

## DNV Certificate Approval and Relevant Requirements for FX3G Series

**■Date of Issue**

June 2021

**■Relevant Models**

MELSEC-F FX3G series programmable controllers

Thank you for your continued support of micro programmable controller MELSEC-F series.

The following MELSEC-F FX3G series main units, expansion boards, special adapter interface adapters, memory cassettes, and display modules have also acquired the type approval certificate for Programmable Logic Controller from DNV (DNV AS).

### 1 APPLICABLE MODELS

Item	Model name
Main unit (AC power supply)	FX3G-14MR/ES, FX3G-14MT/ES, FX3G-14MT/ESS, FX3G-24MR/ES, FX3G-24MT/ES, FX3G-24MT/ESS, FX3G-40MR/ES, FX3G-40MT/ES, FX3G-40MT/ESS, FX3G-60MR/ES, FX3G-60MT/ES, FX3G-60MT/ESS, FX3G-14MR/ES-A, FX3G-14MT/ES-A, FX3G-24MR/ES-A, FX3G-24MT/ES-A, FX3G-40MR/ES-A, FX3G-40MT/ES-A, FX3G-60MR/ES-A, FX3G-60MT/ES-A
Main unit (DC power supply)	FX3G-14MR/DS, FX3G-14MT/DS, FX3G-14MT/DSS, FX3G-24MR/DS, FX3G-24MT/DS, FX3G-24MT/DSS, FX3G-40MR/DS, FX3G-40MT/DS, FX3G-40MT/DSS, FX3G-60MR/DS, FX3G-60MT/DS, FX3G-60MT/DSS
Expansion board	FX3G-232-BD, FX3G-485-BD, FX3G-422-BD, FX3G-2AD-BD, FX3G-1DA-BD, FX3G-8AV-BD
Special adapter interface adapter	FX3G-CNV-ADP
Memory cassette	FX3G-EEPROM-32L
Display module	FX3G-5DM

## 2 DNV CERTIFICATION

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The following table explains the acquired DNV certification.

### 2.1 Acquired Certification

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Item	Description
Accreditation organization	DNV AS
Certificate No.* <sup>1</sup>	—
Classification	Programmable Logic Controller
Test standard* <sup>1</sup>	—
Term of validity* <sup>1</sup>	—

\*<sup>1</sup> Please ask your local Mitsubishi Electric distributor for the certificate No., test standard, and term of validity.

### 2.2 Certification Details

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The MELSEC-F FX3G series main units, expansion boards, special adapter interface adapters, memory cassettes, and display modules certified compliant to DNV Rules must be used under the following environment.

Item	Description	Remarks
EMC	Any given place on vessel (including Bridge and Deck Zone)	Refer to section 3.

### 3 REQUIREMENTS

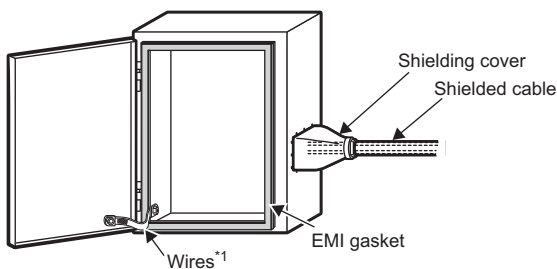
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When using the MELSEC-F FX3G series main units, expansion boards, special adapter interface adapters, memory cassettes, and display modules in a system requiring DNV approval, make sure the following requirements are observed. When using the control cabinet including these devices on the Bridge or Deck Zone, some restrictions are added. (☞ Page 4 Additional Requirements When the Control Cabinet is Located on the Bridge or Deck Zone)

#### 3.1 Control Cabinet

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- The control cabinet must be conductive.
- Ground the control cabinet with the thickest possible grounding cable.
- To ensure that there is electrical contact between the control cabinet and its door, connect the cabinet and its doors with thick wires. (See Fig. 1.)
- In order to suppress the leakage of radio waves, the control cabinet structure must have minimal openings. Also, wrap the cable holes with a shielding cover or other shielding devices. (See Fig. 1.)
- Ensure that the space between the control cabinet and its doors is as small as possible by attaching EMI gaskets between them. Mitsubishi's EMC tests have been carried out on a cabinet whose damping characteristics is 46.8dB max. and 26.4dB mean (measured by 3m method with 30MHz to 2GHz) and to which the EMI gasket having the damping characteristics of 69dB mean (150kHz to 100MHz) is mounted.



\*1 These wires are used to improve the conductivity between the door and control cabinet.

Fig. 1. Control cabinet example

- In order to avoid the effects of static electricity, make sure to eliminate static electricity when there is a possibility of touching the programmable controller on the control cabinet during maintenance or servicing.

#### 3.2 Cable

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- Use shielded cables for the cables that protrude out of the control cabinet.
- Connect the shields, such as the shielded cables and the shielding cover, to the grounded control cabinet.

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### 3.3 Additional Requirements When the Control Cabinet is Located on the Bridge or Deck Zone

#### Control cabinet

When an AC powered main module is used, use a control cabinet with high damping characteristics in the low frequency field. Mitsubishi's EMC tests have been carried out on a cabinet with the damping characteristics of 23.32dB max. and 19.9dB mean (measured by 3m method) in the range of 150KHz to 30MHz, in addition to a cabinet with the damping characteristics in the range of 30MHz to 2GHz.

#### Noise filter

Attach a noise filter on the power line. (See Fig. 4.)

Mitsubishi's EMC tests have been carried out on a noise filter with the common mode damping characteristics shown in Figs 2 and 3. (See Fig. 2 and Fig. 3.)

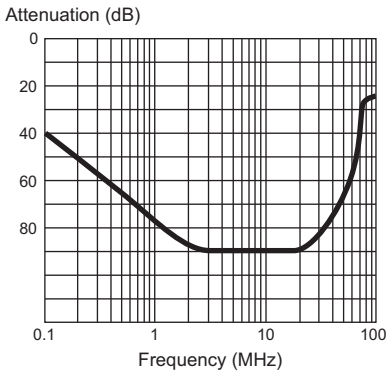


Fig. 2. Damping characteristics of noise filter for AC powered main unit

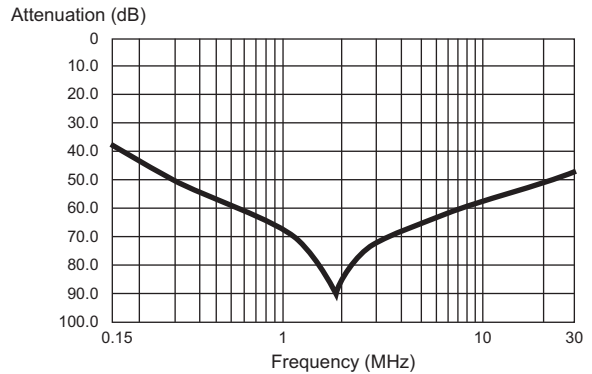


Fig. 3. Damping characteristics of noise filter for DC powered main unit

- Separate and lay the input (power source side) cable and output (device side) cable away from the noise filter. Do not bundle the input cable and output cable together, and do not lay the input cable close to the output cable. If do so, interference may result due to noise being induced to the input cable from the output cable.

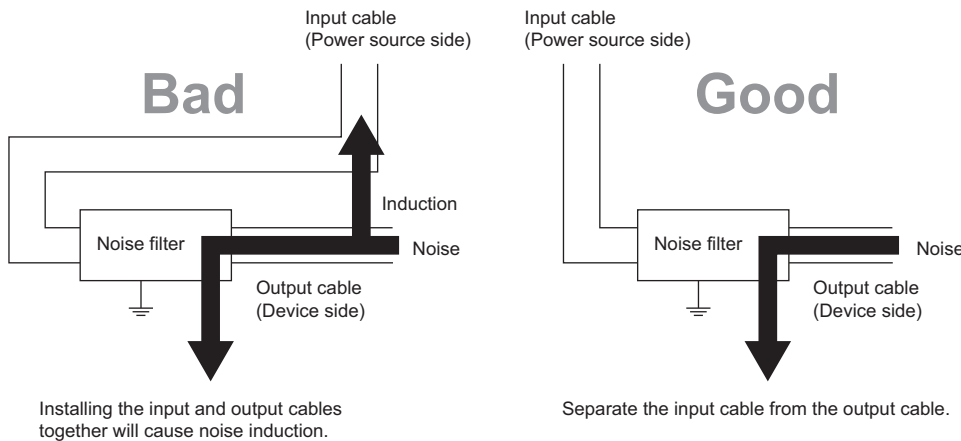


Fig. 4. Precautions on noise filter

- Grounding wires of the noise filter should be as short as possible.

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**REVISIONS**

Version	Date of Issue	Revision
A	June 2021	Change of the issue number from HIME-T-P-0095. Revised with change of the name of Norway classification society. Moved the description of Additional Requirements When the Control Cabinet is Located on the Bridge or Deck Zone to section 3.3.