

## Lloyd's Certificate Approval and Relevant Requirements for FX3U Series

**■Date of Issue**

June 2021

**■Relevant Models**

MELSEC-F FX3U series programmable controllers

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

The following MELSEC-F FX3U series main units, special adapters, expansion boards, memory cassettes, and display modules have also acquired the type approval certificate for Programmable Logic Controller from Lloyd's (Lloyd's Register of Shipping).

### 1 APPLICABLE MODELS

Item	Model name
Main unit	FX3U-16MR/ES, FX3U-16MT/ES, FX3U-16MT/ESS, FX3U-32MR/ES, FX3U-32MT/ES, FX3U-32MT/ESS, FX3U-48MR/ES, FX3U-48MT/ES, FX3U-48MT/ESS, FX3U-64MR/ES, FX3U-64MT/ES, FX3U-64MT/ESS, FX3U-80MR/ES, FX3U-80MT/ES, FX3U-80MT/ESS, FX3U-128MR/ES, FX3U-128MT/ES, FX3U-128MT/ESS, FX3U-16MR/DS, FX3U-16MT/DS, FX3U-16MT/DSS, FX3U-32MR/DS, FX3U-32MT/DS, FX3U-32MT/DSS, FX3U-48MR/DS, FX3U-48MT/DS, FX3U-48MT/DSS, FX3U-64MR/DS, FX3U-64MT/DS, FX3U-64MT/DSS, FX3U-80MR/DS, FX3U-80MT/DS, FX3U-80MT/DSS
Special adapter	FX3U-232ADP, FX3U-485ADP, FX3U-4AD-ADP, FX3U-4DA-ADP, FX3U-4AD-PT-ADP, FX3U-4AD-TC-ADP, FX3U-4HSX-ADP, FX3U-2HSY-ADP
Expansion board	FX3U-USB-BD, FX3U-232-BD, FX3U-485-BD, FX3U-422-BD, FX3U-CNV-BD
Memory cassette	FX3U-FLROM-16, FX3U-FLROM-64, FX3U-FLROM-64L
Display module	FX3U-7DM

## 2 LLOYD'S CERTIFICATION

The following table explains the acquired Lloyd's certification.

### 2.1 Acquired Certification

Item	Description
Accreditation organization	Lloyd's Register of Shipping
Certificate No.* <sup>1</sup>	—
Classification	Programmable Logic Controller (ENV1, ENV2)
Test standard* <sup>1</sup>	—
Term of validity* <sup>1</sup>	—

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

### 2.2 Certification Details

The MELSEC-F FX3U series main units, special adapters, expansion boards, memory cassettes, and display modules certified compliant to Lloyd's 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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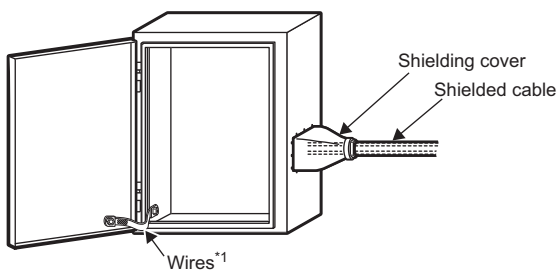
When using the MELSEC-F FX3U series main units, special adapters, expansion boards, memory cassettes, and display modules in a system requiring Lloyd's approval, make sure the following requirements are observed.

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.)



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

Fig. 1. Control cabinet example

- Mitsubishi's EMC tests have been carried out on a cabinet with the damping characteristics of 46.8dB max. and 26.4dB mean (measured by 3m method with 30MHz to 2GHz).

#### 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.

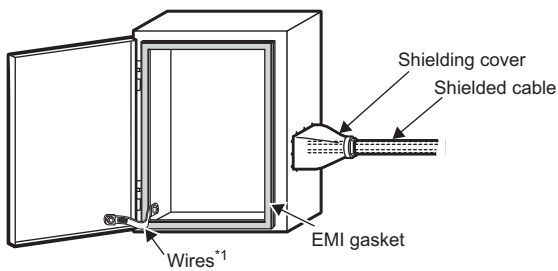
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### 3.3 Additional Requirements When the Control Cabinet is Located on the Bridge or Deck Zone

#### Control cabinet

Ensure that the space between the control cabinet and its doors is as small as possible by attaching EMI gaskets between them. Remove coating of the contact area of the control cabinet and its door, and attach the EMI gasket with conductive adhesive tape. (See Fig. 2.)

Mitsubishi's EMC tests have been carried out on a cabinet with the EMI gasket having the damping characteristics of 69dB mean (150kHz to 100MHz).



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

Fig. 2. Control cabinet example

**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 of 50dB mean at 100kHz to 300kHz and 90dB mean at 6MHz to 20MHz. (See Fig. 3.)

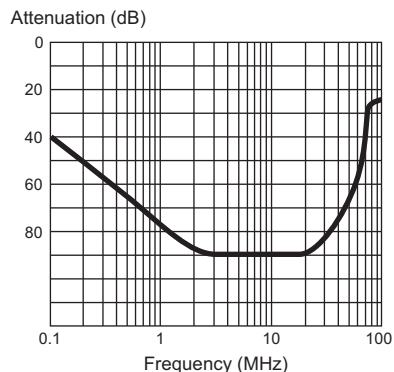


Fig. 3. Damping characteristics of noise filter

- 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.

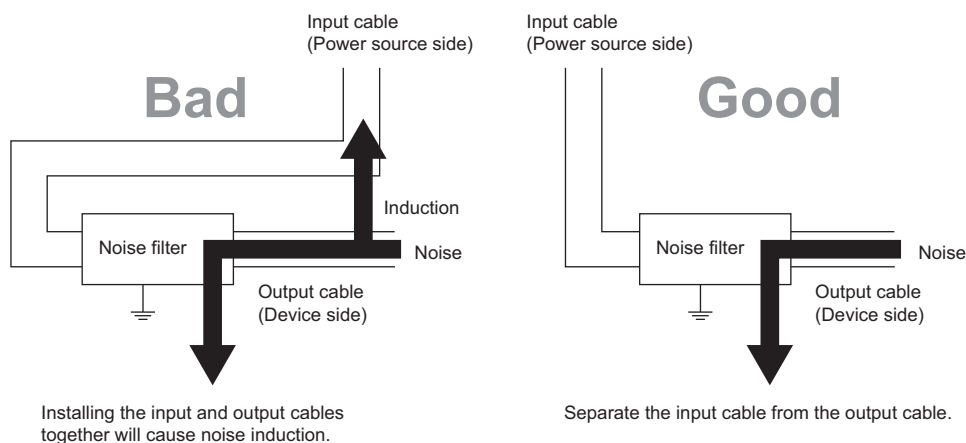


Fig. 4. Precautions on noise filter

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

**REVISIONS**

Version	Date of Issue	Revision
A	June 2021	Change of the issue number from HIME-T-P-0008. Change of the acquired certification according to revision of the Lloyd's certificate. Moved the description of Additional Requirements When the Control Cabinet is Located on the Bridge or Deck Zone to section 3.3.

**TRADEMARKS**

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