults (unpowered) and ensure that the inverters detect the fault indications and trip accordingly. | 
| Turn the earthing switch at the grid-side of the switchgear to the “not earthed” position. | 
| Ask the power grid owner to connect the inverter station to the power grid. Wait until the inverter station has been connected to the power grid before proceeding. | 
| Turn the disconnecting switch at the grid side of the switchgear to the closed position. | 
| Turn the earthing switch at the transformer side of the switchgear to the “not earthed” position. | 
| Turn the disconnecting switch at the transformer side of the switchgear to the closed position. | 
| Close the main breaker or switch fuse combination of the transformer. | 
| Check that the voltage level on the low voltage side of the transformer is correct. Adjust the transformer tap settings if needed. | According to the operating instructions of the transformer. 
| Run the transformer with no load for several hours before proceeding to the tasks under the subsection Connecting the inverters to AC supply. | According to the operating instructions of the transformer. 

## Connecting the inverters to AC supply

- According to the operating instructions of the transformer.
<table>
<thead>
<tr>
<th>Task</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observe the transformer for any malfunction. Monitor the temperature, check for audible changes etc.</td>
<td></td>
</tr>
</tbody>
</table>

### Connecting the inverters to AC supply

<table>
<thead>
<tr>
<th>Task</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close the AC disconnector [Q1] of the first inverter [PVS1] to be commissioned.</td>
<td></td>
</tr>
<tr>
<td>Perform the rest of the inverter commissioning tasks (if any).</td>
<td>See PVS800-57 hardware manual (3AUA0000053689 [English]).</td>
</tr>
<tr>
<td>Close the AC disconnector [Q1] of the second inverter [PVS2] to be commissioned.</td>
<td></td>
</tr>
<tr>
<td>Repeat the commissioning tasks (if any) for the second inverter.</td>
<td></td>
</tr>
</tbody>
</table>
Maintenance

Contents of this chapter

This chapter contains the maintenance intervals table, and related maintenance instructions.

The symbols in square brackets, for example [U1], refer to the device designations used in the circuit diagrams.

General

The recommended maintenance intervals and component replacements are based on specified operational and environmental conditions. ABB recommends annual inspections to ensure the highest reliability and optimum performance. Consult your local ABB Service representative for more details on the maintenance.

WARNING! Only an authorized electrician is allowed to service the inverter station. Follow the safety instructions starting from page 9, and the local safety regulations. If ignored, physical injury or death may follow, or damage may occur to the equipment.
## Maintenance intervals

The table below lists the routine maintenance intervals recommended by ABB.

<table>
<thead>
<tr>
<th>Maintenance task</th>
<th>Interval</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning the inverter compartment</td>
<td>First check after commissioning, then every 2 years.</td>
<td>See section <a href="#">Cleaning the inverter compartment on page 47</a>.</td>
</tr>
<tr>
<td>Replacing intake air filters</td>
<td>2 years in typical conditions. 1 year in dusty conditions. Using night time reactive power reduces the filter change interval by 50%. See the PVS800-57 firmware manual.</td>
<td>See section <a href="#">Replacing the intake air filters and cleaning the sandboxes on page 47</a>.</td>
</tr>
<tr>
<td>General paint and corrosion check, checking and repairing painted surfaces</td>
<td>First check after commissioning, paying special attention to potential paint damage which may have happened during transportation and installation. Then every 2 years.</td>
<td>See section <a href="#">Cleaning the exterior surfaces of the inverter station on page 48</a>.</td>
</tr>
<tr>
<td>Cleaning the external surfaces</td>
<td>First after commissioning, then every 5 years.</td>
<td>See section <a href="#">Cleaning the exterior surfaces of the inverter station on page 48</a>.</td>
</tr>
<tr>
<td>Lubricating hinges and locks.</td>
<td>Every 2 years.</td>
<td>See section <a href="#">Lubricating external hinges, locks and seals on page 49</a>.</td>
</tr>
<tr>
<td>General condition check, checking grounding bar</td>
<td>Every 5 years.</td>
<td>See section <a href="#">Checking and cleaning the grounding bars and points on page 52</a>.</td>
</tr>
<tr>
<td>General condition check, checking tilting of inverter station</td>
<td>Every 5 years.</td>
<td>See drawing <a href="#">Foundation and external cabling layout on page 61</a> for maximum recommended tilting angle.</td>
</tr>
</tbody>
</table>

The inverters have their own routine maintenance schedules in addition to the tasks listed in the table above. See the inverter hardware manual.
Inside the inverter station

Cleaning the inverter compartment

WARNING! Do the steps given in section Safety instructions for the inverter compartment on page 11. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

1. Clean the floor plates with a vacuum cleaner.
2. Remove the floor plates and check the cleanliness of the container base.
3. If the base is not clean, clean it with a vacuum cleaner.
4. Replace the floor plates.
5. Clean the outer surfaces of inverters [PVS1, PVS2], control cabinets/enclosures and the compartment heater [E1] with a vacuum cleaner.

Replacing the intake air filters and cleaning the sandboxes

WARNING! It is mandatory to turn off the inverters before changing the filters in order to prevent dust from the dirty filters flowing into the inverters.

WARNING! Handle the filters gently. The filters are easily damaged if handled carelessly.

WARNING! While cleaning sand collection boxes, make sure that you do not touch or damage the filters.

1. Turn off the inverters [PVS1, PVS2].
2. Loosen the screws on the filter supports on 2 sides.
3. Remove the filter support frame.
4. Replace the air filter.
5. Reinstall the filter support frame and tighten the screws.
6. Check and clean the sand collection boxes from outside the inverter station.
Cleaning the exterior surfaces of the inverter station

- **Materials**
  - Cleaning towels and mop
  - Detergents, Würth universal cleaner 0893 125 R1 (or similar)
  - Water

Wash the inverter station using detergent. Clean the roof first and then the walls. Use a mop to remove stubborn dirt. Rinse the detergent off with water.

The inverter station is IP54 protected. A pressure washer can be used on the roof but must not be used near air inlets or outlets. Wash air inlets with a gentle, low pressure water flow. Use a mop to gently wash the air outlet louvres inside the weather protection hoods.
Lubricating external hinges, locks and seals

- **Materials**
  - Cleaning materials
  - Hinge lubricant: Würth HHS2000 0893 106 (or similar spray)
  - Lock lubricant: Würth Maintenance Spray 0893 051 (or similar spray)
  - Door seal lubricant: Würth Rubber Care 0890 110 (or similar silicone free spray)

**Note!** Do not use lubricants containing silicone. Silicone may react with repaired paint. Oil the hinges and locks. Wipe off excess lubricant with towels.

Spray door seals with rubber conditioning spray. Wipe off excess lubricant with towels.
Checking and repairing painted surfaces

Materials

- Sandpaper or steel wire brush
- Cleaning towels
- Detergents. Würth Pro-Clean 0893 140 (or similar)
- Zinc primer: Hempel zinc primer 16490 or Würth Rost Stop 0890 191 (or similar)
- Finishing paint: Hempel Hempathane HS 55610 two-component polyurethane paint (or similar)
- Paint colors: See Surface finishing on page 55.

Note! Obey the instructions given by the material manufacturers.

Note! If damaged areas are very large, thoroughly clean the external surfaces before starting the repair. See Cleaning the exterior surfaces of the inverter station on page 48.

Procedure

**WARNING!** Follow the steps given in section Safe installation, start-up and maintenance on page 10. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

1. If there is rust, remove it gently with sandpaper or brush.
2. Clean the damaged and adjacent area with suitable detergent. Rinse detergent away with clean water.
3. Let the surface dry completely and keep it clean.
4. Coat the area with zinc primer.
5. Cover the damaged area with finishing paint.
Checking and repairing unpainted, zinc coated surfaces

- **Materials**
  - Sandpaper
  - Cleaning towels and liquids
  - Zinc coating on non painted surfaces: Würth Zinc 300 0892 200 with brush or Zinc Spray Perfect 0893 114 113 (or similar)

  **Note!** Obey the instructions given by the material manufacturers.

- **Procedure**

  **WARNING!** Follow the steps given in section *Safe installation, start-up and maintenance* on page 10. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

Pay special attention to doors and lower parts of the walls which are potentially prone to corrosion due to dust and humidity.

1. If there is rust, remove the rust gently with sandpaper.
2. Clean the damaged area and the area adjacent to it.
3. Coat the damaged area with zinc coat. Würth Zinc 300 is preferred because it gives a thicker coat. On larger areas Würth Zinc Spray Perfect can be used to speed up the work and to provide a smoother surface appearance.
Checking and cleaning the grounding bars and points

- **Materials**
  - Steel wool
  - Ensto SR1 joint compound (or similar)
  - 42839 Würth Protective Wax Spray (or similar).

- **Procedure**

  **WARNING!** Follow the steps given in section *Safety instructions for the inverter compartment* on page 11. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

1. Check the condition of grounding bar and grounding cables in the inverter station. If there is visible corrosion, remove the cables and remove the corrosion with steel wool. Apply joint compound between the grounding bar and cable terminal joint surfaces.

2. Change the spring lock washers. Tighten the cables to the nominal torque values (torque for a M12 bolt is 50 Nm).

**Note!** Check the main earthing bar in the MV substation as well to ensure a proper earthing grid. Follow instructions and guidelines from the supplier of the MV substation.
Technical data

Contents of this chapter

This chapter contains the technical data of the PVS800-IS inverter station.
## Technical data

<table>
<thead>
<tr>
<th>PVS800-IS-1750kW-B</th>
<th>PVS800-IS-2000kW-C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Installed inverter type</strong></td>
<td>PVS800-57-0875kW-B</td>
</tr>
<tr>
<td><strong>Input data (DC)</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum input power ($P_{PV, \text{max}}$)</td>
<td>2 x 1050 kW</td>
</tr>
<tr>
<td>DC voltage range, mpp ($U_{DC, \text{mpp}}$)</td>
<td>525 - 825</td>
</tr>
<tr>
<td>Max DC voltage ($U_{DC, \text{max}}$)</td>
<td>1100 V</td>
</tr>
<tr>
<td>Max DC current ($I_{DC, \text{max}}$)</td>
<td>2 x 1710 A</td>
</tr>
<tr>
<td>Voltage ripple</td>
<td>&lt; 3%</td>
</tr>
<tr>
<td>Number of protected DC inputs</td>
<td>2 x 12 (+/-)</td>
</tr>
<tr>
<td>Number of MPP trackers</td>
<td>2</td>
</tr>
</tbody>
</table>

$1)$ Inverter limits power to safe level

| **Output data (AC)** | | |
| Nominal AC output power ($P_{AC, N}$) | 2 x 875 kW | 2 x 1000 kW |
| Power at cos phi = 0.95 $^2$) | 2 x 830 kW | 2 x 950 kW |
| Maximum AC output power ($P_{AC, \text{MAX}}$) $^3)$ | 2 x 1050 kW | 2 x 1200 kW |
| Nominal AC current ($I_{AC, N}$) | 2 x 1445 A | 2 x 1445 A |
| Nominal output voltage ($U_{AC, N}$) | 350 V | 400 V |
| Output frequency | 50/60 Hz | 50/60 Hz |
| Harmonic distortion, current $^4)$ | <3% | <3% |
| Power factor compensation | Yes | Yes |

$2)$ At 45 °C ambient temperature.

$3)$ At 20 °C ambient temperature.

$4)$ At nominal power.

| **Efficiency** | $^5)$ | $^5)$ |
| Maximum | 98.7% | 98.8% |
| Euro-eta | 98.5% | 98.6% |

$5)$ Efficiency without auxiliary power consumption at min $U_{DC}$

| **Own consumption** | | |
| Aux. power in operation $^6)$ | < 1400 W | |
| Aux. power in standby operation $^6)$ | < 100 W | |
| Additional heating max power $^7)$ | 500 W | |

$6)$ Without options and heating

$7)$ Thermostat controlled

| **Environmental limits** | | |
| Degree of protection $^8)$ | IP54 | |
| Ambient temperature range (nominal ratings) | -20 °C…+45 °C | |
| Maximum ambient temperature $^9)$ | +55 °C | |
| Relative humidity, non condensing | 15%…95% | |

$8)$ After installation. During transportation IP55

$9)$ Power derating above +45 °C
### Technical data

<table>
<thead>
<tr>
<th><strong>Air filtration and cooling system</strong></th>
<th><strong>PVS800-IS-1750kW-B</strong></th>
<th><strong>PVS800-IS-2000kW-C</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum airflow through station</td>
<td>2 x 8700 m³/h (2 inverters)</td>
<td></td>
</tr>
<tr>
<td>Inverters cooling method</td>
<td>Forced air cooling</td>
<td></td>
</tr>
<tr>
<td>Filtering class, normal environment</td>
<td>G4, EN 779</td>
<td></td>
</tr>
<tr>
<td>Optional filtering class, near coastal environment</td>
<td>F7, EN 779</td>
<td></td>
</tr>
<tr>
<td>Intake filters quantity</td>
<td>8 pcs. (4 intake units, 2 filters per unit)</td>
<td></td>
</tr>
<tr>
<td>Intake filter size</td>
<td>H595 x W595 x D98 mm</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Dimensions and weight</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Width / Height / Depth (W / H / D) [mm]</td>
<td>6058 / 2896 / 2438</td>
</tr>
<tr>
<td>Approximate weight</td>
<td>10 t</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Surface finishing</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>External surfaces treatment</td>
<td>Painted (EN ISO12944-2), corrosion class C5</td>
</tr>
<tr>
<td>External surfaces color</td>
<td>RAL 7035</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Local power enclosure (Auxiliary cabinet)</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>External auxiliary supply connection</td>
<td>3/N/PE AC 400 V 50 Hz 3 x 20 A MCB</td>
</tr>
<tr>
<td>Input terminal size</td>
<td>16 mm²</td>
</tr>
<tr>
<td>Optional auxiliary transformer rating</td>
<td>6 kVA (option code +G344)</td>
</tr>
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<tr>
<th><strong>Available standard interfaces</strong></th>
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<td>Power supply to AUX cabinet of MV substation</td>
<td>3 x 6 A MCB, 400 V 50 Hz, 16 mm² terminal size</td>
</tr>
<tr>
<td>Power sockets for general purposes</td>
<td>3 x 10 A MCB, 230 V 50 Hz, socket CEE 7/4 (type F)</td>
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<tr>
<td>Alarm signals interface for MV substation</td>
<td>4 pcs. I/O signals NC type in alarm situation 0. 2.5 mm² terminal size, pre wired to inverters (for example, temperature, oil level, alarm status, optional derating)</td>
</tr>
<tr>
<td>Trip signal interface for MV substation</td>
<td>1 pcs. I/O signals NC types in alarm situation 0. 2.5 mm² terminal size</td>
</tr>
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<th><strong>Inverter fuses</strong></th>
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<tr>
<td>Fuse ratings</td>
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<th><strong>Cable lead-through data</strong></th>
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Derating

The load capacity (current and power) decreases if the installation site altitude exceeds 1000 meters (3300 ft), or if the ambient temperature exceeds the nominal ambient temperature 45 °C (+113 °F).

- **Temperature derating**

  In the temperature range +20 °C (+68 °F) to +55 °C (+131 °F), the rated output current is as shown below. 120% rated current is allowed below +20 °C (+68 °F).

- **Altitude derating**

  At altitudes between 1000 and 4000 m (3300 and 13000 ft) above sea level, the derating is 1% for every 100 m (330 ft). If the installation site is higher than 2000 m (6600 ft) above sea level, contact your local ABB distributor or office for further information.

- **Combined derating**

  Because altitude affects the maximum temperature, it is possible to compensate for the altitude derating value with a limited maximum ambient temperature. Each degree of maximum ambient temperature below the nominal ambient temperature gives a 1% compensation to the altitude derating.

  **Note!** Maximum altitude is still limited to 4000 m (13000 ft).

  **Note!** Use temperature compensation only for altitude derating. Nominal power must not be exceeded.

Example: For the 1750 kW or 2000 kW units, if the maximum ambient temperature of an inverter station installed at 2800 m (9200 ft) is limited to +32 °C (+90 °F) the derating factor is 100% - 18% + 13% = 95% or 0.95.
Drawings

Contents of this chapter
This chapter contains the additional drawings of the PVS800-IS inverter station.
Dimensions and layout

First angle projection. Original drawing made with Pro/ENGINEER. Set the correct scale factor when adding dimensions after DWG/DXF conversion.

Special reservation for post installations.
First angle projection. Original drawing made with Pro/ENGINEER. Set the correct scale factor when adding dimensions after DWG/DXF conversion.
NOTES

USE LIFTING CHAIN WITH MINIMUM CAPACITY OF 5000KG/CHAIN.

USE LIFTING CHAINS WITH MINIMUM LENGTH OF 5000MM.

Length 5000mm.

Max.

Container doors

Exit door

Max.

Max.

NOTES

USE LIFTING CHAINS WITH MINIMUM CAPACITY OF 5000KG/CHAIN.

USE LIFTING CHAINS WITH MINIMUM LENGTH OF 5000MM.

Length 5000mm.

Max.

Container doors

Exit door

Max.

Max.
Foundation and external cabling layout

Note: The control cables must not be installed into the same pit with the DC cables. Follow the minimum distances between control and DC cables stated in the PVS 800-57 Hardware manual (Chapter 5).

Trench around the station. Filled with soil after cabling.

Earthing grid.

Lead throughs for control cables.

Average cable (AC PVS2) length to container corner: 3500mm.

Average cable (AC PVS1) length to container corner: 6000mm.

Average cable (DC PVS1) length to container corner: 8200mm.

Average cable (DC PVS2) length to container corner: 2500mm.

Note: Frost conditions and local regulations may require deeper trenches. In these cases, use taller column foundations.

Lead throughs for earthing, PSU and IO cables.

Dimension between lifting and locking points.

Dimension between lifting and locking points.

Earthing cable: 120mm².

Column foundations.

Trench around the station for AC- and DC- cables and column foundations. Filled with soil after cabling.

Note: Recommended maximum angular tilting of the Inverter Station (IS) after installation. 1mm/meter (= total 6mm in lengthwise, total 2,5mm sidewise)

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Cable lead-through system example

Control cable inlets on bottom on left side

PSU, IO and earthing inlets to a MV station on bottom on right side

DC inlets:
- Total 12 DC inputs / inverter
- 24 cable glands with 1 cable system
- 48 cable glands with 2 cable system
- M40, Cable diameter range 20-28 mm

AC inlets: 4 cable glands / phase
- M50, Cable diameter range 28-33 mm
- Max current 1732 A / phase
- Nominal current 1501 A / phase
Further information

For more information on ABB products and services for solar applications, navigate to www.abb.com/solar.