Welcome to the ABB Industrial Drives, ACS800 planning the installation training module.

If you need help navigating this module, click the Help button in the top right corner. To view the presenter notes as text, please click the Notes button in the bottom right corner.
After completing this module, you will be able to

- Recommend the correct cabling rules to avoid EMC and bearing current problems.
- Describe the right methods for earthing of the power and control cables.
- Explain how the installation site variables effect the product behaviour.
- Locate public support material.
- Locate internal support material.

After completing this module, you will be able to

- Recommend the correct cabling rules to avoid EMC and bearing current problems.
- Describe the right methods for the earthing of the power and control cables.
- Explain how the installation site variables effect the product behavior, and
- locate public and internal support material.
Selection of the Devices

- Select the correct motor type according to Requirements table of the Hardware manual.
- Select the drive.
- Select the disconnecting device according to local requirements.
- Dimension, select and protect the power cables according to local and ACS800 hardware manual requirements.
- Check that the following matters fulfil the HW manual requirements:
  - Ambient conditions
  - Ratings
  - Cooling air flow
  - Power connections (cabling directions, cable sizes)

- Environment should be checked for optional EMC filters:
  - The First environment (Public – category C1 and C2)
  - The Second environment (Industrial – Category C3 and C4)

Selection of the Devices

- Select the correct motor type according to the requirements table of the Hardware manual.
- Select the drive.
- Select the disconnecting device according to local requirements.
- Dimension, select and protect the power cables **according to local and ACS800 Hardware manual requirements**.
- Check that the
  - Ambient conditions
  - Ratings
  - Cooling air flow, and
  - Power connections (cabling directions, cable sizes) fulfil the HW manual requirements.
- The environment should be checked for optional EMC filters.
Cabling:

To reduce bearing currents and to avoid the stress on motor insulation, correct filters must be used.

To avoid damage to motor bearings and other devices, the cables must be selected and installed according to the instructions given in the hardware manual.

The drive protects itself and the power cables against thermal overload when the cables are dimensioned according to the nominal current of the drive.

Cabling:

To reduce bearing currents and to avoid the stress on motor insulation, correct filters, such as du/dt, common mode or sine, must be used.

To avoid damage to motor bearings and other devices, the cables must be selected and installed according to the instructions given in the hardware manual.

The drive protects itself and the power cables against thermal overload when the cables are dimensioned according to the nominal current of the drive.

The drive is also equipped with an internal ground fault protective function to protect the unit against ground faults in the motor and motor cable.

The drive protects the motor cable and motor in a short-circuit situation when the motor cable is dimensioned according to the nominal current of the drive.
Selecting the Power Cables:
Shielded symmetrical motor cables must be used for frame sizes R5 or larger, and motors larger than 30kW. For other sizes they are also recommended.
Shielded symmetrical cables reduce electromagnetic emission, motor bearing currents and unsymmetrical phase currents.
See the hardware manual for additional information about cabling rules, power cable shielding and alternative cable types.
When selecting control cables, note that all control cables must be shielded.

Use a double-shielded twisted pair cable for analogue and pulse encoder signals
  - Single-shielded cable for low-voltage digital signals can be used

Run analogue and digital signals in separate, shielded cables

In remote use, the cable connecting the control panel to the drive must not exceed 3 meters

When selecting control cables, note that all control cables must be shielded.

Use a double shielded twisted pair cable for analogue signals. This cable type is illustrated in “Figure a”. This type of cable is also recommended for the pulse encoder signals also.

A double-shielded cable is the best alternative for low-voltage digital signals but a single-shielded twisted pair cable, illustrated in “Figure b”, is also usable.

Employ one individually shielded pair for each signal and do not use common return for different analogue signals.

Run analogue and digital signals in separate, shielded cables.

Also, remember that in remote use, the cable connecting the control panel to the drive must not exceed 3 meters.
Cabling Routing:

Route the motor cable away from other cable routes. Motor cables of several drives can be run in parallel, installed next to each other.

It is recommended that the motor cable, input power cable and control cables are installed on separate trays.
  - Decreases electromagnetic interference caused by the rapid changes in the drive output voltage
  - Lead 24 V and 230 V control cables in separate ducts inside the cabinet

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

See the cable routing diagram for the required distances between the cables.

Do not run extra cables through the drive.

The cable trays must have good electrical bonding to each other and to the grounding electrodes.

Aluminium tray systems can be used to improve local equalizing of potential.
Environment:

The allowed installation site altitude is between 0 and 4000 m. If the installation site is above 1000 m, the loading capacity decreases by 1% for every 100 m.

If the installation site is higher than 2000m above sea level, please contact your local ABB distributor or office for further information.

The allowed operation temperature range is -15 to +50°C. From +40°C to +50°C the rated output current is decreased 1% for every additional 1°C.

The relative humidity must be less than 95%. The maximum allowed relative humidity is 60% in the presence of corrosive gases.

No condensation or conductive dust is allowed.
Here you can see the voltage ratings of the input and output connections. Input voltage means the input power connection to the drive and output voltage means the motor connection.
A certain amount of free space around the drive is required to enable sufficient cooling air flow. It is also required for service and maintenance work and door opening.

The amount of free space depends on the chosen mounting orientation or installation method. See the hardware manual for the recommended free space in each direction.

In the pictures you can see the cooling air flow in the case of a cabinet and a module. Recirculating cooling air into the unit is not allowed.
Electromagnetic compatibility is the ability of electrical equipment to operate without problems within an electromagnetic environment.

The Power Drive Systems (PDS) can be connected to either industrial or public power distribution networks.

The industrial low-voltage network can be of the IT (floating network) or TN (grounded) types.

The environment classes are the First (Public – Category C1 and C2) and the Second (Industrial – Category C3 and C4) Environment.

The First Environment (Category C1 and C2) comprises of domestic premises. It also includes establishments directly connected without an intermediate transformer to a low-voltage power supply network which supplies buildings used for domestic purposes.

The Second Environment (Category C3 and C4) comprises of all establishments other than those directly connected to a low-voltage power supply network which supplies buildings used for domestic purposes.

ACS800 products have optional filters for the First and the Second environment (Categories C1 to C4).

The environment should be selected when the ACS800 drive is ordered.

In order to fulfil EMC Directive requirements you should

- Make a 360° high frequency grounding of cable entries in order to suppress electromagnetic disturbances,
- Ensure that cable length is not longer than 100 m (328 ft), and also
- Ensure that the drive is equipped with an appropriate EMC filter.
Here are the requirements for the installation site.

The drive must be installed in an upright position on a floor or wall. Check that there is nothing on the wall to inhibit the installation.

The wall material or material near the unit must be non-flammable.

If a unit is mounted on the wall, the wall must be as close to vertical as possible and strong enough to carry the weight of the unit.

The drive must not be installed without a pedestal and a support shelf on the wall.

The floor or material below the installation should be non-flammable and the floor must be horizontal.

Provide the drive with the amount of fresh cooling air given in the Technical data chapter in the User’s manual.
Drives Technical Support Services provide accurate, consistent, and responsive information and support.

The Drive services concept means that ABB offers the same after sales services to its customers all around the world.

You can also get support from the: Channel partner network, the ABB Service Guide, Parts OnLine and the ABB Support line.
There is public support material available on the ABB website, including a document library, manuals, service instructions and brochures.
Internal support material is available in the In-House Maintenance Manual. There you can find circuit diagrams, hints and product notices, PC Tool Hints, Service instructions and manuals, spare parts, special variants, frequently asked questions and comments.
Thank you for your attention. You may now go ahead and move on to the next unit.