JY997D51901D Side B

MITSUBISHI ELECTRIC

Side A JAPANESE

Side B ENGLISH

PROGRAMMABLE CONTROLLERS
MELSEC-F

Powered by Anywire

FX3U-128ASL-M

INSTALLATION MANUAL

FX3U

Manual Number	JY997D51901
Revision	D
Date	April 2015

This manual describes the part names, dimensions, mounting, cabling and specifications of the product. Before use, read this manual and the manuals of all relevant products fully to acquire proficiency in handling and operating the product. Make sure to learn all the product information, safety information, and precautions. Store this manual in a safe place so that it can be taken out and read whenever necessary. Always forward it to the end user.
Registration:
Anywire and ANYWIREASLINK is a trademark of Anywire Corporation.
The company and product names described in this manual are registered trademarks or the trademarks of their respective companies.

Effective April 2015
Specifications are subject to change without notice.

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Safety Precaution (Read these precautions before use.)

This manual classifies the safety precautions into two categories:

⚠WARNING and ⚠CAUTION.

⚠WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Depending on the circumstances, procedures indicated by ⚠CAUTION may also cause severe injury.
It is important to follow all precautions for personal safety.

PRECAUTIONS REGARDING WARRANTY AND SPECIFICATIONS

The FX3U-128ASL-M is jointly developed and manufactured by Mitsubishi and Anywire Corporation.
Note that there are some precautions regarding warranty and specifications of this product.
<Warranty>

Item	FX3U-128ASL-M	Other programmable controller products (e.g. MELSEC-F series)
Repair term after discontinuation of production	1 year	7 years

<Application of the standards>

Item	FX3U-128ASL-M	Other programmable controller products (e.g. MELSEC-F series)
Applicable EMC standard	EN61131-2 (Zone A)	EN61131-2
Applicable UL standard/cUL standard	UL508*1	UL508

*1 December 2014 and later

Associated Manuals

Manual name	Manual No.	Description
FX3U-128ASL-M User's Manual	JY997D52101 MODEL CODE: 09R731	Describes details of the FX3U-128ASL-M AnyWireASLINK system special adapter.
FX3G Series User's Manual - Hardware Edition	JY997D31301 MODEL CODE: 09R521	Explains FX3G Series PLC specifications for I/O, wiring, installation, and maintenance.
FX3GC Series User's Manual - Hardware Edition	JY997D45401 MODEL CODE: 09R533	Explains FX3GC Series PLC specifications for I/O, wiring, installation, and maintenance.
FX3U Series User's Manual - Hardware Edition	JY997D16501 MODEL CODE: 09R516	Explains FX3U Series PLC specifications for I/O, wiring, installation, and maintenance.
FX3UC Series User's Manual - Hardware Edition	JY997D28701 MODEL CODE: 09R519	Explains FX3UC Series PLC specifications for I/O, wiring, installation, and maintenance.
FX3S/FX3G/FX3GC/FX3U/FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601 MODEL CODE: 09R517	Describes PLC programming for basic/applied instructions and devices.

How to obtain manuals
For product manuals or documents, consult with the Mitsubishi Electric dealer from who you purchased your product.

Certification of UL, cUL standards

FX3U-128ASL-M adapter comply with the UL standards (UL, cUL). (December 2014 and later)
UL, cUL File Number: E95239
Regarding the standards that comply with the main unit, please refer to either the FX series product catalog or consult with your nearest Mitsubishi product provider.

Compliance with EC directive (CE Marking)

This note does not guarantee that an entire mechanical module produced in accordance with the contents of this note will comply with the following standards.
Compliance to EMC directive and LVD directive for the entire mechanical module should be checked by the user / manufacturer. For more information please consult with your nearest Mitsubishi product provider.
Regarding the standards that comply with the main unit, please refer to either the FX series product catalog or consult with your nearest Mitsubishi product provider.
Regarding the standards that comply with the AnyWireASLINK slave module, please consult with Anywire Corporation.

Requirement for Compliance with EMC directive

The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (2004/108/EC) when used as directed by the appropriate documentation.

Attention
- This product is designed for use in industrial applications.

Note
- Authorized Representative in the European Community:
  Mitsubishi Electric Europe B.V.
  Gothaer Str. 8, 40880 Ratingen, Germany

Type: Programmable Controller (Open Type Equipment)
Models: MELSEC FX3U series manufactured
from October 1st, 2013 FX3U-128ASL-M

Standard	Remark
EN61131-2:2007 Programmable controllers - Equipment requirements and tests	Compliance with all relevant aspects of the standard. **EMI** • Radiated Emission • Conducted Emission **EMS** • Radiated electromagnetic field • Fast transient burst • Electrostatic discharge • High-energy surge • Voltage drops and interruptions • Conducted RF • Power frequency magnetic field

Caution for EC Directive
- Installation in Enclosure
  Programmable logic controllers are open-type devices that must be installed and used within conductive control cabinets. Please use the programmable logic controller while installed within a conductive shielded control cabinet. Please secure the cabinet door to the control cabinet (for conduction). Installation within a control cabinet greatly affects the safety of the system and aids in shielding noise from the programmable logic controller.
- Use the FX3U-128ASL-M in Zone A*1 as defined in EN61131-2.
  *1 Zone defined in EN61131-2.
  Separation defined in EN61131-2 for EMC LVD regulation decided depending on condition in industrial setting.
  Zone C = Factory mains which is isolated from public mains by dedicated transformers.
  Zone B = Dedicated power distribution which is protected by secondary surge protection. (300 V or less in the rated voltage is assumed.)
  Zone A = Local power distribution which is isolated from dedicated power distribution by AC/DC converters, isolation transformers, etc. (120 V or less in the rated voltage is assumed.)
- Please attach a ferrite core less than 200 mm from the FX3U-128ASL-M side terminal block to the DP and DN signal wires. The wire should be wound twice around the ferrite core. The ferrite core should be a product equivalent to ZCAT3035-1330 by TDK Corporation.
  Please attach a noise filter to the 0 V and 24 V power cables. The noise filter should be a product equivalent to SNR-10-223 by COSEL CO., LTD.

1. Outline

The FX3U-128ASL-M type AnyWireASLINK system master block (hereinafter referred to as 128ASL-M) is a special function block for building an AnyWireASLINK system with FX3G/FX3GC/FX3U/FX3UC PLC.
The 128ASL-M is jointly developed and manufactured by Mitsubishi and Anywire Corporation.
The AnyWireASLINK system is a sensor network system.
→ **System configuration details, refer to the FX3U-128ASL-M User's Manual.**

1.1 Outline and features of AnyWireASLINK system

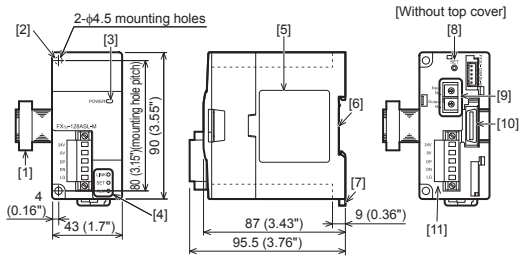
AnyWireASLINK is a high-speed and highly reliable system which relieves the work site from complicated and incorrect wiring.
In this network, sensors at the end of a control system are connected to a programmable controller in the optimum form.

1.2 Incorporated Items

Check to ensure the following product and items are included in the package:

Included Item	
FX3U-128ASL-M	1 unit
Special unit/block No. label	1 sheet
Dust proof protection sheet	1 sheet
Manuals (Japanese version, English version)	1 manual each

1.3 External Dimensions and Each Part Names



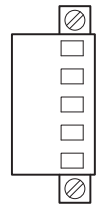
Unit: mm (inches)
MASS (Weight): Approx. 0.2 kg (0.44 lbs)

[1] Extension cable
[2] Direct mounting hole
2 holes of φ4.5 (0.18")
(mounting screw: M4 screw)
[3] Power LED (green)
[4] Status LEDs (green, red)
→ **Refer to section 1.4.**
[5] Nameplate
[6] DIN rail mounting groove (DIN rail: DIN46277, 35 mm (1.38") width)
[7] DIN rail mounting hook
[8] SET switch
(Automatic address setting switch)
[9] Transmission points number setting switch (Rotary switch)
[10] Extension connector
[11] AnyWireASLINK connection terminal block
→ **Refer to section 1.5.**

1.4 Indications of LEDs

LED display	LED color	Status	Description
POWER	Green	ON	5 V DC is being supplied from the PLC.
		OFF	5 V DC is not being supplied from the PLC, or they are the units failure.
LINK	Green	ON	units failure
		Flicker	Operating normally
		OFF	5 V DC power off or the units failure.
SET	Green	ON	Automatic address detection in progress.
		Flicker	Writing in the EEPROM
		OFF	Operating normally
ALM	Red	ON	DP/DN disconnection
		Slow flicker (one-second intervals)	DP/DN short
		Fast flicker (0.2-second intervals)	24 V DC is not being supplied or the voltage is low.
		OFF	Operating normally

1.5 Terminal Layout



Terminal name	Description
24V	24V terminal for sensor power and communication.
0V	0V terminal for sensor power and communication.
DP	Transmission signal (+) terminal. It connects with DP of the slave module and the Terminator.
DN	Transmission signal (-) terminal. It connects with DN of the slave module and the Terminator.
LG	Functional earth terminal. The one point is grounded with the grounding terminal and functional earth terminal of the PLC (FG terminal).

- AnyWireASLINK connection terminal block specifications
  Type: MSTB2,5/5-STF-5,08AU (Phoenix Contact Co., Ltd.)
  Electric wire size: 0.2 to 2.5 mm^2 (AWG24 to 12)
  Tightening torque: 0.5 to 0.6 N•m (For both connector fixing screw and transmission line connection screw)
  Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.
- For details on the wiring needed to connect to the terminal blocks shown in the figure above, refer to the following manual.
  → **Refer to the FX3U-128ASL-M User's Manual.**

2. Installation

For installation details, refer to the following manuals.
→ **Refer to the FX3U-128ASL-M User's Manual.**

INSTALLATION PRECAUTIONS ⚠WARNING

- Make sure to cut off all phases of the power supply externally before attempting installation work.
  Failure to do so may cause electric shock.

INSTALLATION PRECAUTIONS ⚠CAUTION

- Use the product within the generic environment specifications described in PLC main unit manual (Hardware Edition).
  Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl2, H2S, SO2 or NO2), flammable gas, vibration or impacts, or expose it to high temperature, condensation, or rain and wind.
  If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.
- Do not touch the conductive parts of the product directly.
  Doing so may cause device failures or malfunctions.
- Install the product securely using a DIN rail or mounting screws.
- Install the product on a flat surface.
  If the mounting surface is rough, undue force will be applied to the PC board, thereby causing nonconformities.
- When drilling screw holes or wiring, make sure that cutting and wiring debris do not enter the ventilation slits.
  Failure to do so may cause fire, equipment failures or malfunctions.
- Be sure to remove the dust proof sheet from the PLC's ventilation slits when installation work is completed.
  Failure to do so may cause fire, equipment failures or malfunctions.
- Make sure to attach the top cover, offered as an accessory, before turning on the power or initiating operation after installation or wiring work.
  Failure to do so may cause electric shock.
- Connect extension cables securely to their designated connectors.
  Loose connections may cause malfunctions.

2.1 Connection to the PLC

The 128ASL-M connects on the right side of an PLC main unit or extension units/blocks (including special function units/blocks).
For connection to an FX3UC Series PLC or FX2NC Series PLC extension block, an FX2NC-CNV-IF or FX3UC-1PS-5V is required.
For installation method to PLCs, refer to the User's Manual - Hardware Edition of the connected PLC.

2.2 Mounting

The product is mounted by the following method.

- DIN rail mounting
- Direct mounting (mounting screw: M4 screw)

For details, refer to the User's Manual - Hardware Edition of the connected PLC.

3. Wiring

For wiring details, refer to the following manuals.

→ **Refer to the FX3U-128ASL-M User's Manual.**

WIRING PRECAUTIONS ⚠**WARNING**

- Make sure to cut off all phases of the power supply externally before attempting wiring work.
  Failure to do so may cause electric shock or damage to the product.

WIRING PRECAUTIONS ⚠**CAUTION**

- Connect the DC power supply wiring to the dedicated terminals described in this manual.
  If an AC power supply is connected to a DC input/output terminal or DC power supply terminal, the PLC will burn out.
- Make sure to attach the top cover, offered as an accessory, before turning on the power or initiating operation after installation or wiring work.
  Failure to do so may cause electric shock.
- When drilling screw holes or wiring, make sure that cutting and wiring debris do not enter the ventilation slits.
  Failure to do so may cause fire, equipment failures or malfunctions.
- Make sure to properly wire to the terminal block (European type) in accordance with the following precautions.
  Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
  - The disposal size of the cable end should follow the dimensions described in the manual.
  - Tightening torque should follow the specifications in the manual.
  - Twist the end of strand wire and make sure that there are no loose wires.
  - Do not solder-plate the electric wire ends.
  - Do not connect more than the specified number of wires or electric wires of unspecified size.
  - Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.
- Do not apply the 24VDC power before wiring the entire AnyWireASLINK system.
- Connect a 24VDC external power supply to 128ASL-M for the AnyWireASLINK system.
- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
  1) Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line.
     Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or high-voltage lines.
  2) Ground the shield wire or shield of the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems.
- Place the cables in a duct or clamp them.
  If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- When disconnecting the cable from the module, do not pull the cable by the cable part.
  For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.

3.1 AnyWireASLINK connection terminal block

For details on the terminal block layout, refer to section 1.5.

Item	Description
Model name	MSTB2,5/5-STF-5,08AU (Phoenix Contact Co., Ltd.)
Electric wire size	0.2 to 2.5 mm^2 (AWG24 to 12)
Tightening torque	0.5 to 0.6 N•m (It is common also on the connector fixing screw and the transmission line connection screw)

- To tighten the terminal block, a flathead screwdriver having a tip size of 0.6×3.5 mm is required.
- When the AnyWireASLINK connection terminal block is removed
  Before removing the transmission cable terminal block, check that the fixing screws on both sides are completely loosened (removed from the socket). Pulling with excessive force while the fixing screws of both ends are still tightened may damage the device.
- When the AnyWireASLINK connection terminal block is attached
  Before tightening, check that there are no short circuits due to disconnected or frayed wires. Then tighten the screws at both sides securely.
  (Tightening torque: 0.5 N•m to 0.6 N•m)

3.2 Cable treatment

Bare cables can be connected to the AnyWireASLINK connection terminal block; however, for safety reasons, it is recommended to connect the crimped bar terminals. Use UL-listed solderless terminals and, for processing, use a tool recommended by their manufacturer.

recommended bar terminals (Phoenix Contact Co., Ltd.)

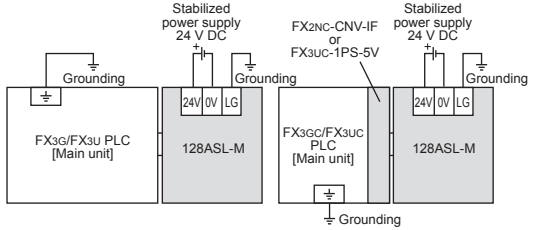
Electric wire size	Electric wire connected number	recommended bar terminals model name (Phoenix Contact Co., Ltd.)
0.75 mm^2	1 cable	AI 0,75-8 GY
	2 cables	AI-TWIN 2X 0,75-8 GY
1.25 mm^2	1 cable	AI 1,5-8 BK
	2 cables	AI-TWIN 2X 1,5-8 BK

3.3 Wiring precautions

- Do not run multiple transmission cables (DP, DN) using a multicore cable.

- The voltage should not fall below the lower limit of the allowable voltage range due to voltage drop caused by the cable.
  If the voltage falls below the lower limit, malfunctions may occur.
- Do not connect soldered cables directly to the terminals. Doing so may loosen the screws, resulting in a poor contact.
- It is recommended to use a 1.25 mm^2 lead wire for the main line because the power supply is superimposed on the signal wire in the AnyWireASLINK system.
- General-purpose wire, VCTF cable and flat cable, etc. can be used. Use stranded wires instead of single core wires.

3.4 Power supply and grounding wiring



3.4.1 Power on timing

The AnyWireASLINK system external power supply should be turned ON simultaneously with or before the power supply of the PLC main unit it is connected to. (The order is inverted when the system is powered off.)

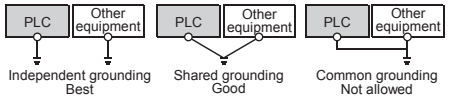
Caution

If the PLC main unit is powered on before the 24 V DC external power supply in the AnyWireASLINK system, a transmission cable voltage drop detection error may occur. If the error including transmission cable voltage drop detection error is detected, the error can be cleared by turning the error flag clear command (BFM#27 b0) from OFF to ON.

3.4.2 Grounding

Ground the PLC as stated below.

- Perform class D grounding. (Grounding resistance: 100 Ω or less)
- Ground the PLC independently if possible.
  If it cannot be grounded independently, ground it jointly as shown below.
  For details, refer to the User's Manual - Hardware Edition of the connected PLC.



- Position the grounding point as close to the PLC (128ASL-M) as possible to decrease the length of the ground wire.

4. Specification

For details on specifications, refer to the following manual.

→ **FX3U-128ASL-M User's Manual**

DESIGN PRECAUTIONS ⚠**WARNING**

- An AnyWireASLINK system has no control function for ensuring safety.
- When a communication failure occurs in the network, data in the master module are held.
  Check the communication status information and configure an interlock circuit in the sequence program to ensure that the entire system will operate safely.
- Make sure to have the following safety circuits outside of the PLC to ensure safe system operation even during external power supply problems or PLC failure. Otherwise, malfunctions may cause serious accidents.
  1)Most importantly, have the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper and lower positioning limits).
  2)Note that when the PLC CPU detects an error, such as a watchdog timer error, during self-diagnosis, all outputs are turned off. Also, when an error that cannot be detected by the PLC CPU occurs in an input/output control block, output control may be disabled.
  External circuits and mechanisms should be designed to ensure safe machinery operation in such a case.

DESIGN PRECAUTIONS ⚠**CAUTION**

- Configure safety circuits, such as an emergency stop circuit and interlock circuit, external to the AnyWireASLINK system.
- Install module so that excessive force will not be applied to the terminal blocks.
  Failure to do so may result in wire damage/breakage or PLC failure.
- When executing control (data changes) to an operating PLC, construct an interlock circuit in the sequence program so that the entire system operates conservatively. Additionally, when executing control such as program changes and operation status changes (status control) to an operating PLC, thoroughly read the manual and sufficiently confirm safety in advance.

DISPOSAL PRECAUTIONS ⚠**CAUTION**

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.

TRANSPORTATION AND STORAGE PRECAUTIONS ⚠**CAUTION**

- The PLC is a precision instrument. During transportation, avoid impacts larger than those specified in the general specifications of the PLC main unit manual by using dedicated packaging boxes and shock-absorbing palettes.
  Failure to do so may cause failures in the PLC.
  After transportation, verify operation of the PLC and check for damage of the mounting part, etc.

4.1 Applicable PLC

Model name	Applicability	Number of connectable units
FX3G Series PLC	Ver. 1.00 or later	One unit
FX3GC Series PLC*1	Ver. 1.40 or later	One unit
FX3U Series PLC	Ver. 2.20 or later	One unit
FX3UC Series PLC*1	Ver. 2.20 or later	One unit

The version number can be checked by reading the last three digits of device D8001 or D8101.

*1 An FX2NC-CNV-IF or FX3UC-1PS-5V is necessary to connect the FX3U-128ASL-M with the FX3GC/FX3UC PLCs.

4.2 General Specifications

Items other than the following are equivalent to those of the PLC main unit.

For general specifications, refer to the User's Manual - Hardware Edition of the connected PLC.

Item	Specification	
Dielectric withstand voltage	500 V AC for one minute	Between all PLC terminals and ground terminal
Insulation resistance	5 MΩ or more by 500 V DC megger	
Pollution degree	2 or less	

4.3 Power Supply Specification

Item	Specification
Driving power supply	130 mA / 5 V DC 5 V DC power is supplied internally from the main unit.
External power supply for ASLINK communication	Voltage: 21.6 to 27.6 V DC (24 V DC -10 % to +15 %), ripple voltage 0.5 Vp-p or lower Rated voltage: 24 V DC * Please use a UL Class 2 power supply. Module current consumption: 0.1 A Transmission cable supply current: Up to 2 A

4.4 Performance Specifications

Item	Specification
Transmission clock	27.0 kHz
Maximum transmission distance (total length)	200 m
Transmission system	DC power supply transmission total frame cyclic system
Connection type	Bus topology (multidrop system, T-branch system, tree branch system)
Transmission protocol	Dedicated protocol (AnyWireASLINK)
Error control	Double-check system, checksum
Number of connected I/O points	Up to 128 points
Number of connectable modules	Up to 128 (varies depending on the current consumption of each slave module)
Maximum number of I/O points per system	Number of input points of the slave module + number of output points of the slave module ≤ 128 points
RAS function	• Disconnected transmission cable location detection function • Transmission cable short detection function • Transmission cable voltage drop detection function
AnyWireASLINK transmission cable	• UL-listed general-purpose 2-wire cable (VCTF, VCT 1.25 mm^2, 0.75 mm^2, rated temperature 70 °C or higher) • UL-listed general-purpose wire (1.25 mm^2, 0.75 mm^2, rated temperature 70 °C or higher) • Dedicated flat cable (1.25 mm^2, 0.75 mm^2, rated temperature 90 °C)*1
Power cable	• UL-listed general-purpose 2-wire cable (VCTF, VCT 0.75 mm^2 to 2.0 mm^2, rated temperature 70 °C or higher) • UL-listed general-purpose wire (0.75 mm^2 to 2.0 mm^2, rated temperature 70 °C or higher) • Dedicated flat cable (1.25 mm^2, 0.75 mm^2, rated temperature 90 °C)*1
Communication with PLC	By FROM and TO instructions or direct specification of buffer memory (FX3U/FX3UC) via the buffer memory.
Number of I/O occupied points	8 points (taken from either the input or output points of the PLC)
Number of connectable units to the main unit	One unit

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; opportunity loss or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

⚠ For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

Anywire Anywire Corporation http://www.anywire.jp

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

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FX3GC Series User's Manual - Hardware Edition	JY997D45401 MODEL CODE: 09R533	Explains FX3GC Series PLC specifications for I/O, wiring, installation, and maintenance.
FX3U Series User's Manual - Hardware Edition	JY997D16501 MODEL CODE: 09R516	Explains FX3U Series PLC specifications for I/O, wiring, installation, and maintenance.
FX3UC Series User's Manual - Hardware Edition	JY997D28701 MODEL CODE: 09R519	Explains FX3UC Series PLC specifications for I/O, wiring, installation, and maintenance.
FX3S/FX3G/FX3GC/FX3U/FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601 MODEL CODE: 09R517	Describes PLC programming for basic/applied instructions and devices.

How to obtain manuals
For product manuals or documents, consult with the Mitsubishi Electric dealer from who you purchased your product.

Certification of UL, cUL standards

FX3U-128ASL-M adapter comply with the UL standards (UL, cUL). (December 2014 and later)
UL, cUL File Number: E95239
Regarding the standards that comply with the main unit, please refer to either the FX series product catalog or consult with your nearest Mitsubishi product provider.

Compliance with EC directive (CE Marking)

This note does not guarantee that an entire mechanical module produced in accordance with the contents of this note will comply with the following standards.
Compliance to EMC directive and LVD directive for the entire mechanical module should be checked by the user / manufacturer. For more information please consult with your nearest Mitsubishi product provider.
Regarding the standards that comply with the main unit, please refer to either the FX series product catalog or consult with your nearest Mitsubishi product provider.
Regarding the standards that comply with the AnyWireASLINK slave module, please consult with Anywire Corporation.

Requirement for Compliance with EMC directive

The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (2004/108/EC) when used as directed by the appropriate documentation.

Attention
- This product is designed for use in industrial applications.

Note
- Authorized Representative in the European Community:
  Mitsubishi Electric Europe B.V.
  Gothaer Str. 8, 40880 Ratingen, Germany

Type: Programmable Controller (Open Type Equipment)
Models: MELSEC FX3U series manufactured
from October 1st, 2013 FX3U-128ASL-M

Standard	Remark
EN61131-2:2007 Programmable controllers - Equipment requirements and tests	Compliance with all relevant aspects of the standard. **EMI** • Radiated Emission • Conducted Emission **EMS** • Radiated electromagnetic field • Fast transient burst • Electrostatic discharge • High-energy surge • Voltage drops and interruptions • Conducted RF • Power frequency magnetic field

Caution for EC Directive
- Installation in Enclosure
  Programmable logic controllers are open-type devices that must be installed and used within conductive control cabinets. Please use the programmable logic controller while installed within a conductive shielded control cabinet. Please secure the cabinet door to the control cabinet (for conduction). Installation within a control cabinet greatly affects the safety of the system and aids in shielding noise from the programmable logic controller.
- Use the FX3U-128ASL-M in Zone A*1 as defined in EN61131-2.
  *1 Zone defined in EN61131-2.
  Separation defined in EN61131-2 for EMC LVD regulation decided depending on condition in industrial setting.
  Zone C = Factory mains which is isolated from public mains by dedicated transformers.
  Zone B = Dedicated power distribution which is protected by secondary surge protection. (300 V or less in the rated voltage is assumed.)
  Zone A = Local power distribution which is isolated from dedicated power distribution by AC/DC converters, isolation transformers, etc. (120 V or less in the rated voltage is assumed.)
- Please attach a ferrite core less than 200 mm from the FX3U-128ASL-M side terminal block to the DP and DN signal wires. The wire should be wound twice around the ferrite core. The ferrite core should be a product equivalent to ZCAT3035-1330 by TDK Corporation.
  Please attach a noise filter to the 0 V and 24 V power cables. The noise filter should be a product equivalent to SNR-10-223 by COSEL CO., LTD.

1. Outline

The FX3U-128ASL-M type AnyWireASLINK system master block (hereinafter referred to as 128ASL-M) is a special function block for building an AnyWireASLINK system with FX3G/FX3GC/FX3U/FX3UC PLC.
The 128ASL-M is jointly developed and manufactured by Mitsubishi and Anywire Corporation.
The AnyWireASLINK system is a sensor network system.
→ **System configuration details, refer to the FX3U-128ASL-M User's Manual.**

1.1 Outline and features of AnyWireASLINK system

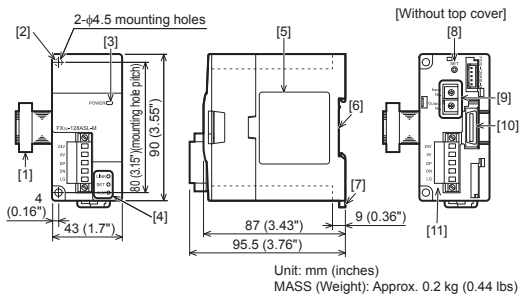
AnyWireASLINK is a high-speed and highly reliable system which relieves the work site from complicated and incorrect wiring.
In this network, sensors at the end of a control system are connected to a programmable controller in the optimum form.

1.2 Incorporated Items

Check to ensure the following product and items are included in the package:

Included Item	
FX3U-128ASL-M	1 unit
Special unit/block No. label	1 sheet
Dust proof protection sheet	1 sheet
Manuals (Japanese version, English version)	1 manual each

1.3 External Dimensions and Each Part Names



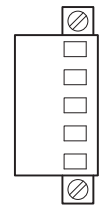
Unit: mm (inches)
MASS (Weight): Approx. 0.2 kg (0.44 lbs)

[1] Extension cable
[2] Direct mounting hole
2 holes of φ4.5 (0.18")
(mounting screw: M4 screw)
[3] Power LED (green)
[4] Status LEDs (green, red)
→ **Refer to section 1.4.**
[5] Nameplate
[6] DIN rail mounting groove (DIN rail: DIN46277, 35 mm (1.38") width)
[7] DIN rail mounting hook
[8] SET switch
(Automatic address setting switch)
[9] Transmission points number setting switch (Rotary switch)
[10] Extension connector
[11] AnyWireASLINK connection terminal block
→ **Refer to section 1.5.**

1.4 Indications of LEDs

LED display	LED color	Status	Description
POWER	Green	ON	5 V DC is being supplied from the PLC.
		OFF	5 V DC is not being supplied from the PLC, or they are the units failure.
LINK	Green	ON	units failure
		Flicker	Operating normally
		OFF	5 V DC power off or the units failure.
SET	Green	ON	Automatic address detection in progress.
		Flicker	Writing in the EEPROM
		OFF	Operating normally
ALM	Red	ON	DP/DN disconnection
		Slow flicker (one-second intervals)	DP/DN short
		Fast flicker (0.2-second intervals)	24 V DC is not being supplied or the voltage is low.
		OFF	Operating normally

1.5 Terminal Layout



Terminal name	Description
24V	24V terminal for sensor power and communication.
0V	0V terminal for sensor power and communication.
DP	Transmission signal (+) terminal. It connects with DP of the slave module and the Terminator.
DN	Transmission signal (-) terminal. It connects with DN of the slave module and the Terminator.
LG	Functional earth terminal. The one point is grounded with the grounding terminal and functional earth terminal of the PLC (FG terminal).

- AnyWireASLINK connection terminal block specifications
  Type: MSTB2,5/5-STF-5,08AU (Phoenix Contact Co., Ltd.)
  Electric wire size: 0.2 to 2.5 mm^2 (AWG24 to 12)
  Tightening torque: 0.5 to 0.6 N•m (For both connector fixing screw and transmission line connection screw)
  Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.
- For details on the wiring needed to connect to the terminal blocks shown in the figure above, refer to the following manual.
  → **Refer to the FX3U-128ASL-M User's Manual.**

2. Installation

For installation details, refer to the following manuals.
→ **Refer to the FX3U-128ASL-M User's Manual.**

INSTALLATION PRECAUTIONS ⚠WARNING

- Make sure to cut off all phases of the power supply externally before attempting installation work.
  Failure to do so may cause electric shock.

INSTALLATION PRECAUTIONS ⚠CAUTION

- Use the product within the generic environment specifications described in PLC main unit manual (Hardware Edition).
  Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl2, H2S, SO2 or NO2), flammable gas, vibration or impacts, or expose it to high temperature, condensation, or rain and wind.
  If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.
- Do not touch the conductive parts of the product directly.
  Doing so may cause device failures or malfunctions.
- Install the product securely using a DIN rail or mounting screws.
- Install the product on a flat surface.
  If the mounting surface is rough, undue force will be applied to the PC board, thereby causing nonconformities.
- When drilling screw holes or wiring, make sure that cutting and wiring debris do not enter the ventilation slits.
  Failure to do so may cause fire, equipment failures or malfunctions.
- Be sure to remove the dust proof sheet from the PLC's ventilation slits when installation work is completed.
  Failure to do so may cause fire, equipment failures or malfunctions.
- Make sure to attach the top cover, offered as an accessory, before turning on the power or initiating operation after installation or wiring work.
  Failure to do so may cause electric shock.
- Connect extension cables securely to their designated connectors.
  Loose connections may cause malfunctions.

2.1 Connection to the PLC

The 128ASL-M connects on the right side of an PLC main unit or extension units/blocks (including special function units/blocks).
For connection to an FX3UC Series PLC or FX2NC Series PLC extension block, an FX2NC-CNV-IF or FX3UC-1PS-5V is required.
For installation method to PLCs, refer to the User's Manual - Hardware Edition of the connected PLC.

2.2 Mounting

The product is mounted by the following method.
- DIN rail mounting
- Direct mounting (mounting screw: M4 screw)

For details, refer to the User's Manual - Hardware Edition of the connected PLC.

3. Wiring

For wiring details, refer to the following manuals.
→ **Refer to the FX3U-128ASL-M User's Manual.**

WIRING PRECAUTIONS ⚠WARNING

- Make sure to cut off all phases of the power supply externally before attempting wiring work.
  Failure to do so may cause electric shock or damage to the product.

WIRING PRECAUTIONS ⚠CAUTION

- Connect the DC power supply wiring to the dedicated terminals described in this manual.
  If an AC power supply is connected to a DC input/output terminal or DC power supply terminal, the PLC will burn out.
- Make sure to attach the top cover, offered as an accessory, before turning on the power or initiating operation after installation or wiring work.
  Failure to do so may cause electric shock.
- When drilling screw holes or wiring, make sure that cutting and wiring debris do not enter the ventilation slits.
  Failure to do so may cause fire, equipment failures or malfunctions.
- Make sure to properly wire to the terminal block (European type) in accordance with the following precautions.
  Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
  - The disposal size of the cable end should follow the dimensions described in the manual.
  - Tightening torque should follow the specifications in the manual.
  - Twist the end of strand wire and make sure that there are no loose wires.
  - Do not solder-plate the electric wire ends.
  - Do not connect more than the specified number of wires or electric wires of unspecified size.
  - Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.
- Do not apply the 24VDC power before wiring the entire AnyWireASLINK system.
- Connect a 24VDC external power supply to 128ASL-M for the AnyWireASLINK system.
- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
  1) Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line.
  Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or high-voltage lines.
  2) Ground the shield wire or shield of the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems.
- Place the cables in a duct or clamp them.
  If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- When disconnecting the cable from the module, do not pull the cable by the cable part.
  For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.

3.1 AnyWireASLINK connection terminal block

For details on the terminal block layout, refer to section 1.5.

Item	Description
Model name	MSTB2,5/5-STF-5,08AU (Phoenix Contact Co., Ltd.)
Electric wire size	0.2 to 2.5 mm^2 (AWG24 to 12)
Tightening torque	0.5 to 0.6 N•m (It is common also on the connector fixing screw and the transmission line connection screw)

- To tighten the terminal block, a flathead screwdriver having a tip size of 0.6×3.5 mm is required.
- When the AnyWireASLINK connection terminal block is removed
  Before removing the transmission cable terminal block, check that the fixing screws on both sides are completely loosened (removed from the socket). Pulling with excessive force while the fixing screws of both ends are still tightened may damage the device.
- When the AnyWireASLINK connection terminal block is attached
  Before tightening, check that there are no short circuits due to disconnected or frayed wires. Then tighten the screws at both sides securely.
  (Tightening torque: 0.5 N•m to 0.6 N•m)

3.2 Cable treatment

Bare cables can be connected to the AnyWireASLINK connection terminal block; however, for safety reasons, it is recommended to connect the crimped bar terminals. Use UL-listed solderless terminals and, for processing, use a tool recommended by their manufacturer.

recommended bar terminals (Phoenix Contact Co., Ltd.)

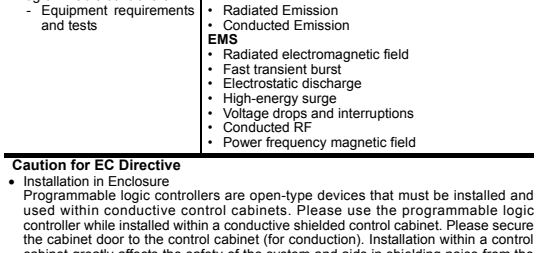
Electric wire size	Electric wire connected number	recommended bar terminals model name (Phoenix Contact Co., Ltd.)
0.75 mm^2	1 cable	AI 0,75-8 GY
	2 cables	AI-TWIN 2X 0,75-8 GY
1.25 mm^2	1 cable	AI 1,5-8 BK
	2 cables	AI-TWIN 2X 1,5-8 BK

3.3 Wiring precautions

- Do not run multiple transmission cables (DP, DN) using a multicore cable.

- The voltage should not fall below the lower limit of the allowable voltage range due to voltage drop caused by the cable.
  If the voltage falls below the lower limit, malfunctions may occur.
- Do not connect soldered cables directly to the terminals. Doing so may loosen the screws, resulting in a poor contact.
- It is recommended to use a 1.25 mm^2 lead wire for the main line because the power supply is superimposed on the signal wire in the AnyWireASLINK system.
- General-purpose wire, VCTF cable and flat cable, etc. can be used. Use stranded wires instead of single core wires.

3.4 Power supply and grounding wiring



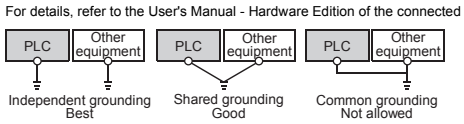
3.4.1 Power on timing

The AnyWireASLINK system external power supply should be turned ON simultaneously with or before the power supply of the PLC main unit it is connected to. (The order is inverted when the system is powered off.)

Caution
If the PLC main unit is powered on before the 24 V DC external power supply in the AnyWireASLINK system, a transmission cable voltage drop detection error may occur. If the error including transmission cable voltage drop detection error is detected, the error can be cleared by turning the error flag clear command (BFM#27 b0) from OFF to ON.

3.4.2 Grounding

Ground the PLC as stated below.
- Perform class D grounding. (Grounding resistance: 100 Ω or less)
- Ground the PLC independently if possible.
  If it cannot be grounded independently, ground it jointly as shown below.
  For details, refer to the User's Manual - Hardware Edition of the connected PLC.



- Position the grounding point as close to the PLC (128ASL-M) as possible to decrease the length of the ground wire.

4. Specification

For details on specifications, refer to the following manual.
→ **FX3U-128ASL-M User's Manual**

DESIGN PRECAUTIONS ⚠WARNING

- An AnyWireASLINK system has no control function for ensuring safety.
- When a communication failure occurs in the network, data in the master module are held.
  Check the communication status information and configure an interlock circuit in the sequence program to ensure that the entire system will operate safely.
- Make sure to have the following safety circuits outside of the PLC to ensure safe system operation even during external power supply problems or PLC failure. Otherwise, malfunctions may cause serious accidents.
  1)Most importantly, have the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper and lower positioning limits).
  2)Note that when the PLC CPU detects an error, such as a watchdog timer error, during self-diagnosis, all outputs are turned off. Also, when an error that cannot be detected by the PLC CPU occurs in an input/output control block, output control may be disabled.
  External circuits and mechanisms should be designed to ensure safe machinery operation in such a case.

DESIGN PRECAUTIONS ⚠CAUTION

- Configure safety circuits, such as an emergency stop circuit and interlock circuit, external to the AnyWireASLINK system.
- Install module so that excessive force will not be applied to the terminal blocks. Failure to do so may result in wire damage/breakage or PLC failure.
- When executing control (data changes) to an operating PLC, construct an interlock circuit in the sequence program so that the entire system operates conservatively. Additionally, when executing control such as program changes and operation status changes (status control) to an operating PLC, thoroughly read the manual and sufficiently confirm safety in advance.

DISPOSAL PRECAUTIONS ⚠CAUTION

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.

TRANSPORTATION AND STORAGE PRECAUTIONS ⚠CAUTION

- The PLC is a precision instrument. During transportation, avoid impacts larger than those specified in the general specifications of the PLC main unit manual by using dedicated packaging boxes and shock-absorbing palettes.
  Failure to do so may cause failures in the PLC.
  After transportation, verify operation of the PLC and check for damage of the mounting part, etc.

4.1 Applicable PLC

Model name	Applicability	Number of connectable units
FX3G Series PLC	Ver. 1.00 or later	One unit
FX3GC Series PLC*1	Ver. 1.40 or later	One unit
FX3U Series PLC	Ver. 2.20 or later	One unit
FX3UC Series PLC*1	Ver. 2.20 or later	One unit

The version number can be checked by reading the last three digits of device D8001 or D8101.
*1 An FX2NC-CNV-IF or FX3UC-1PS-5V is necessary to connect the FX3U-128ASL-M with the FX3GC/FX3UC PLCs.

4.2 General Specifications

Items other than the following are equivalent to those of the PLC main unit.
For general specifications, refer to the User's Manual - Hardware Edition of the connected PLC.

Item	Specification	
Dielectric withstand voltage	500 V AC for one minute	Between all PLC terminals and ground terminal
Insulation resistance	5 MΩ or more by 500 V DC megger	
Pollution degree	2 or less	

4.3 Power Supply Specification

Item	Specification
Driving power supply	130 mA / 5 V DC 5 V DC power is supplied internally from the main unit.
External power supply for ASLINK communication	Voltage: 21.6 to 27.6 V DC (24 V DC -10 % to +15 %), ripple voltage 0.5 Vp-p or lower Rated voltage: 24 V DC * Please use a UL Class 2 power supply. Module current consumption: 0.1 A Transmission cable supply current: Up to 2 A

4.4 Performance Specifications

Item	Specification
Transmission clock	27.0 kHz
Maximum transmission distance (total length)	200 m
Transmission system	DC power supply transmission total frame cyclic system
Connection type	Bus topology (multidrop system, T-branch system, tree branch system)
Transmission protocol	Dedicated protocol (AnyWireASLINK)
Error control	Double-check system, checksum
Number of connected I/O points	Up to 128 points
Number of connectable modules	Up to 128 (varies depending on the current consumption of each slave module)
Maximum number of I/O points per system	Number of input points of the slave module + number of output points of the slave module ≤ 128 points
RAS function	• Disconnected transmission cable location detection function • Transmission cable short detection function • Transmission cable voltage drop detection function
AnyWireASLINK transmission cable	• UL-listed general-purpose 2-wire cable (VCTF, VCT 1.25 mm^2, 0.75 mm^2, rated temperature 70 °C or higher) • UL-listed general-purpose wire (1.25 mm^2, 0.75 mm^2, rated temperature 70 °C or higher) • Dedicated flat cable (1.25 mm^2, 0.75 mm^2, rated temperature 90 °C)*1
Power cable	• UL-listed general-purpose 2-wire cable (VCTF, VCT 0.75 mm^2 to 2.0 mm^2, rated temperature 70 °C or higher) • UL-listed general-purpose wire (0.75 mm^2 to 2.0 mm^2, rated temperature 70 °C or higher) • Dedicated flat cable (1.25 mm^2, 0.75 mm^2, rated temperature 90 °C)*1
Communication with PLC	By FROM and TO instructions or direct specification of buffer memory (FX3U/FX3UC) via the buffer memory.
Number of I/O occupied points	8 points (taken from either the input or output points of the PLC)
Number of connectable units to the main unit	One unit

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

Warranty
Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; opportunity loss or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

⚠ For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

Anywire Anywire Corporation http://www.anywire.jp

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN