

**TECHNICAL BULLETIN**
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[Issue No.] HIME-T-P-0142C

[Title] DNV GL Certificate Approval and Relevant Requirements FX3s series PLC

[Date of Issue] Mar. 2015 (Ver. C: Jan. 2017)

[Relevant Models] FX3s series

The following MELSEC-F FX3s series products have also acquired the type approval certificate for Programmable Logic Controller from DNV GL.

**1. Applicable models**

Type	Model Name
Main Units [AC Power Supply]	FX3S-10MR/ES, FX3S-10MT/ES, FX3S-10MT/ESS FX3S-14MR/ES, FX3S-14MT/ES, FX3S-14MT/ESS FX3S-20MR/ES, FX3S-20MT/ES, FX3S-20MT/ESS FX3S-30MR/ES, FX3S-30MT/ES, FX3S-30MT/ESS FX3S-30MR/ES-2AD, FX3S-30MT/ES-2AD, FX3S-30MT/ESS-2AD
Main Units [DC Power Supply]	FX3S-10MR/DS, FX3S-10MT/DS, FX3S-10MT/DSS FX3S-14MR/DS, FX3S-14MT/DS, FX3S-14MT/DSS FX3S-20MR/DS, FX3S-20MT/DS, FX3S-20MT/DSS FX3S-30MR/DS, FX3S-30MT/DS, FX3S-30MT/DSS
Connection Conversion Adapter	FX3S-CNV-ADP

**2. DNV GL certification**

The following table explains the acquired DNV GL certification.

**(1) Acquired certification**

Item	Description
Accreditation organization	DNV GL
Certificate No.*	-
Category	Programmable Logic Controller
Test standard*	-
Term of validity*	-

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

**(2) Certification details**

The DNV GL approved MELSEC-F FX3s series main unit and connection conversion adapter must be used in the following environment.

Item	Description	Remarks
EMC	EMC: Any given place on vessel (Bridge and Deck Zone is included.)	—
Power Supply	Supply power from a DC power source other than battery.	Refer to section 3.

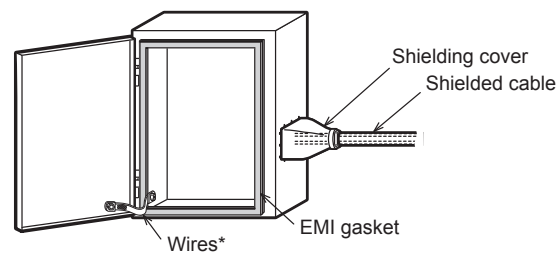
### 3. Requirements

When using the MELSEC-F FX3S series main unit and connection conversion adapter in a system requiring DNV GL approval, make sure the following requirements are observed.

#### (1) Control cabinet

- (a) The control cabinet must be conductive.
- (b) Ground the control cabinet with the thickest possible grounding cable.
- (c) 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.)
- (d) In order to suppress the leakage of radio waves, the control cabinet must be structured with minimal openings. The gap between the control cabinet and its door must be eliminated whenever possible by attaching EMI gaskets between them. To attach an EMI gasket, remove the coating on the contact area between the control cabinet and its door and attach the EMI gasket with conductive adhesive tape. In addition, wrap the cable holes with a shielding cover or other shielding devices. (See Fig. 1.)

Mitsubishi's EMC tests were carried out on a cabinet with damping characteristics of 46.8 dB max. and 26.4 dB mean (measured by the 3-meter method from 30 MHz to 2 GHz) with an EMI gasket attached, whose damping characteristics were 69 dB mean (150 kHz to 100 MHz).



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

**Fig. 1. Control Cabinet Example**

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

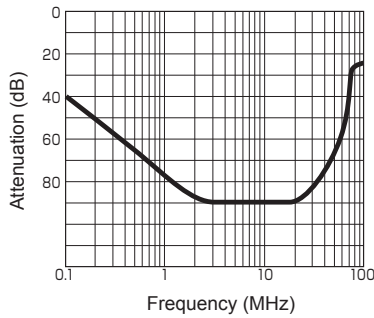
#### (2) Cables

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

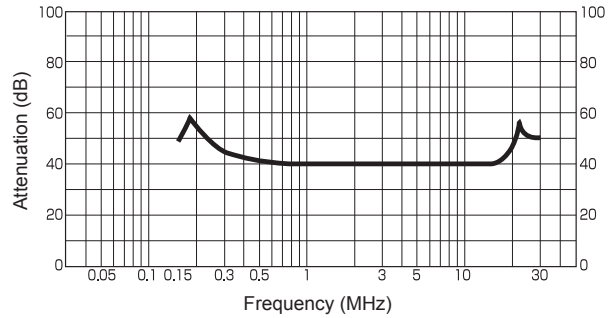
**(3) Noise filter**

Please attach a noise filter on the power line. (Refer to Fig. 4.)

Mitsubishi performed the EMC test with a common-mode noise filter connected in series as shown in Figs. 2 and 3.



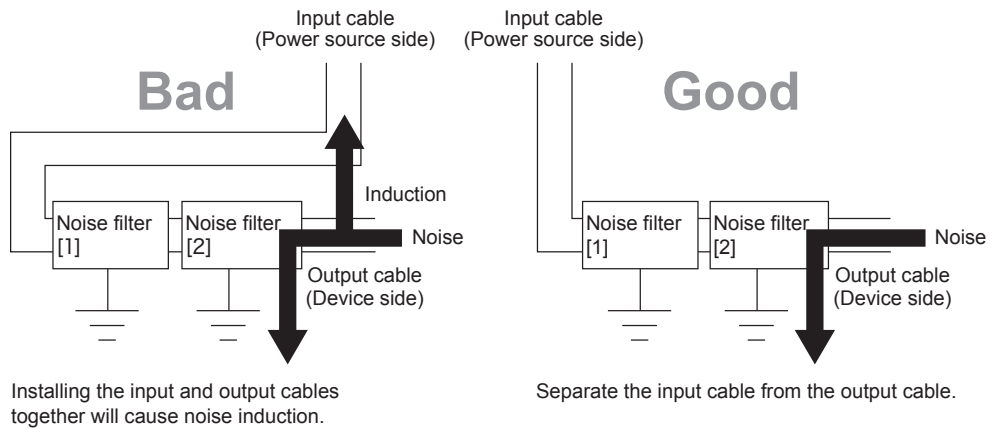
**Fig. 2. Damping characteristics of noise filter[1]**



**Fig. 3. Damping characteristics of noise filter[2]**

(a) Separate and lay the input (power source side) and output (device side) cable away from the noise filter.

Do not bundle the input cable together and do not lay it close to the output cable. If input and output cables are installed together, interference may result due to noise being inducted to the input cable from the output cable.



**Fig. 4. Precautions on noise filter**

(b) Grounding wires of the noise filter should be as short as possible.

**(4) Ferrite core**

Always attach a ferrite core to cables that extend outside the control panel, including power cable. Mitsubishi performed the EMC test with 2 turns around NEC Tokin ESD-SR-250.

**(5) Power supply**

Use a DC power source other than battery to supply power to DC power type main units.

**Revised History**

Date	Revision	Description
Mar. 2015	A	First Edition
Nov. 2015	B	Partial design change
Jan. 2017	C	Acquired certification is modified

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