









dv/dt Filter Series FN 5060

Mounting and Installation Guidelines

Please read and follow the safety, application and installation notes.

Important safety notes

	Filter installation, start-up, operation and maintenance (if any) has to be carried out by a trained and certified electrician or technician, who is familiar with safety procedures in electrical systems.
	Danger of electrical shock! High voltage potentials are involved in the operation of this product. Always remove power before handling energized parts of the filter, and let ample time elapse for the capacitors to discharge to safe levels (<42 V). Residual voltages are to be measured both line to line and line to earth.
	Always connect the filter to protective earth (PE) first, then continue with the wiring of phase terminals. When decommissioning the filter, remove the PE connection at the end. The sine wave filter must not be operating without connected motor.
	Follow the general installation notes closely. Ensure that cooling slots, openings or grids (if any) are free from obstructions that could inhibit efficient air circulation. Operate the filter within its electrical, mechanical, thermal and ambient specifications at all times.
	For safety reasons, dv/dt filters must be installed in a way to prevent access of non-qualified persons to the filters.
	dv/dt filters are lossy electrical components. Filter surfaces and terminals may get hot under full load operating conditions and can exceed surface temperature >70 °C.
	Always practice the safety procedures defined by your company and by applicable national electric codes when handling, installing, operating or maintaining electrical equipment.
	In case of uncertainty and questions please contact your local Schaffner partner for assistance.

General application notes

NOTICE	Filter suitability for a given application must ultimately be determined by the user (the party that is putting the filter into operation) on a case-by-case basis. Schaffner will not assume liability for any consequential downtimes or damages resulting from use of filters outside their specifications.
NOTICE	dv/dt filters must be mounted in a clean, dry location (enclosures, cabinets, closed rooms). Contaminants such as oils, liquids, corrosive vapors, abrasive debris, dust and aggressive gases must be kept out of the filter enclosure.
Standard products	Standard catalog filters must be used for the published applications and operated within the published technical specifications.
Custom products	Custom filters must be used for the bespoke application and operated within the provided and mutually agreed technical specifications.
NOTICE	dv/dt filters are design-in products by definition. Their functionality and suitability must be determined with a proper design-in process, involving electrical, mechanical and thermal verification within the final equipment.

General installation notes

- Carefully inspect the shipping container and the product prior to the installation. In case of visual damage, don't install the filter and file a claim with the freight carrier involved.
- Filters may be heavy. Follow the instructions for lifting heavy equipment defined by your company.
- Use an appropriately sized threaded bolt for every mounting hole/slot provided by the filter flange. The strength class of the bolt must be determined by the installer, depending upon filter weight and the material of the mounting surface.
- Connect the filter to the protective earth (PE) terminal(s).
- Remove all line side power, then connect the phase terminal(s) and neutral terminal (if any) of the filter.
- For the electrical connection of the filter terminals, apply the torques recommended on the filter label and/or in the published filter datasheets. For the bus bar connections do apply the corresponding tightening torque of the screws.
- Cable or busbar cross sections have to be chosen in accordance with national and international electric codes and applicable product standards governing the equipment that will incorporate the filter.
- Special attention should be paid to cable dimensioning, fuses, grounding, shutdown, disconnection, and overcurrent protection.

In order to get the maximum benefit out of the Schaffner filters, please also consult "Basics in EMC and Power Quality", published in the download section of www.schaffner.com. These additional guidelines provide helpful hints for HF-grounding, shielding, proper cable routing, etc.

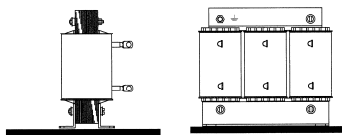
Filter placement and mounting

Lift the heavy IP00-filters of series FN 5060 which do have lifting eyes with appropriate lifting aids – smaller types may be lifted manually by two persons (no lifting eye bolt applicable).

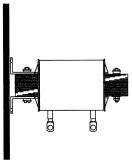


The dv/dt filter or the inductance unit (with separate resistors and capacitors) shall in principle be mounted vertically in order to respect a proper heat dissipation flow. To ensure an optimum ventilation and thermal radiation, it is recommended to leave enough space towards surrounding equipment, walls or components in all directions. A minimum free space below and above the filter of >150 mm and >50 mm aside is required. The separate capacitors can be mounted aside the inductance with a minimum air distance of 150 mm. Due to the heat dissipation of the inductance it is not recommended to mount the capacitors above or on top of the inductance.

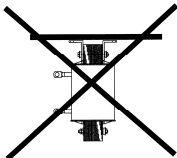
Recommended mounting positions:



Permitted mounting positions:

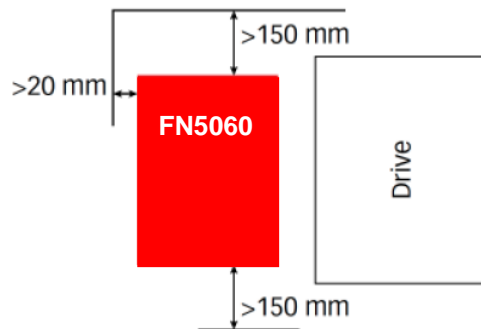


Prohibited mounting positions:
 mechanical constraint



thermal constraint

FN 5060:



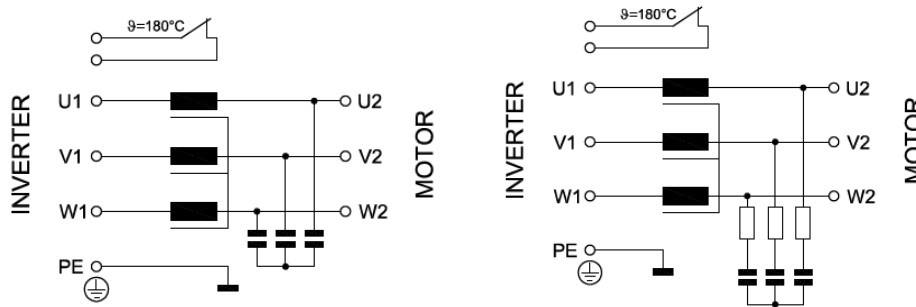
The pictures above show recommended, permitted and prohibited mounting positions. The mounting on a vertical plate (middle left picture) is limited to IP00 products with a maximum weight of 25 kg. Use all available mounting holes and select the correct screws and washers in order to ensure a reliable mounting and to do justice to the weight of these products. Apply torques appropriate for the strength class of the screws and washers you are using. Specifications can be obtained from the supplier of the screws and washers.

Wiring and connections

The filter rating has to be compatible with the drives to which it is to be connected. All drives manufacturer installation and safety instructions must be fulfilled. The typical block schematic is shown for a motor load, but the load can be also multiple motors (take into account the total cable length). Drives and load cable selection/placement should be in accordance with all local electrical standards and regulations.

In many applications a shielded motor cable may not be required. Anyhow, due to other possible influences of common mode disturbances Schaffner does recommend to use shielded motor cables. This is to avoid back-coupling of radiated interferences to the mains cable at the frequency range from 1–30 MHz. This EMC measure however can only be considered to be efficient, if the ends of the cable shield of the motor cable are put in proper HF low-impedance contact with the ground of the motor and the frequency converter.

dv/dt filters with separate capacitors and/or resistors must be connected as follows:

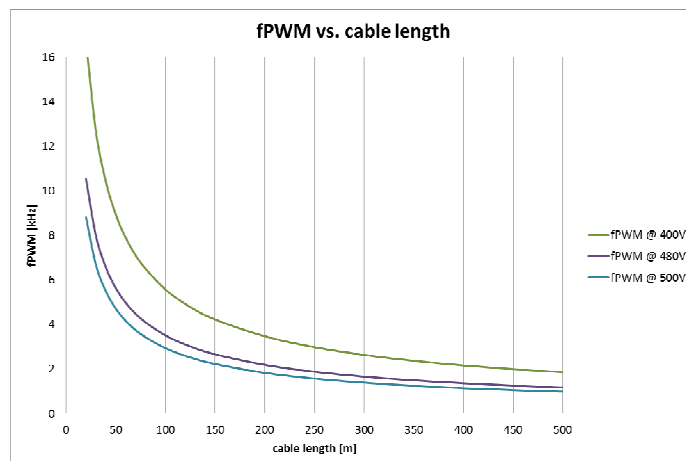


The temperature switch (normally closed) is mounted within the middle winding and opens at 180°C.

Required drives settings

Ensure the motor drive switching frequency is set to the required switching frequency (see filter selection table). Check the drives manual whether special settings are necessary. For any questions please contact the drives manufacturer.

Refer also to the “fPWM/cable length” diagram below:



If the drives settings are not correct, the dv/dt effect may not be sufficient to protect the motor winding insulation and the filter may be damaged!

Last update: June 2015