

GTX Three-Phase Series, EMI-RFI Filters



INTRODUCTION

This application note provides important information and recommended usage for KEMET's EMI-RFI filters.

"EMI-RFI filter" and "Noise filter" are general terms for low-pass filters that pass voltage, current, and signals in the commercial frequency band (50 / 60 Hz). These are composed of LC circuits and suppress unwanted noise. Generally, they effectively suppress noise in the frequency band from several hundred kHz to several tens of MHz.

HANDLING PRECAUTIONS

The contents described in the EMI-RFI filter datasheets and specifications guarantee the characteristics and quality of individual parts. When using these parts, evaluate and check them while it is mounted on the end product.

Please note that KEMET cannot guarantee the performance of the parts if the EMI-RFI filter is used in a way that deviates from the usages described in the EMI-RFI filters' datasheets and specifications.

EMI-RFI filters are intended for use in general electronic devices. If extremely high reliability is required and you are considering using it for equipment or devices that directly affect human life or property, please contact our sales office in advance.

Depending on the conditions of use, the EMI-RFI filter may make a noise that sounds like a growl. This roaring noise is not a problem with the electrical performance of the EMI-RFI filter. However, when using it, evaluate it while it is mounted on the end product and confirm that there is no problem.

Please install a protective device such as an overvoltage or an overcurrent protection device between the EMI-RFI filter and the input power supply.

PRECAUTIONS FOR PRODUCT STORAGE

EMI-RFI filters should be stored in normal working environments. While the filters are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long-term storage. KEMET recommends that maximum storage temperature not exceed 40°C, maximum storage humidity not exceed 70% relative humidity, and atmospheres should be free of chlorine and sulfur-bearing compounds. Temperature fluctuations should be minimized to avoid condensation on the parts. Also, avoid storage near strong magnetic fields as this might magnetize the product. EMI-RFI filters' stock should be used promptly, preferably within 12 months of receipt.

PRECAUTIONS WHEN INSTALLING THE EMI-RFI FILTER

The EMI-RFI filter should be used in an environment with normal temperatures and humidity. It should not be exposed to direct sunlight, corrosive gas, dust, liquid (such as raindrops), and condensation.

The EMI-RFI filter cannot be used on the output side of a general-purpose inverter (position of N / F ②) as shown in Figure 1 except for some instances. The three-phase GTX series can be used at the position of N / F ① in the figure below.

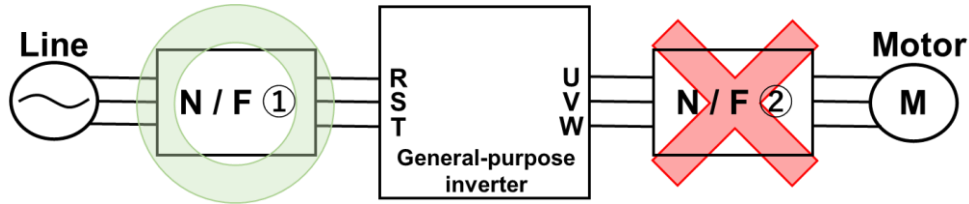


Figure 1

When installing the EMI-RFI filter in the application's chassis, install it where the surface is not painted, if possible, so that it is electrically conductive and the original performance of the EMI-RFI filter will be preserved. When grounding with wiring such as lead wires, it is recommended to use thick and short wiring.

Do not insert conductive foreign matter through the ventilation holes provided in the outer shell of the EMI-RFI filter. If the ventilation holes provided in the outer shell of the noise filter are blocked, the heat dissipation effect will be reduced. A 25 mm or more space should be left for the ventilation holes so that the air can circulate efficiently.

Please do not use a dropped EMI-RFI filter.

If abnormal noise, odor, smoke, etc., occur while using the EMI-RFI filter, stop using it immediately and consult your KEMET sales representative.

Connect to the input/output terminals of the three-phase GTX series via the ring lug terminals and fasten them with the recommended torque below. Please limit the number of ring lug terminals to the same connection point to two.

The three-phase GTX series' input/output terminal block tightening recommended torque is 2 to 2.3 N · m.

The compatible crimp terminal shape is defined as below:

- Line terminal up to 14-5 (made by JST) (terminal width dimension 12 mm),
- Ground terminal up to R5.5-4 (made by JST) (terminal width dimension 9.5 mm).

Since this part is not a terminal block, it may be deformed if extreme torque or repeated mounting and dismounting occurs.

The three-phase GTX series Y capacitors have a product line-up that incorporates high-capacity capacitors. Connect the ground terminal to prevent electric shock because the leakage current is large. If the earth leakage breaker operates, select a product with a low capacity.

Class Y Capacitors	C _Y	Leakage Current at 500 V/60 Hz
• Y000	-	0.03 mA maximum
• Y103	10,000 pF	2.00 mA maximum
• Y473	47,000 pF	9.00 mA maximum
• Y683	68,000 pF	13.00 mA maximum
• Y104	100,000 pF	20.00 mA maximum
• Y474	470,000 pF	92.00 mA maximum

Table 1

When selecting an EMI-RFI filter, select a product with high insertion loss characteristics according to the frequency band of the noise targeted to be suppressed.

The three-phase GTX series can also be used with a single phase. When using in a single phase, use 2 of the 3 lines and use the remaining 1 line in an open state.

In some products, the EMI suppression effect will change if the input and output of the EMI-RFI filter are inverted. Even though the internal circuit configuration of the three-phase GTX series is symmetrical, be sure to connect the filter in the same way in each occurrence of the end product so that unintended changes do not occur.

If the input wiring and output wiring connected to the EMI-RFI filter are bundled, the noise suppression effect may be lost due to crosstalk, so the input and output wiring should be kept separate.

The EMI-RFI filter should be placed as close to the noise source as possible to maximize its EMI suppression effect. Alternatively, install it near the device's outlet to prevent noise from entering the wiring from the outside.

PRECAUTIONS WHEN USING THE EMI-RFI FILTER

When using beyond the upper limit of the operating temperature range, perform derating based on the specified output derating curve. Please refer to the GTX Three-Phase datasheet for the derating curve.

Do not disassemble, modify, repair, or touch the inside of the EMI-RFI filter, as it may cause an electric shock.

Be careful not to get burned as the EMI-RFI filter surface becomes hot during use and immediately after the power is turned off.

Do not touch each terminal while the power is on as there is a risk of electric shock.

Immediately after the power is turned off, the internal capacitor is charged with a high voltage, so leave it for a while (about 5 seconds) until the discharge is completed.

Be careful not to miswire the input/output terminals, as smoke and fire risks exist.

The three-phase GTX series' line-to-ground is designed to withstand 2,800 VDC for 1 minute. When conducting a withstand voltage test, set the cutoff current of the withstand voltage tester to 10 mA.

If 2,800VDC is suddenly applied with the switch of the withstand voltage tester, the EMI-RFI filter may be damaged by the impulse voltage. The applied voltage should be gradually increased from 0 V by using the voltage volume of the withstand voltage tester.

Use a DC insulation resistance tester (500 VDC) when conducting an insulation resistance test.

Please check with your KEMET sales representative for the certificate of each country's safety standard and the latest registration status.

For Conditions of Acceptability in the safety standard UL certification, please contact your KEMET sales representative.

The design life of the EMI-RFI filter is about 10 years. After this, it is recommended to replace the EMI-RFI filter for maintenance.

When using multiple EMI-RFI filters connected in series or parallel, ensure that the voltage and current applied to each EMI-RFI filter are within the rated voltage and rated current.