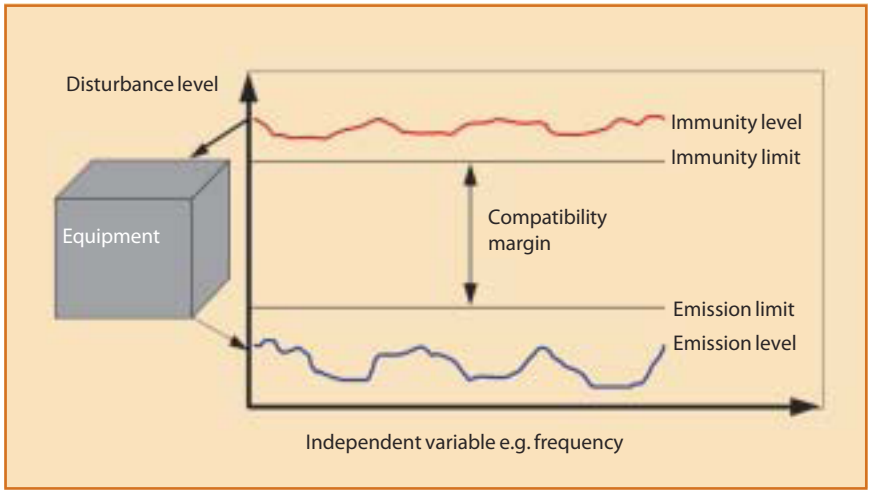
EMC compliant installation and configuration for a power drive system



Immunity and emission compatibility.

What is EMC?

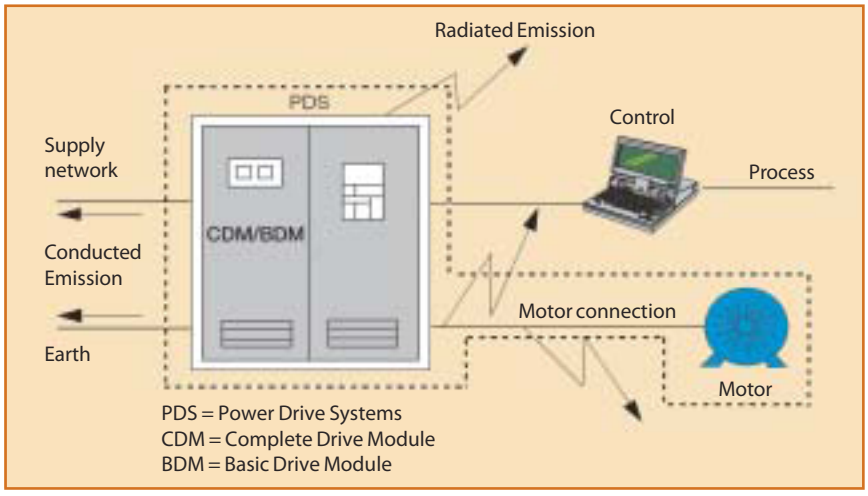
EMC stands for Electromagnetic Compatibility. This is the ability of electrical and electronic equipment to operate without problems within an electromagnetic environment and without disturbing or interfering with nearby equipment.

Why is EMC important?

Electric devices, when energised, are surrounded by an electromagnetic field. If the current changes, the field changes. Conversely, if the field is forcibly changed, this will change the current within the device. If the field of one device alters the weaker field of a nearby, unshielded, device, this may disturb the operation of the second device.

EMC problems can manifest themselves in a number of ways, and can often be attributed to other causes, such as softw are bugs. Because the problems are difficult to trace, the cost for correcting them can be very high.

Emissions and immunity in practice



Emissions from power drive system.

Technical Notes

Basic principles have to be followed to ensure the EMC compatibility of drive systems incorporating AC drive products. All ABB drive products fulfil the requirements of the EMC Directive and the EMC Product Standard of variable speed drives, however any OEM using drive products has responsibility for ensuring the EMC compatibility of the whole system.

FACT FILE

Technical Notes

The source of high-frequency emission from frequency converters is the fast switching of power components such as IGBTs and control electronics.

Electrical equipment should be immune to high-frequency and low-frequency phenomena. High-frequency phenomena include electrostatic discharges (ESD), fast transient bursts, radiating electromagnetic fields, conducting radio frequency disturbances and electrical surges. Typical low-frequency phenomena are mains voltage harmonics, notches and imbalance.

Preventing conducted disturbances

Conducted disturbances can propagate to other equipment via all conductive parts including cabling, earthing and the metal frame of an enclosure. Conductive emissions can be reduced in the following ways:

- By choosing a drive with the RFI-filter
- By using ferrite rings in any power connection points

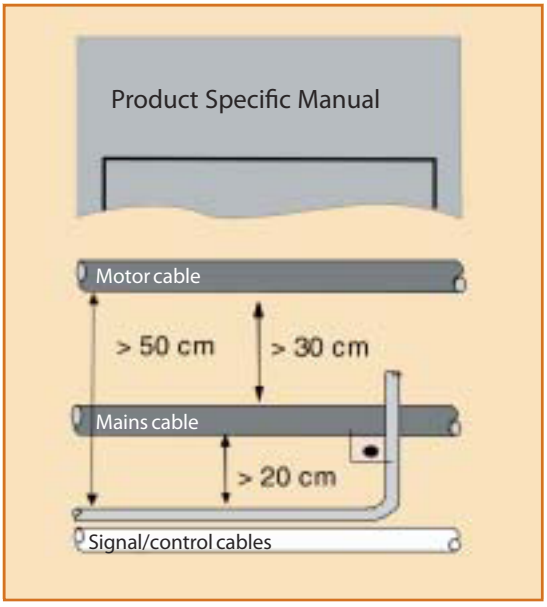
Preventing radiated disturbances

To avoid disturbance through the air, all parts of the Power Drive System (PDS) should form a Faraday Cage against radiated emissions. The PDS includes drive modules, cabinets, auxiliary boxes, cabling, motors, etc. To safeguard the continuity of the Faraday Cage; follow this advice:

Enclosure:
- Unpainted metal to metal contacts shall be used throughout, with conductive gaskets, where appropriate.
- Use conductive gaskets in doors and covers. Covers should be secured at no more than 100 mm intervals in sections where radiation can escape.
- Holes in the enclosure should be minimised.

Cabling & Wiring:
- Use special HF cable entries for high frequency earthing of power and control cable shields.
- Use shielded cables in accordance with the manufacturers' instructions.
- Route power and control cables separately.
- Use twisted pairs to avoid disturbances.

Installation:
- Selection and installation of accessories should be made in accordance with the manufacturers' instructions.
- Use 360° earthing at motor end. See product specific instructions.
- Special attention must be given to earthing.



Routing principles of control cables.

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