MITSUBISHI ELECTRIC

700 series Frequency Inverters

RFI Filter Units for Frequency Inverter FR-D700

Art-no.: XXXXXX ENG, Version A, 05082008

Safety Information

For qualified staff only

This manual is only intended for use by properly trained and qualified electrical technicians who are fully acquainted with automation technology safety standards. All work with the hardware described, including system design, installation, setup, maintenance, service and testing, may only be performed by trained electrical technicians with approved qualifications who are fully acquainted with the applicable automation technology safety standards and regulations.

Proper use of equipment

The frequency inverters of the FR-D700 series are only intended for the specific applications explicitly described in this manual and the manuals listed below. Please take care to observe all the installation and operating parameters specified in the manuals. Only accessories and peripherals specifically approved by MITSUBISHI ELECTRIC may be used. Any other use or application of the products is deemed to be improper.

Relevant safety regulations

All safety and accident prevention regulations relevant to your specific application must be observed in the system design, installation, setup, maintenance, servicing and testing of these products.
In this manual special warnings that are important for the proper and safe use of the products are clearly identified as follows:

DANGER:
Personnel health and injury warnings.
Failure to observe the precautions described here can result in serious health and injury hazards.

CAUTION:
Equipment and property damage warnings.
Failure to observe the precautions described here can result in serious damage to the equipment or other property.

Further Information

The following manuals contain further information about the devices:

- Manual for frequency inverters and EMC
- Instruction manual of the frequency inverter FR-D700
- Beginners manual of the frequency inverters FR-D700, FR-E700, FR-F700, and FR-A700
- Installation manual of the frequency inverter FR-D700

These manuals are available free of charge through the internet (www.mitsubishi-automation.com).

If you have any questions concerning the programming and operation of the equipment described in this manual, please contact your relevant sales office or department.

Installation Notes

Please read the following installation notes carefully to use the filter unit to its option.

CAUTION

- ***The RFI filter units described in this reference sheet are designed exclusively for use with Mitsubishi inverter type FR-D700.***
- ***These filters are necessary to comply with limits for conducted noise voltages defined by the EN 61800-3 standard. The ≤ 180 A filter units are suitable for complying with the limits for Environment 1 (unrestricted and restricted distribution) and Environment 2. The > 180 A filter units are suitable for complying with the limits for Environment 1 (restricted distribution) and Environment 2. It is possible to that you may experience different results in practice, particularly if you do not completely and correctly follow the accepted EMC procedures for proper installation of filters and routing the power and control lines.***
- ***These filters are NOT designed for use in IT networks.***
- ***When the noise filters are operated leakage currents are discharged to earth. This can trigger upstream protective devices (as RCDs), particularly when there are unbalanced mains voltages, mains phase failures or switching activities on the input side of the filter.***
- ***The values of the power loss and leakage current in the following tables are typical values in a steady and error-free state. Depending on the power supply voltage, the power supply frequency and the filter used they may vary slightly.***
- ***Please note, that the appearance and wiring mechanics of the noise filters may differ from the figures shown in this short reference. Safe functioning as well as the grade of the radio frequency protection do not take affect of this.***
- ***For further details please refer to the Mitsubishi manual for Frequency Inverters and EMC, which contains detailed information about EMC conforming installation.***

Mounting

Check the inverter type.The filter should be used only in combination with inverters described in the table below.

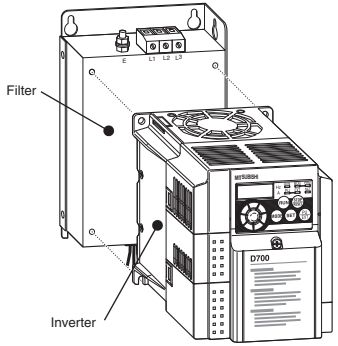
Filter		Frequency inverter
200V class	FFR-CS-050-14A-RF1	FR-D720S-008–042
	FFR-CS-080-20A-RF1	FR-D720S-070
	FFR-CS-110-26A-RF1	FR-D720S-100
400V class	FFR-CSH-036-8A-RF1	FR-D740-012–036
	FFR-CSH-080-16A-RF1	FR-D740-050/080
	FFR-MSH-170-30A-RF1	FR-D740-120/160

Function

The filters described in this document are designed to reduce conducted noise voltages to comply with the limits defined for Environments 1 and 2. The FFR-BS-SF100 can provide conformity with the limits for Environment 1 (unrestricted distribution/category C1) with motor cable lengths of up to 25m (shielded) and for Environment 1 (restricted distribution/category C2) with motor cable lengths of up to 100m (shielded), and thus also with the 100A limits of Environment 2 with motor cable lengths of up to 100m.

Footprint-mounting

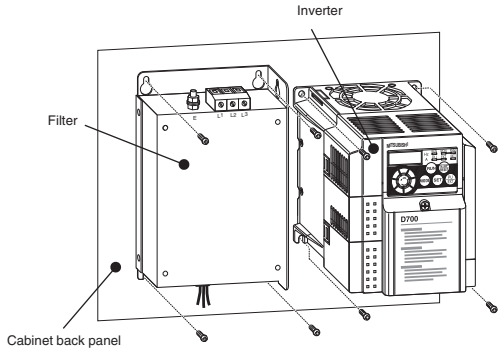
Fix the inverter to the top panel of the filter and secure it with the screws provided.



To fix the filter-inverter unit on the back of the cabinet use the mounting bolts provided with the filter. For correct filter performance the filter mounting bolts should electrically bond to the cabinet back panel wich is connected to earth. If this is not possible, the paint should be removed from the cabinet directly under the filter footprint.

Side-by-side-mounting

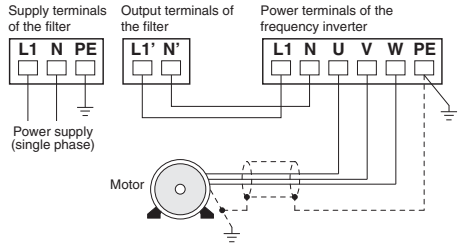
If you mount the filter and inverter side by side, always mount the filter on the left side of the inverter to avoid couplings from the motor cables.
For correct filter performance the filter mounting bolts should electrically bond to the cabinet back panel wich is connected to earth. If this is not possible, the paint should be removed from the cabinet directly under the filter footprint.



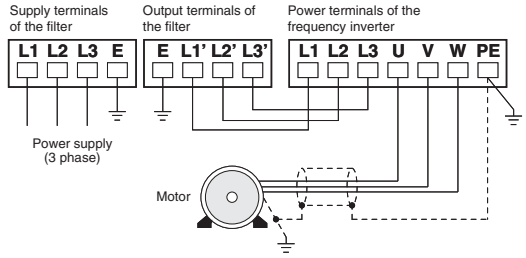
Wiring

For electrical installation follow the wiring procedure shown in the picture below. The maximum wiring lenght of the motor cable should be within the specified values.

200V class



400V class



All cables must be shielded and earthed at both ends in order to reduce cable radiation. Earth motor, bond to filters.
For environmental conditions and mounting position please note the instructions in the operation manual for the frequency inverter FR-D700 EC.

Specifications

Specifications	Filter type	
	200V class	400V class
Rated voltage	Max. 1~ 250V AC	Max. 3~ 480V AC
Frequency	48–62Hz	
Rated and leakage current	See the following tables	
Power loss	See the following tables	
Ambient temperature range	–25–85°C	
Ambient humidity	Max. 95% (non-condensing)	
Vibration	Max. 5.9m/s²	

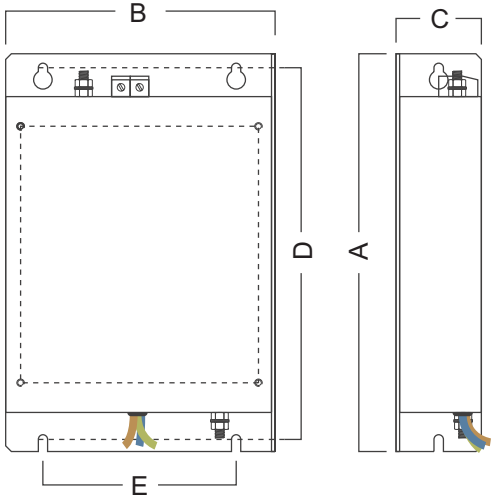
MITSUBISHI ELECTRIC FACTORY AUTOMATION
Mitsubishi Electric Europe B.V. /// FA - European Business Group ///
Germany /// Tel.: +49(0)2102-4860 /// Fax: +49(0)2102-4861120 ///
www.mitsubishi-automation.com

(GB) **Dimensions**

(D) **Abmessungen**

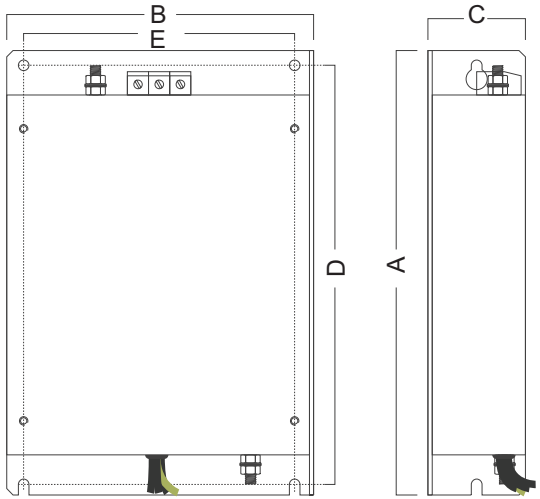
(F) **Dimensions**

200V class/200-V-Klasse/Classe 200 V



Filter/Filter/Filtre	Inverter/ Frequenzumrichter/ Variateur de fréquence	Mounting screws/ Montage-schrauben/ Vis de montage	A	B	C	D	E	Weight/ Gewicht/ Masse [kg]	Power loss/ Verlustleistung/ Variateur puissance dissipée [W]	Leakage current/ Ableitstrom/ Courant de fuite [mA] ①	Rated current/ Nennstrom/ Courant nominal [A]
FFR-CS-050-14A-RF1	FR-D720S-008–042	3 × M4	168	72	38	158	56	0,4	9	< 30	14
FFR-CS-080-20A-RF1	FR-D720S-070	4 × M4	168	113	38	158	96	0,6	13	< 30	20
FFR-CS-110-26A-RF1	FR-D720S-100	4 × M4	214	145	46	200	104	0,8	18	< 30	26

400V class/400-V-Klasse/Classe 400 V



Filter/Filter/Filtre	Inverter/ Frequenzumrichter/ Variateur de fréquence	Mounting screws/ Montage-schrauben/ Vis de montage	A	B	C	D	E	Weight/ Gewicht/ Masse [kg]	Power loss/ Verlustleistung/ Variateur puissance dissipée [W]	Leakage current/ Ableitstrom/ Courant de fuite [mA] ①	Rated current/ Nennstrom/ Courant nominal [A]
FFR-CSH-40-8A-RF1	FR-D740-012–036	4 × M4	168	114	45	158	96	0,9	6	< 30	8
FFR-CSH-80-16A-RF1	FR-D740-050/080	4 × M4	168	114	45	158	96	1,9	14	< 30	16
FFR-MSH-170-30A-RF1	FR-D740-120/160	4 × M4	210	225	55	198	208	2,0	42	< 30	30

① (GB) The values shown are for the leakage currents in a balanced 400V 50Hz mains network under normal conditions. Higher leakage currents can occur briefly in the event of phase failures and when systems are powered on.

(D) Die Werte geben die im Normalzustand fließenden Ableitströme bei einem symmetrischen Netz von 230 V bzw. 400 V, 50 Hz wieder. Bei Phasenausfall oder im Einschaltmoment können kurzzeitig größere Ableitströme auftreten.

(F) Les valeurs reproduisent les courants de fuite circulant en régime normal pour un réseau symétrique de 400 V, 50 Hz. Lors de défaillance de phase ou à l 'instant de démarrage, des courants de fuite plus grands peuvent temporairement apparaître.