



PROGRAMMABLE CONTROLLERS
MELSEC-F

FX3G-1DA-BD

INSTALLATION MANUAL



| | |
|---------------|-------------|
| Manual Number | JY997D33601 |
| Revision | F |
| Date | April 2015 |

This manual describes the part names, dimensions, mounting, 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:
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.

Associated Manuals

| Manual name | Manual No. | Description |
|--|-----------------------------------|---|
| FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - Analog Control Edition | JY997D16701 MODEL CODE: 09R619 | Describes specifications for analog control and programming method for FX3S/FX3G/FX3GC/FX3U/FX3UC Series PLC. |
| FX3S Series User's Manual - Hardware Edition | JY997D48601 MODEL CODE: 09R535 | Explains FX3S Series PLC specifications for I/O, wiring, installation, and maintenance. |
| FX3G Series User's Manual - Hardware Edition | JY997D31301 MODEL CODE: 09R521 | Explains FX3G Series PLC specifications for I/O, wiring, installation, and maintenance. |

How to obtain manuals

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

Applicable standards

FX3G-1DA-BD units made in November, 2008 or later comply with the EC Directive (EMC Directive). Further information can be found in the following manual.

- FX3S Series Hardware Manual (Manual No. JY997D48301)
- FX3G Series Hardware Manual (Manual No. JY997D46001)

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

Caution for EC Directive

The analog expansion boards have been found to be compliant to the European standards in the aforesaid manual and directive. However, for the very best performance from what are in fact delicate measuring and controlled output device Mitsubishi Electric would like to make the following points; As analog devices are sensitive by nature, their use should be considered carefully. For users of proprietary cables (integral with sensors or actuators), these users should follow those manufacturers installation requirements. Mitsubishi Electric recommend that shielded cables should be used. If NO other EMC protection is provided, then users may experience temporary loss or accuracy between ±10 % in very heavy industrial areas.

However, Mitsubishi Electric suggest that if adequate EMC precautions are followed for the users complete control system, users should expect accuracy as specified in this manual.

- Sensitive analog cable should not be laid in the same trunking or cable conduit as high voltage cabling. Where possible users should run analog cables separately.
- Good cable shielding should be used. When terminating the shield at Earth - ensure that no earth loops are accidentally created.
- When reading analog values, EMC accuracy can be improved out by averaging the readings. This can be achieved either through functions on the analog expansion boards or through a users program in the PLC main unit.

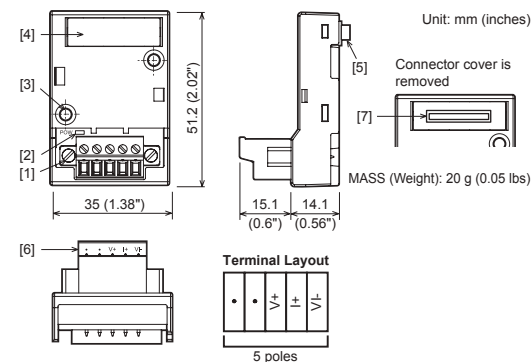
1. Outline

The FX3G-1DA-BD board (hereinafter called 1DA-BD) is an expansion board for adding one additional analog output point.

1.1 Incorporated Items

| Product | Analog output expansion board FX3G-1DA-BD |
|----------------|---|
| Included items | <ul style="list-style-type: none"> M3x8 tapping screws for installation: 2 pcs. Side cover Installation Manual (This manual) |

1.2 External Dimensions, Part Names



- [1] Terminal block mounting screws
- [2] POW LED: Lit while power is properly supplied from main unit
- [3] Mounting holes (2-φ3.2)
- [4] Connector cover
- [5] Main unit connector
- [6] Terminal block to connect analog output
- [7] Memory cassette/Display module connector

2. Installation

INSTALLATION PRECAUTIONS **WARNING**

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

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.
- When drilling screw holes or wiring, make sure cutting or wire debris does not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions.
- Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions.
- Connect expansion board securely to their designated connectors. Loose connections may cause malfunctions.

For the installation, refer to the following manual.
→ FX3S Series User's Manual - Hardware Edition
→ FX3G Series User's Manual - Hardware Edition

3. Wiring

WIRING PRECAUTIONS **WARNING**

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

WIRING PRECAUTIONS **CAUTION**

- When drilling screw holes or wiring, make sure cutting or wire debris does not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions.
- 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:

- Do not bundle the power line or shield of the analog input/output cable 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, high-voltage line or load line.
 - Ground the shield of the analog input/output cable at one point on the signal receiving side. However, do not use common grounding with heavy electrical systems.
- 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.
 - Make sure to properly wire to the terminal blocks 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.

3.1 Applicable Cable and Terminal Tightening Torque

3.1.1 Terminal block (European type)

- Wire size
Wiring to analog device should use 20-22 AWG wire.
- Applicable cable

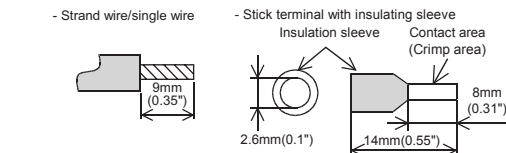
| Type | Wire size |
|-------------|--|
| Single-wire | 0.3 mm ² to 0.5 mm ² (AWG22 to 20) |
| 2-wire | 2 pieces of 0.3 mm ² (AWG22) |

- Termination of cable end
Strip the coating of strand wire and twist the cable core before connecting it, or strip the coating of single wire before connecting it. An alternative connection is to use a ferrule with insulating sleeve. <Reference>

| Manufacturer | Model | Caulking tool |
|---------------------------|------------|--|
| Phoenix Contact Co., Ltd. | AI 0.5-8WH | CRIMPFOX 6 ¹ (or CRIMPFOX 6T-F ²) |

*1 Old model name: CRIMPFOX ZA 3

*2 Old model name: CRIMPFOX UD 6



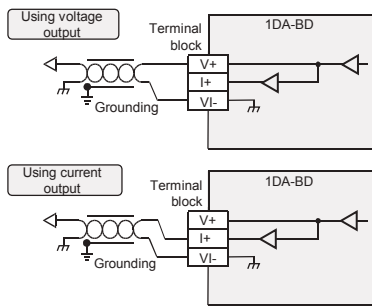
When using a stick terminal with insulating sleeve, choose a wire with proper cable sheath referring to the above outside dimensions, or otherwise, the wire cannot be inserted easily. The tightening torque must be 0.22 to 0.25 N-m. Do not tighten terminal screws exceeding the specified torque. Failure to do so may cause equipment failures or malfunctions.

- Tool
For tightening the terminal, use a commercially available small screwdriver having a straight form that is not widened toward the end as shown right.
Caution: If the diameter of screwdriver grip is too small, tightening torque will not be able to be achieved. Use the following recommended screwdriver or an appropriate replacement (grip diameter: approximately 25 mm (0.98")). <Reference>

| Manufacturer | Model |
|---------------------------|-------------|
| Phoenix Contact Co., Ltd. | SZS 0.4x2.5 |

3.2 Wiring of Analog Output

→ For the terminal configuration, refer to Section 1.2



- *1 Use 2-core shielded twisted pair cable for the analog output lines, and separate the analog output lines from other power lines or inductive lines.
- *2 The grounding resistance should be 100 Ω or less.

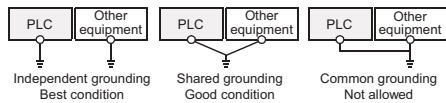
3.3 Grounding

Grounding should be performed as stated below.

- The grounding resistance should be 100 Ω or less.
- Independent grounding should be performed for best results. When independent grounding is not performed, perform "shared grounding" of the following figure.

For details, refer to the following manual.

→ FX3S Series User's Manual - Hardware Edition
→ FX3G Series User's Manual - Hardware Edition



- The grounding wire size should be AWG 22-20 (0.3-0.5 mm²).
- The grounding point should be close to the PLC, and all grounding wire should be as short as possible.

4. Specifications

| | |
|--|------------------|
| STARTUP AND MAINTENANCE PRECAUTIONS | ⚠ CAUTION |
| <ul style="list-style-type: none"> Do not disassemble or modify the PLC. Doing so may cause fire, equipment failures, or malfunctions. * For repair, contact your local Mitsubishi Electric representative. Do not drop the product or exert strong impact to it. Doing so may cause damage. | |
| DISPOSAL PRECAUTIONS | ⚠ CAUTION |
| <ul style="list-style-type: none"> Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device. | |
| TRANSPORTATION AND STORAGE PRECAUTIONS | ⚠ CAUTION |
| <ul style="list-style-type: none"> The product is a precision instrument. During transportation, avoid any impacts. Failure to do so may cause failures in the product. After transportation, verify the operations of the product. | |

4.1 Applicable PLC

| Model name | Applicability |
|-----------------|--|
| FX3S Series PLC | Ver. 1.00 or later (from first production) |
| FX3G Series PLC | Ver. 1.10 or later |

The version number can be checked by monitoring D8001/D8101 as the last three digits indicate it.

- The number of connectable expansion boards varies depending on the main unit as follows:
 - FX3S, FX3G-14M□, FX3G-24M□ Main units: 1 unit
 - FX3G-40M□, FX3G-60M□ Main units: 2 units
 Never stack up two or more expansion boards.

For details on the system configuration, refer to the following manual.

→ FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - Analog Control Edition

4.2 General Specifications

The general specifications are equivalent to the PLC main unit. For general specifications, refer to the following manuals.

→ FX3S Series User's Manual - Hardware Edition
→ FX3G Series User's Manual - Hardware Edition

4.3 Performance Specifications

| Item | Specifications | |
|-------------------------------|---|--|
| | Voltage output | Current output |
| Analog output range | 0 to 10 V DC (External load resistance: 2 kΩ to 1 MΩ) | 4 to 20 mA DC (External load resistance: 500 Ω or less) |
| Digital input | 12 bits, binary | 11 bits, binary |
| Resolution | 2.5 mV (10 V/4000) | 8 μA (16 mA/2000) |
| Total accuracy | <ul style="list-style-type: none"> ±0.5 % (±50 mV) for full scale of 10 V (when ambient temperature is 25 °C±5 °C) ±1.0 % (±100 mV) for full scale of 10 V (when ambient temperature is 0 °C to 55 °C) Shipment adjustment is carried out by external load resistance 2 kΩ. If external load resistance becomes larger than 2 kΩ, the output voltage will increase slightly. When the load is 1 MΩ, the output voltage becomes about 2 % higher than the correct value. | <ul style="list-style-type: none"> ±0.5 % (±80 μA) for full scale of 16 mA (when ambient temperature is 25 °C±5 °C) ±1.0 % (±160 μA) for full scale of 16 mA (when ambient temperature is 0 °C to 55 °C) |
| D/A conversion time | 60 μs (The data will be updated at every scan time of the PLC.) | |
| output characteristics | 0 to 4000 are adjusted to 0 to 10 V when the external load resistance is 2 kΩ. | 0 to 2000 are adjusted to 4 to 20 mA when the external load resistance is 250 Ω. |
| Insulation method | No insulation between the PLC. | |
| Occupied points | 0 point (This number is not related to the maximum number of input/output points of the PLC.) | |

4.4 List of Special Devices

R: Read W: Write

| | Device number | | | Description | R/W |
|-------------------------|---------------|---------|---------|--|-----|
| | FX3S | FX3G | | | |
| | | Board A | Board B | | |
| Special auxiliary relay | M8260 | M8260 | M8270 | Switches the output mode OFF: Voltage output ON: Current output | R/W |
| | M8264 | M8264 | M8274 | Output Holding Function Cancellation Setting OFF: Holds the analog data output just before stop of the PLC. ON: Output the offset data at stop of the PLC. | R/W |
| Special data register | D8260 | D8260 | D8270 | Output setting data | R/W |
| | D8268 | D8268 | D8278 | Error status b0: Output data setting error b1: Unused b2: Unused b3: Unused b4: EEPROM error b15 to b5: Unused | R/W |
| | D8269 | D8269 | D8279 | Model code = 4 | R |

As for the details of the special devices, refer to the following manual.

→ FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - Analog Control Edition

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.

MITSUBISHI ELECTRIC CORPORATION

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

FX3G-1DA-BD

INSTALLATION MANUAL



| | |
|---------------|-------------|
| Manual Number | JY997D33601 |
| Revision | F |
| Date | April 2015 |

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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.

Associated Manuals

| Manual name | Manual No. | Description |
|--|-----------------------------------|---|
| FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - Analog Control Edition | JY997D16701 MODEL CODE: 09R619 | Describes specifications for analog control and programming method for FX3S/FX3G/FX3GC/FX3U/FX3UC Series PLC. |
| FX3S Series User's Manual - Hardware Edition | JY997D48601 MODEL CODE: 09R535 | Explains FX3S Series PLC specifications for I/O, wiring, installation, and maintenance. |
| FX3G Series User's Manual - Hardware Edition | JY997D31301 MODEL CODE: 09R521 | Explains FX3G Series PLC specifications for I/O, wiring, installation, and maintenance. |

How to obtain manuals

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

Applicable standards

FX3G-1DA-BD units made in November, 2008 or later comply with the EC Directive (EMC Directive). Further information can be found in the following manual.

- FX3S Series Hardware Manual (Manual No. JY997D48301)
- FX3G Series Hardware Manual (Manual No. JY997D46001)

Attention

- This product is designed for use in industrial applications.

Note

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Mitsubishi Electric Europe B.V.
Gothaer Str. 8, 40880 Ratingen, Germany

Caution for EC Directive

The analog expansion boards have been found to be compliant to the European standards in the aforesaid manual and directive. However, for the very best performance from what are in fact delicate measuring and controlled output device Mitsubishi Electric would like to make the following points; As analog devices are sensitive by nature, their use should be considered carefully. For users of proprietary cables (integral with sensors or actuators), these users should follow those manufacturers installation requirements. Mitsubishi Electric recommend that shielded cables should be used. If NO other EMC protection is provided, then users may experience temporary loss or accuracy between ±10 % in very heavy industrial areas. However, Mitsubishi Electric suggest that if adequate EMC precautions are followed for the users complete control system, users should expect accuracy as specified in this manual.

- Sensitive analog cable should not be laid in the same trunking or cable conduit as high voltage cabling. Where possible users should run analog cables separately.
- Good cable shielding should be used. When terminating the shield at Earth - ensure that no earth loops are accidentally created.
- When reading analog values, EMC accuracy can be improved out by averaging the readings. This can be achieved either through functions on the analog expansion boards or through a users program in the PLC main unit.

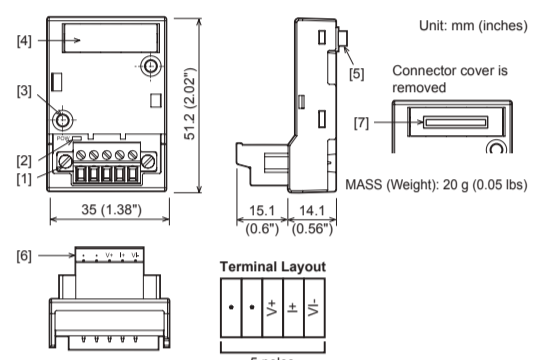
1. Outline

The FX3G-1DA-BD board (hereinafter called 1DA-BD) is an expansion board for adding one additional analog output point.

1.1 Incorporated Items

| Product | Analog output expansion board FX3G-1DA-BD |
|----------------|---|
| Included items | <ul style="list-style-type: none"> M3×8 tapping screws for installation: 2 pcs. Side cover Installation Manual (This manual) |

1.2 External Dimensions, Part Names



- [1] Terminal block mounting screws
- [2] POW LED: Lit while power is properly supplied from main unit
- [3] Mounting holes (2-φ3.2)
- [4] Connector cover
- [5] Main unit connector
- [6] Terminal block to connect analog output
- [7] Memory cassette/Display module connector

2. Installation

INSTALLATION PRECAUTIONS ⚠️ **WARNING**

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

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 NO_x), 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.
- When drilling screw holes or wiring, make sure cutting or wire debris does not enter the ventilation slits.
- Failure to do so may cause fire, equipment failures or malfunctions.
- Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions.
- Connect expansion board securely to their designated connectors. Loose connections may cause malfunctions.

For the installation, refer to the following manual.
→ FX3S Series User's Manual - Hardware Edition
→ FX3G Series User's Manual - Hardware Edition

3. Wiring

WIRING PRECAUTIONS ⚠️ **WARNING**

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

WIRING PRECAUTIONS ⚠️ **CAUTION**

- When drilling screw holes or wiring, make sure cutting or wire debris does not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions.
- 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:
 - Do not bundle the power line or shield of the analog input/output cable 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, high-voltage line or load line.
 - Ground the shield of the analog input/output cable at one point on the signal receiving side. However, do not use common grounding with heavy electrical systems.
- 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.
- Make sure to properly wire to the terminal blocks 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.

3.1 Applicable Cable and Terminal Tightening Torque

3.1.1 Terminal block (European type)

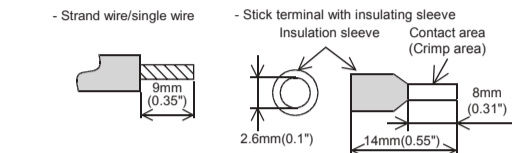
- Wire size
Wiring to analog device should use 20-22 AWG wire.
- Applicable cable

| Type | Wire size |
|-------------|--|
| Single-wire | 0.3 mm ² to 0.5 mm ² (AWG22 to 20) |
| 2-wire | 2 pieces of 0.3 mm ² (AWG22) |

- Termination of cable end
Strip the coating of strand wire and twist the cable core before connecting it, or strip the coating of single wire before connecting it. An alternative connection is to use a ferrule with insulating sleeve. <Reference>

| Manufacturer | Model | Caulking tool |
|---------------------------|------------|--|
| Phoenix Contact Co., Ltd. | AI 0.5-8WH | CRIMPFOX 6 ¹ (or CRIMPFOX 6T-F ²) |

- Old model name: CRIMPFOX ZA 3
- Old model name: CRIMPFOX UD 6



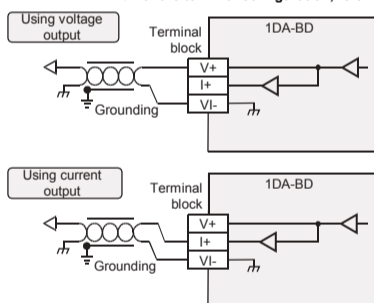
When using a stick terminal with insulating sleeve, choose a wire with proper cable sheath referring to the above outside dimensions, or otherwise, the wire cannot be inserted easily. The tightening torque must be 0.22 to 0.25 N·m. Do not tighten terminal screws exceeding the specified torque. Failure to do so may cause equipment failures or malfunctions.

- Tool
For tightening the terminal, use a commercially available small screwdriver having a straight form that is not widened toward the end as shown right.
Caution: If the diameter of screwdriver grip is too small, tightening torque will not be able to be achieved. Use the following recommended screwdriver or an appropriate replacement (grip diameter: approximately 25 mm (0.98")). <Reference>

| Manufacturer | Model |
|---------------------------|-------------|
| Phoenix Contact Co., Ltd. | SZS 0.4×2.5 |

3.2 Wiring of Analog Output

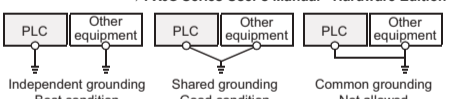
→ For the terminal configuration, refer to Section 1.2



- *1 Use 2-core shielded twisted pair cable for the analog output lines, and separate the analog output lines from other power lines or inductive lines.
- *2 The grounding resistance should be 100 Ω or less.

3.3 Grounding

- Grounding should be performed as stated below.
- The grounding resistance should be 100 Ω or less.
- Independent grounding should be performed for best results. When independent grounding is not performed, perform "shared grounding" of the following figure. For details, refer to the following manual.
→ FX3S Series User's Manual - Hardware Edition
→ FX3G Series User's Manual - Hardware Edition



- The grounding wire size should be AWG 22-20 (0.3-0.5 mm²).
- The grounding point should be close to the PLC, and all grounding wire should be as short as possible.

4. Specifications

STARTUP AND MAINTENANCE PRECAUTIONS ⚠️ **CAUTION**

- Do not disassemble or modify the PLC. Doing so may cause fire, equipment failures, or malfunctions. * For repair, contact your local Mitsubishi Electric representative.
- Do not drop the product or exert strong impact to it. Doing so may cause damage.

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 product is a precision instrument. During transportation, avoid any impacts. Failure to do so may cause failures in the product. After transportation, verify the operations of the product.

4.1 Applicable PLC

| Model name | Applicability |
|-----------------|--|
| FX3S Series PLC | Ver. 1.00 or later (from first production) |
| FX3G Series PLC | Ver. 1.10 or later |

The version number can be checked by monitoring D8001/D8101 as the last three digits indicate it.

- The number of connectable expansion boards varies depending on the main unit as follows:
 - FX3S, FX3G-14M□, FX3G-24M□ Main units: 1 unit
 - FX3c-40M□, FX3c-60M□ Main units: 2 units
 Never stack up two or more expansion boards. For details on the system configuration, refer to the following manual.
→ FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - Analog Control Edition

4.2 General Specifications

The general specifications are equivalent to the PLC main unit. For general specifications, refer to the following manuals.
→ FX3S Series User's Manual - Hardware Edition
→ FX3G Series User's Manual - Hardware Edition

4.3 Performance Specifications

| Item | Specifications | |
|-------------------------------|---|--|
| | Voltage output | Current output |
| Analog output range | 0 to 10 V DC (External load resistance: 2 kΩ to 1 MΩ) | 4 to 20 mA DC (External load resistance: 500 Ω or less) |
| Digital input | 12 bits, binary | 11 bits, binary |
| Resolution | 2.5 mV (10 V/4000) | 8 μA (16 mA/2000) |
| Total accuracy | <ul style="list-style-type: none"> ±0.5 % (±50 mV) for full scale of 10 V (when ambient temperature is 25 °C±5 °C) ±1.0 % (±100 mV) for full scale of 10 V (when ambient temperature is 0 °C to 55 °C) Shipment adjustment is carried out by external load resistance 2 kΩ. If external load resistance becomes larger than 2 kΩ, the output voltage will increase slightly. When the load is 1 MΩ, the output voltage becomes about 2 % higher than the correct value. | <ul style="list-style-type: none"> ±0.5 % (±80 μA) for full scale of 16 mA (when ambient temperature is 25 °C±5 °C) ±1.0 % (±160 μA) for full scale of 16 mA (when ambient temperature is 0 °C to 55 °C) |
| D/A conversion time | 60 μs (The data will be updated at every scan time of the PLC.) | |
| output characteristics | 0 to 4000 are adjusted to 0 to 10 V when the external load resistance is 2 kΩ. | 0 to 2000 are adjusted to 4 to 20 mA when the external load resistance is 250 Ω. |
| | Caution: An area of dead band is located in the region of 0 V. Therefore the output analog value may not represent the digital value accurately. | |
| Insulation method | No insulation between the PLC. | |
| Occupied points | 0 point (This number is not related to the maximum number of input/output points of the PLC.) | |

4.4 List of Special Devices

R: Read W: Write

| | Device number | | | Description | R/W |
|-------------------------|---------------|---------|-------|--|-----|
| | FX3S | FX3G | | | |
| | Board A | Board B | | | |
| Special auxiliary relay | M8260 | M8260 | M8270 | Switches the output mode OFF: Voltage output ON: Current output | R/W |
| | M8264 | M8264 | M8274 | Output Holding Function Cancellation Setting OFF: Holds the analog data output just before stop of the PLC. ON: Output the offset data at stop of the PLC. | R/W |
| | D8260 | D8260 | D8270 | Output setting data | R/W |
| Special data register | D8268 | D8268 | D8278 | Error status b0: Output data setting error b1: Unused b2: Unused b3: Unused b4: EEPROM error b15 to b5: Unused | R/W |
| | D8269 | D8269 | D8279 | Model code = 4 | R |
| | | | | | |
| | | | | | |

As for the details of the special devices, refer to the following manual.
→ FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - Analog Control Edition

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