Foreword
Thank you for purchasing the MX100/MW100 Data Acquisition Unit. This guide describes concisely the installation and wiring procedures of the MX100/MW100 Data Acquisition Unit. For more details on this topic as well as safety precautions (be sure to read), and the descriptions of the functions and operations of the MX100/MW100 Data Acquisition Unit, see the MX100/MW100 Data Acquisition Unit User’s Manual (electronic manual in PDF format) which is contained in the CD-ROM provided.

1. Installation Procedure of Modules

   • Attaching the Module
   1. Prepare the base block.
      When attaching the **MW100**, replace the current base block BRACKET with the BRACKET that came with the MW100.

      ![Remove the base block bracket](image)

      ![Attach the bracket that came with the MW100](image)

      When attaching the **MX100**, if using a conventional version of the main module, remove the base block BRACKET. If the main module has been reworked, use the existing base block as-is. See “MX100/MW100: Handling of the Base Block (Model MX150—□□)” in IM MX100-75.

   2. Check that the power supply is not connected to the main module.

2. Installation Procedure of the MX100/MW100

   - Attaching and Removing the Terminal Block
     - Screw Terminal Block
     - Plate with screw terminals

   3. Terminal Arrangement Markings

   4. Wiring Procedure

   5. Attaching and Removing the Terminal Block

   6. Connecting the Power Supply

   7. Connecting to the Ethernet Interface

   Inserting and Ejecting the CF Card

   Contents Displayed on the 7-Segment LED

   Dipswitches**1**

   *1 Normally all dip switches are turned ON. Used to initialize settings and for other purposes. The figure on the left is the MX100 Main Module. This is different from the overview of the MW100 Main Module. On the MW100, it is dip switch 1.

**2 Modules compatible with the MW100.

Types of Input/Output Modules

| 4-CH, High-Speed Universal Input Module (MX110-UNV-H04) | 10-CH, Medium-Speed Universal Input Module (MX110-UNV-M10) |
| 30-CH, Medium-Speed DCV/TC/DI Input Module (MX110-VTD-L30) | 6-CH, Medium-Speed Four-Wire RTD Resistance Input Module (MX110-V4R-M06) |
| 4-CH, Medium-Speed Strain Input Module (MX112-B12-M04) | 4-CH, Medium-Speed Strain Input Module (MX112-B35-M04) |
| 4-CH, Medium-Speed Strain NDIS Input Module (MX112-NDI-M04) | 10-CH, Pulse Input Module**2** (MX114-PLS-M10) |
| 10-CH, High-Speed Digital Input Module (MX115-D05-H10) | 10-CH, High-Speed Digital Input Module (MX114-D24-H10) |
| 8-CH, Medium-Speed Analog Output Module (MX120-VAO-M08) | 8-CH, Medium-Speed PWM Output Module (MX120-PWM-M08) |
| 10-CH, Medium-Speed Digital Output Module (MX125-MKC-M10) | |

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1. Installation Procedure of Modules

3. Align the connector on the rear panel of the module to the connector at the desired position of the base plate and insert the connector. When the connectors are correctly connected, the guide pin on the rear panel of the module is inserted into the guide hole on the base plate. Then, the module is secured to the base plate with the latch lever locking in place at the bottom section of the base plate. Note that the main module can only be attached to the right end of the base plate.

4. For the MX100 main module, attach using a screw (M3) at the top of the module. For the MW100 main module, attach using screws (M3) in two locations at the top of the module.

- Detaching the Module
  Loosen the attachment screw, pull down on the latch lever on the rear panel of the module, and pull the module straight from the base plate.

- Attachment Positions and Channel Numbers
  The figure below shows how the channel numbers are identified on the PC. The MW100 channel numbers are only displayed when viewing measured data on the MW100 Viewer software.

<table>
<thead>
<tr>
<th>Slot number</th>
<th>Channel number in the unit (001 to 060)</th>
<th>Unit number</th>
</tr>
</thead>
<tbody>
<tr>
<td>01, 02, 03, 04</td>
<td>041 to 050 bit 01 to 10</td>
<td>MX100: 00 to 19 MW100: 00 to 89</td>
</tr>
<tr>
<td>05, 06, 07, 08</td>
<td>051 to 060 bit 01 to 20</td>
<td></td>
</tr>
</tbody>
</table>

*1 Fixed to 00 when connecting using the MX100 Standard software; set between 00 and 19 when using MXLOGGER software; and set between 00 and 89 when using the MW100 Viewer software.

*2 The last one digit on a 4-channel module is 1 to 4, the last one digit on a 6-channel module is 1 to 6, the last one digit on a 8-channel module is 1 to 8.

Note
The 30-CH Medium Speed DCV/TC/DI Input Module takes up three modules worth of space when attaching to the base plate.
2. Installation Procedure of the MX100/MW100

The MX100/MW100 Data Acquisition Unit can be used on a desktop, on a floor, in a rack mount, or in a panel mount. In all cases, be sure to install the instrument in a vertical position.

- **Use on a Desktop or a Floor**
  Each module has feet that can be attached to the base plate allowing them to be placed vertically.

- **Attachment to a DIN Rail**
  As shown in the figure below, you can rack-mount or panel-mount the MX100/MW100 Data Acquisition Unit by attaching a DIN rail mount bracket to the base plate.

- **Attachment of the DIN rail mount bracket to the base plate**
  - Bracket (brackets for the MX100 and MW100 have different shapes)
  - To prevent slacks in the DIN rail, fix at least three locations of the DIN rail.

- **Attachment of the base plate to the DIN rail**
  - Latch lever (Pull up to remove the base plate from the DIN rail.)

3. Terminal Arrangement Markings

A character indicating the terminal function and a terminal symbol indicating the type of signal to be input/output to each terminal are written on the back of the terminal cover of each I/O module.
4. Attaching and Removing the Terminal Block

The terminals of the input/output modules in the figure below can be removed.

The terminal block is detachable.

4-CH, High-Speed Universal Input Module

4-CH, Medium-Speed Strain Input Module (-B12, -B35)

The terminal plate can be attached and detached.

Attachment screw (Loosen before removing the terminal plate.)

Pull-out handle

The terminal block can be attached and detached.

Attachment screw (Loosen before removing the terminal block.)

The terminal block can be attached and detached.

Attachment screw (Loosen before removing the terminal block.)

4-CH, Medium-Speed Universal Input Module/6-CH, Medium-Speed 4-wire RTD Resistance Input Module/10-CH, Pulse Input Module/10-CH, High-Speed Digital Input Module (-D05, -D24)

8-CH, Medium-Speed Analog Output Module/8-CH, PWM Output Module/10-CH, Medium-Speed Digital Output Module

Screw Terminal Block

You can connect a 10-channel screw terminal block (accessory sold separately, M4 screws) that can be attached to a DIN rail (see the figure below) to the 10-CH, Medium-Speed Universal Input Module, 10-CH, Pulse Input Module, and 10-CH, High-Speed Digital Input Module (-D05, D24).

To do so, remove the terminal plate from the module (not necessary with the /NS option since it has no terminal plate).

Attachment to a DIN Rail

DIN rail

Latch lever (Pull down to detach.)

10-CH, Medium-Speed Universal Input Module

10-CH, Pulse Input Module

10-CH, High-Speed Digital Input Module

Loosen the attachment screw for the connector cover and open the connector cover.

Plate with Screw Terminals / Plate with Clamp Terminals for Current

You can attach the plate with screw terminals (sold separately) to the 10-CH, Medium-Speed Universal Input Module, 10-CH, Pulse Input Module, and the 10-CH, High-Speed Digital Input Module (-D05 and -D24).

Also, you can attach the plate with clamp terminals for current (sold separately) to the 10-CH, Medium-Speed Universal Input Module.

To do so, remove the terminal plate from the module (not necessary for the /NS option since it has no terminal plate).

Plate with Screw Terminals (model: 772080)

- Appearance
- Terminal arrangement marking on the terminal cover

Plate with Clamp Terminals for Current (model: 772081 (10 Ω)/772082 (100 Ω)/772083 (250 Ω))

- Appearance
- Terminal arrangement marking on the terminal cover
Attaching the Terminal Cover
1. Loosen the terminal cover attachment screw, then flip up the terminal cover in the direction of the arrow as shown in the figure.
2. Loosen the terminal block screw, then remove the terminal block.
3. Attach the screw terminal plate or the plate with clamp terminals for current, and fasten with screws.
4. Attach the terminal cover that came with the plate with screw terminals or plate with clamp terminals for current.

• Example of attaching the plate with screw terminals.

![Diagram of Attaching the Terminal Cover]

Note
The plate with screw terminals is recognized by the PC software as a clamp terminal. The terminal arrangement of the plate with screw terminals differs from that of the clamp terminal. Follow the terminal arrangement markings on the terminal cover when wiring.

5. Wiring Procedure
1. Turn OFF the power to the MX100/MW100.
2. Loosen the terminal cover attachment screw and lift up the terminal cover.
3. Connect the signal wires to the terminals.
4. Return the terminal cover to the original position and secure it with the screw.
The appropriate screw tightening torque is 0.6 N·m.

Wiring the Universal Input Module and DCV/TC/DI Input Module

• Thermocouple input

![Diagram of Thermocouple Input]

• RTD input

![Diagram of RTD Input]

• DC voltage input/DI input (contact)

![Diagram of DC Voltage/Contact Input]

• DC current input

![Diagram of DC Current Input]

Note
• On the 10-CH, Medium-Speed Universal Input module, RTD input terminals A and B are isolated on each channel. Terminal b is shorted internally across all channels.
• Measurement using RTD cannot be performed with the 30-CH, Medium Speed DCV/TC/DI Input Module.
• When the plate with screw terminal (model 772080) is connected to the 10-CH, Medium-Speed Universal Input Module, the terminal arrangement differs from that of clamp terminals, so wire according to the markings on the terminal cover.
5. Wiring Procedure

- Wiring the 4-Wire RTD Resistance Input Modules
  - DC voltage input/DI (contact) input
    - Voltage
    - DC voltage
    - Contact Input
    - Nothing connected to the I or C terminal
  - RTD input, resistance input
    - Resistance, RTD
    - Resistance per lead wire of 10 Ω or less
  - DC current input
    - Shunt resistor
      - Example: For 4 to 20 mA input, shunt resistance values should be 250 Ω ±0.1%
      - Terminal type: Clamp
      - Applicable wire size: 0.14 to 1.5 mm² (AWG26 to 16)

- Wiring the Strain Input Modules
  - One-Gauge Method
    - Setting switch
    - ON
    - OFF
    - No. 1
    - No. 2
    - No. 3
    - No. 4
    - No. 5
    - A(+V)
    - B( L)
    - C(-V)
    - D( H)
    - Bridge head (701955 or 701956)
    - Setting switch
    - SW1
    - SW2
    - SW3
    - SW4
    - SW5
    - No. 1
    - ON
    - No. 2
    - ON
    - No. 3
    - OFF
    - No. 4
    - ON
    - No. 5
    - OFF
    - -B12, -B35
    - -NDI
    - Setting switch
    - ON
    - OFF
    - SW
    - 1
    - 2
    - 3
    - 4
    - 5
    - R: fixed resistance
    - r: resistance value of lead wire
    - Rg: resistance value of strain gauge
    - e: output voltage from bridge
    - E: voltage applied to bridge

  - One-Gauge Three-Wire Method
    - Setting switch
    - ON
    - OFF
    - SW
    - 1
    - 2
    - 3
    - 4
    - 5
    - R: fixed resistance
    - r: resistance value of lead wire
    - Rg: resistance value of strain gauge
    - e: output voltage from bridge
    - E: voltage applied to bridge

  - Adjacent Two-Gauge Method
    - Setting switch
    - ON
    - OFF
    - SW
    - 1
    - 2
    - 3
    - 4
    - 5
    - R: fixed resistance
    - r: resistance value of lead wire
    - Rg: resistance value of strain gauge
    - e: output voltage from bridge
    - E: voltage applied to bridge
- Opposing Two-Gauge Method

Rg1, Rg2

R: fixed resistance
r: resistance value of lead wire
Rg: resistance value of strain gauge
e: output voltage from bridge
E: voltage applied to bridge

-B12, -B35
Setting switch
No.1 ON
No.2 OFF
No.3 ON
No.4 OFF
No.5 ON

-NDI

Bridge head
(701955 or 701956)

Setting switch
ON
OFF

SW 1 2 3 4 5

- Opposing Two-Gauge Three-Wire Method

Rg1, Rg2

R: fixed resistance
r: resistance value of lead wire
Rg: resistance value of strain gauge
e: output voltage from bridge
E: voltage applied to bridge

-B12, -B35
Use -NDI

-NDI

Bridge head
(701955 or 701956)

Setting switch
ON
OFF

SW 1 2 3 4 5

- Four-Gauge Method

Rg1, Rg3
Rg2, Rg4

R: fixed resistance
r: resistance value of lead wire
Rg: resistance value of strain gauge
e: output voltage from bridge
E: voltage applied to bridge

-B12, -B35
Setting switch
No.1 OFF
No.2 OFF
No.3 OFF
No.4 OFF
No.5 ON

-NDI

Bridge head
(701955 or 701956)

Setting switch
ON
OFF

SW 1 2 3 4 5
5. Wiring Procedure

- Wiring the Pulse Input Module and Digital Input Modules (-D05, -D24)

  **Note**
  - With the pulse input module and digital input module, the (–) terminal and unassigned terminals on all channels are shorted internally.
  - When the screw terminal plate (model 772080) is connected to the pulse input module and digital input module, the terminal arrangement differs from that of clamp terminals, therefore wire according to the markings on the terminal cover. Do not connect anything to the b terminals.

**Wiring the Pulse Input and Digital Input (-D05) Modules**

- **Transistor input**
- **Contact input**
- **5-V logic input**

**Main Input Specifications (for Pulse Input and Digital Input (-D05))**

<table>
<thead>
<tr>
<th>Input type</th>
<th>Input format</th>
<th>Minimum detection pulse width</th>
<th>Input threshold level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI (non-voltage contact, open collector, and 5 V logic)</td>
<td>Pull-up at approximately 5 V/approximately 5 kΩ, common electric potential between channels</td>
<td>Pulse input: 4 µs Digital input (-D05): Twice the measurement interval or more</td>
<td>Pulse input: Non-voltage contact or open collector: Counts when changing from contact open (100 kΩ or more) to contact close (100 Ω or less) 5-V logic: Counts when changing from 1 V or less to 3 V or more Digital input (-D05): Non-voltage contact or open collector: ON at 100 Ω or less and OFF at 100 kΩ or more 5-V logic: OFF at 1 V or less and ON at 3 V or more</td>
</tr>
<tr>
<td>Contact with a rating of 15 VDC or greater and 30 mA or greater Vce and Ic are transistors with ratings of 15 VDC or more, and 30 mA or more, respectively.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamp</td>
<td>Clamp</td>
<td>0.14 to 1.5 mm² (AWG26 to 16)</td>
<td></td>
</tr>
</tbody>
</table>

**Wiring the Digital Input (-D24) Module**

- **24-V logic input**

**Main Input Specifications (for Digital Input (-D24))**

<table>
<thead>
<tr>
<th>Input type</th>
<th>Input format</th>
<th>Minimum detection pulse width</th>
<th>Input threshold level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI (24-V logic)</td>
<td>Common potential between channels</td>
<td>Twice the sampling interval or more</td>
<td>24-V logic: OFF at 6 V or less and ON at 16 V or greater</td>
</tr>
<tr>
<td>Clamp</td>
<td>0.14 to 1.5 mm² (AWG26 to 16)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
- Wiring the Analog Output Modules

**Main Output Specifications**
- **Terminal type:** Clamp, attached and removed in units of 4 channels
- **Load impedance:** Voltage 5 kΩ or more
  - Current 600 Ω or less
- **Applicable wire size:** 0.08 to 2.5 mm² (AWG28 to 12)

**CAUTION**
Two power supply terminals are connected internally. Therefore, do not connect a separate external power supply to them as fire can result. If external power is connected to one power supply terminal, use the other power supply terminal for connection with another analog output module.

- Wiring the PWM Output Modules

**Main Output Specifications**
- **Output capacity:** 1A/ch max, however, 4 A or less total for all modules**1, **2
- **Terminal type:** Clamp, attached and removed in units of 4 channels
- **Applicable wire size:** 0.08 to 2.5 mm² (AWG28 to 12)

*1 A 1A current limit circuit is built in to the output circuit. Once the current limit circuit is ON, the circuit continues to operate unless the external power supply is turned OFF.
*2 This module has a built-in fuse. The built-in fuse protects against fires or abnormal emissions of heat due to load short-circuiting or other abnormalities.

**CAUTION**
Two power supply terminals are connected internally. Therefore, do not connect a separate external power supply to them as fire can result. If external power is connected to one power supply terminal, use the other power supply terminal for connection with another PWM output module.

- Wiring the Digital Output Modules

**Main Output Specifications**
- **Contact mode:** A contact (SPST)
- **Contact capacity:** 250 VDC/0.1 A, 250 VAC/2 A, or 30 VDC/2 A (resistance load)
- **Terminal type:** Clamp, attached and removed in units of 5 channels
- **Applicable wire size:** 0.08 to 2.5 mm² (AWG28 to 12)

**Note**
Do not connect anything to the unassigned terminals of the digital output module.
6. Connecting the Power Supply

- Connection Procedure Using the Power Cord (When the Suffix Code of the Power Cord Is 1D etc.)

1. Check that the power switch of the main module is OFF.
2. Connect the power cord plug to the power connector of the MX100/MW100 Data Acquisition Unit. (Use the power cord that came with the package.)
3. Connect the plug on the other end of the power cord to the outlet that meets the conditions above. The AC outlet must be of a three-prong type with a protective earth ground terminal.

- Wiring Procedure to the Power Supply Terminal (When the Suffix Code of the Power Cord Is 1W)

1. Check that the power supply and the power switch of the main module is OFF.
2. Loosen the screw fixing the power supply terminal cover of the main module in place and open the power supply terminal cover.
3. Connect the power cord and the protective ground cord to the power supply terminals according to the figure below. Use round crimp-on lugs with isolation sleeves (for 4 mm screws) for the power cord and protective ground cord terminals.
4. Close the power supply terminal cover and secure it with the screw.

- ON/OFF of the power switch

Pressing the I side of the power switch turns the instrument ON. Pressing the O side turns the instrument OFF. When turned ON, the 7-segment LED illuminates.
7. Connecting to the Ethernet Interface

Connect the Ethernet cable to the Ethernet port of the main module. Use a UTP cable (category 5 or better) or an STP cable for the Ethernet cable.

- Checking the Communication Status
  You can check the status on the two LEDs at the upper-right and lower-right of the Ethernet port.

  - LINK LED
    Illuminates in orange when the link between the MX100/MW100 and the connected device is established and communication is mutually possible.

  - ACT LED
    Blinks green when transmitting/receiving packets.

Inserting and Ejecting the CF Card

- Inserting the CF Card
  To insert the CF card into the card slot, open the slot cover and face the card's front side to the right.

- Ejecting the CF Card
  Be sure to check that the CF card is not being access before ejecting the card from the slot. When the CF card is being accessed, the 7-segment LED indicates that processing is taking place.

  For the **MX100**, to eject the CF card, open the slot cover while touching the metal for discharging the static electricity, press the access stop switch, and press the eject lever once. Then, press the eject lever that came out once again, and remove the CF card from the slot.

  For the **MW100**, be sure to check that the CF card is not being accessed before ejecting the card from the slot. To eject the CF card, first open the slot cover while touching the anti-static metal, then push the eject lever once. Next, push the eject lever (which is pulled out) again, and pull out the CF card.

  **Note**
  Do not close the slot cover by force while the eject lever is pulled out. Doing so can damage the card slot. When not using the eject lever, push the lever in so that the slot cover can close.
The main module has a two-digit 7-segment LED. The 7-segment LED displays the unit number, operating status, operation complete, and operation error of the MX100/MW100 Data Acquisition Unit.

**Unit Number Display**
When connected using the MX100 standard software:
- Fixed at 00

When connected using MXLOGGER software (MX100 only):
- 00:19

When connected using the MW100 browser software:
- 00:89

**Display of the Self-Test Operation at Power on**
When the power is turned ON, the LED displays startup indications (such as 00), and a self-test is carried out. While the self-test is in progress, the following displays are repeated.

\[ \overline{00} \rightarrow \overline{00} \]

**Display While Processing Is in Progress**
The displays shown below repeat when there is access to the CF card, when the CF card is being formatted, or when calibration is taking place.

\[ \overline{---} \rightarrow \overline{---} \rightarrow \overline{---} \rightarrow \overline{---} \rightarrow \overline{---} \]

**Unit Confirmation Display**
The figure below shows the display that appears when you confirm the MX100 Data Acquisition Unit that is connected using the MX100 Standard Software, MXLOGGER (software sold separately), or MW IP Config Software. The word "--CALL--" flows through the display from right to left.

\[ \overline{----} \rightarrow \overline{----} \rightarrow \overline{----} \rightarrow \overline{----} \rightarrow \overline{----} \]

For details on the display and meaning of operation errors, see section 3.1, "Error Display on the 7-Segment LED and Corrective Actions" in the MX100 Data Acquisition Unit User’s Manual or section 4.1, "Error Display on the 7-Segment LED and Corrective Actions" in the MW100 Data Acquisition Unit User’s Manual.

**Operation Mode Hold Function Display (Only When the MX100/DS Option Function Is Enabled)**
Following the self-check, the /DS option function execution confirmation "--- ---" is displayed.

**Operation Mode Display (MX100 Only)**
The MX100 Data Acquisition Unit has three operation modes: idle mode, measurement mode, and backup mode (measured data saved to a CF card due to the disconnection of communications). The modes are displayed as shown below. In the figure below, 00 indicates the unit number. If the unit number is not 00, the specified unit number is displayed.

- Idle mode: Two zeroes
- Measurement mode: Two zeroes and a dot
- Backup mode: Two zeroes and two dots

**Display When Operation Is Complete (MX100 Only)**
The figure below shows the display that appears when an operation such as IP address configuration, time setup, and measurement condition change is completed. In the figure below, 00 indicates the unit number. If the unit number is not 00, the specified unit number is displayed.

\[ \overline{00} \rightarrow \text{Turns off for 1 s} \rightarrow \overline{00} \]

**Key Lock Status (MW100 Only)**
A key lock function is included for preventing accidental manipulation of the MW100 front panel keys. The key lock status is indicated by a dot at the bottom of the unit number. The example shown is for a unit of number 00.

- Key lock released
- Key lock

**Access Forewarning to the CF Card (MW100 Only)**
When saving measured, computed, or thinned data, the dots blink before accessing of the CF card. This indication starts 10 seconds before the access. If you see this indication, quickly finish the insertion or removal of the CF card.

\[ \overline{00} \rightarrow \overline{00} \rightarrow \overline{00} \rightarrow \overline{00} \rightarrow \overline{00} \rightarrow \text{In-progress display} \]

If you are using the multi interval function, this indication may be shorter than 10 seconds. If the time until the CF card is accessed is less than or equal to 5 seconds, the time unit access is displayed numerically.

\[ 5 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 1 \rightarrow \text{In-progress display} \]

When performing a manual sample, and when saving report data, the dots do not blink before accessing of the CF card.