

General Specifications

PC-Based Data Acquisition Unit MX100



GS 04M08B01-00E

■ Product Overview

The MX100 is a data acquisition unit designed to operate as a front end for PCs. Data measured by the MX100 is transferred to PCs in real-time.

Based on the concept of achieving higher performance and increased ease of use, the MX100 provides the following features:

- High speed/multi-channel/high withstand voltage:
- Shortest measurement interval of 10 ms (High speed measurement of 24 channels/10 ms or 60 channels/100 ms are enabled)
 - Possible to acquire data of up to 1,200 channels (when software developed by Yokogawa Electric Corporation is used)
 - Reinforced insulation between the input terminal and the case
3700 Vrms (one minute), 600 Vrms/VDC (continuous)

Multi-interval: Mixed use of three types of measurement intervals is enabled within the system (measurement intervals are set for each module).

Flexibility in building a system: A system can be flexibly built or changed between from 4 to 1,200 channels and the measurement intervals of 10 ms-60 s according to module configurations.

Adaptability to any type of PC-based measurement environment:
Software developed by Yokogawa, API, and LabVIEW driver are available.

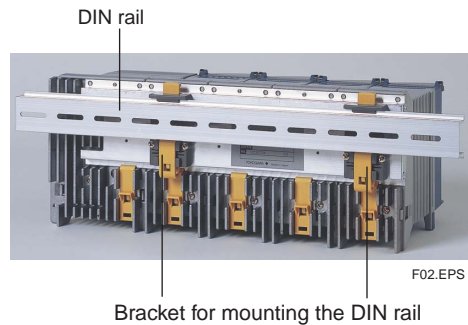
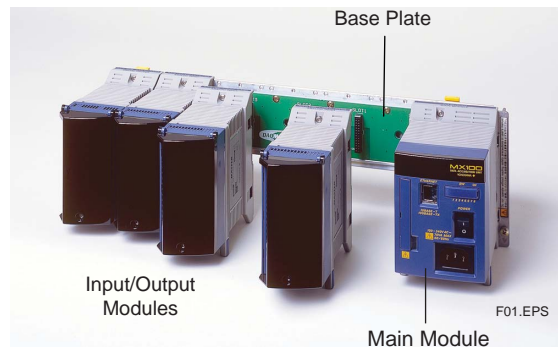
Easy to setup: PC software developed by Yokogawa strongly supports setting up the network with ease.

No re-wiring between measurements:
A removable terminal unit is available.

Inclusion of the CF card slot: Measured values are backed up automatically in case of a communication failure.

■ Equipment Configuration

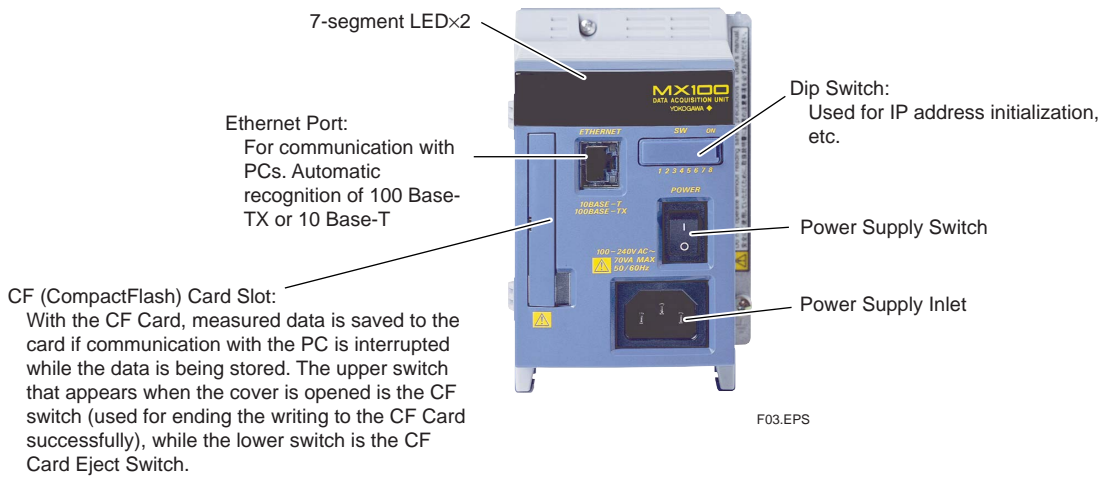
MX is designed to enable desired measurement environments in a combination of three elements: main module, input/output module, and base plate. The assembled unit can be utilized for desktop use as it is (modules have legs on their bases). Note that DIN rails are used for the rack mount.



The DIN rail can be easily mounted using the dedicated brackets. Two brackets are provided as standard devices of the base plate (MX150).

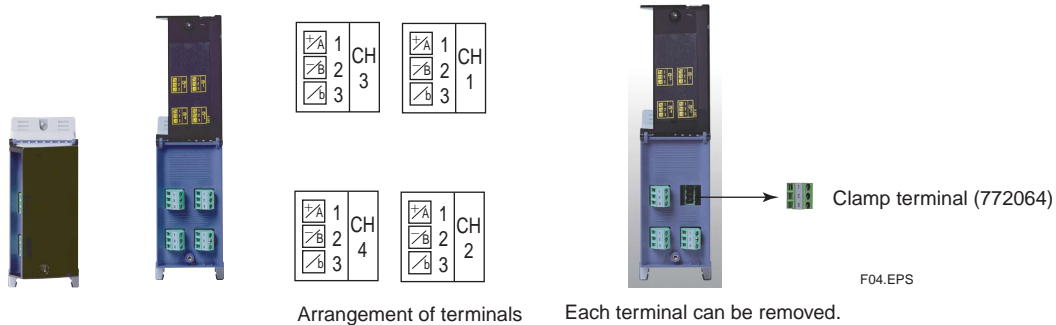
<Main Module> MX100

The main module is the engine to control data acquisition. It is equipped with a power supply, an Ethernet port, a CompactFlash card slot, etc. One main module has up to six input/output modules. As long as six or less modules are used, the user can choose their types and quantity arbitrarily.

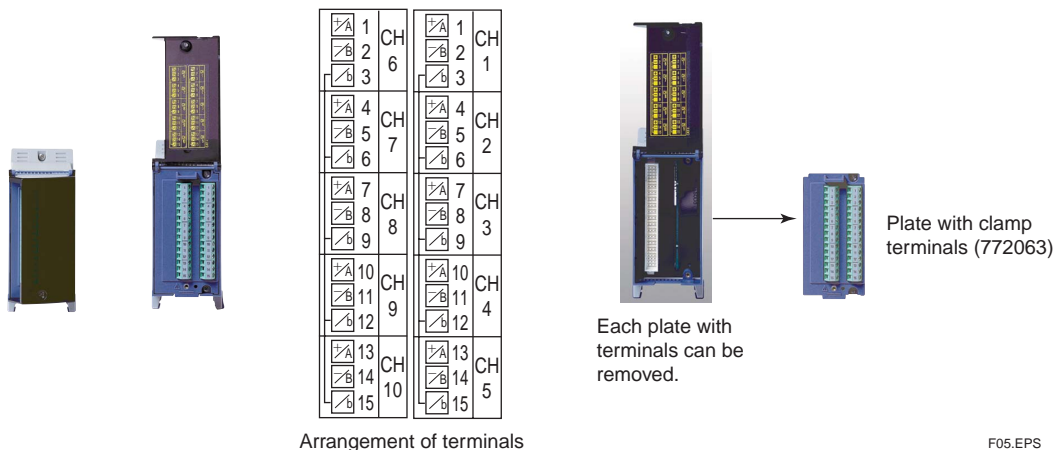


<Input/Output Module> MX110, MX115, MX125

• MX110-UNV-H04 Four-Channel High-Speed Universal Input Module



• MX110-UNV-M10 Ten-Channel Medium-Speed Universal Input Module



• MX115-D05-H10 Ten-Channel High-Speed Digital Input Module

Arrangement of terminals

| | | | |
|----|----|----|----|
| 1 | CH | 1 | 1 |
| 2 | 6 | 2 | 1 |
| 3 | | 3 | |
| 4 | CH | 4 | CH |
| 5 | 7 | 5 | 2 |
| 6 | | 6 | |
| 7 | CH | 7 | CH |
| 8 | 8 | 8 | 3 |
| 9 | | 9 | |
| 10 | CH | 10 | CH |
| 11 | 9 | 11 | 4 |
| 12 | | 12 | |
| 13 | CH | 13 | CH |
| 14 | 10 | 14 | 5 |
| 15 | | 15 | |

Each plate with terminals can be removed.

This plate with clamp terminals is used only for the MX115-D05-H10. It cannot be used for the MX110-UNV-M10 (because the RJC sensor is not built in).

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• MX125-MKC-M10 Ten-Channel Medium-Speed Digital Output Module

Arrangement of terminals

| | | | | | |
|----|----|----|----|----|----|
| NO | 1 | CH | NO | 1 | CH |
| C | 2 | 6 | C | 2 | 1 |
| | 3 | | | 3 | |
| NO | 4 | CH | NO | 4 | CH |
| C | 5 | 7 | C | 5 | 2 |
| | 6 | | | 6 | |
| NO | 7 | CH | NO | 7 | CH |
| C | 8 | 8 | C | 8 | 3 |
| | 9 | | | 9 | |
| NO | 10 | CH | NO | 10 | CH |
| C | 11 | 9 | C | 11 | 4 |
| | 12 | | | 12 | |
| NO | 13 | CH | NO | 13 | CH |
| C | 14 | 10 | C | 14 | 5 |
| | 15 | | | 15 | |

Each terminal can be removed.

Clamp terminal (772065)

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<Base Plate> MX150

The main module and input/output modules are connected using connectors on base plates. The following six types of base plates are available:

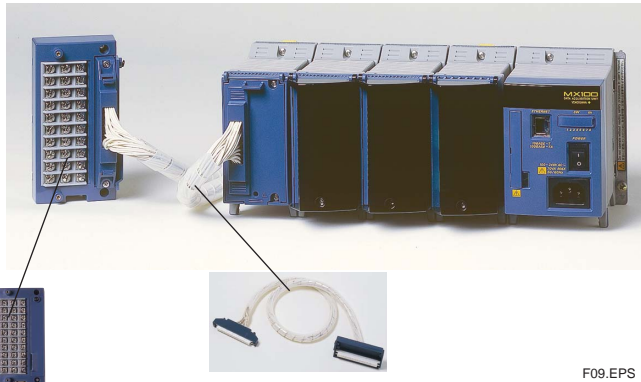
- For mounting one main module and one input/output module
- For mounting one main module and two input/output modules
- For mounting one main module and three input/output modules
- For mounting one main module and four input/output modules
- For mounting one main module and five input/output modules
- For mounting one main module and six input/output modules

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<Other Accessories>

• **Screw Terminal Block**

A separate screw terminal block is available for the Ten-Channel Medium-Speed Universal Input Module (MX110-UNV-M10) and Ten-Channel High-Speed Input Module (MX115-D05-H10).



Screw Terminal Block (772061)

Connection Cable (772062) between the input module and the screw terminal block

Remove the plate with clamp terminals from the MX110-UNV-M10 or the MX115-D05-H10. Then, connect each module with the screw terminal block (772061) by means of the connection cable (772062).

Option code can be added to the MX110-UNV-M10 and the MX115-D05-H10 to indicate whether or not the plate with clamp terminals is included at the time of delivery. If the user requires only the screw terminal block and not the clamp terminals, specify either the MX110-UNV-M10/NC or the MX115-D05-H10/NC.

• **Connector Cover for Base Plate**

A connector cover is available for a vacant slot, into which a module is not inserted.



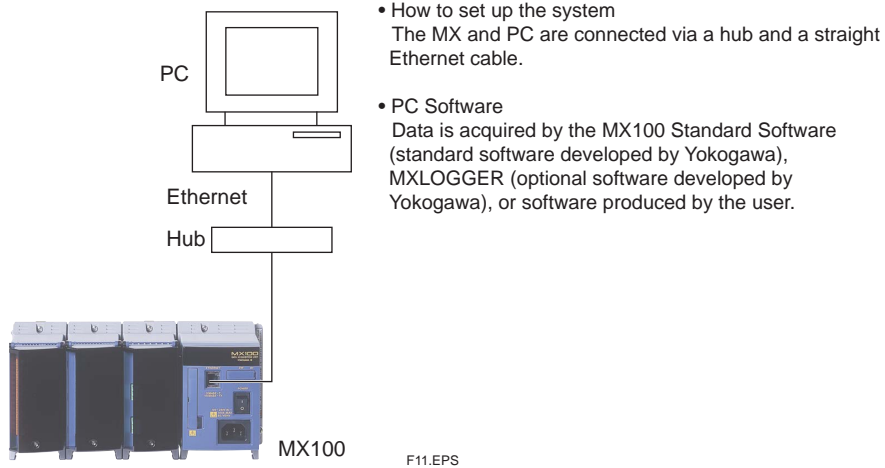
Connector Cover (772066)

■ System Configuration

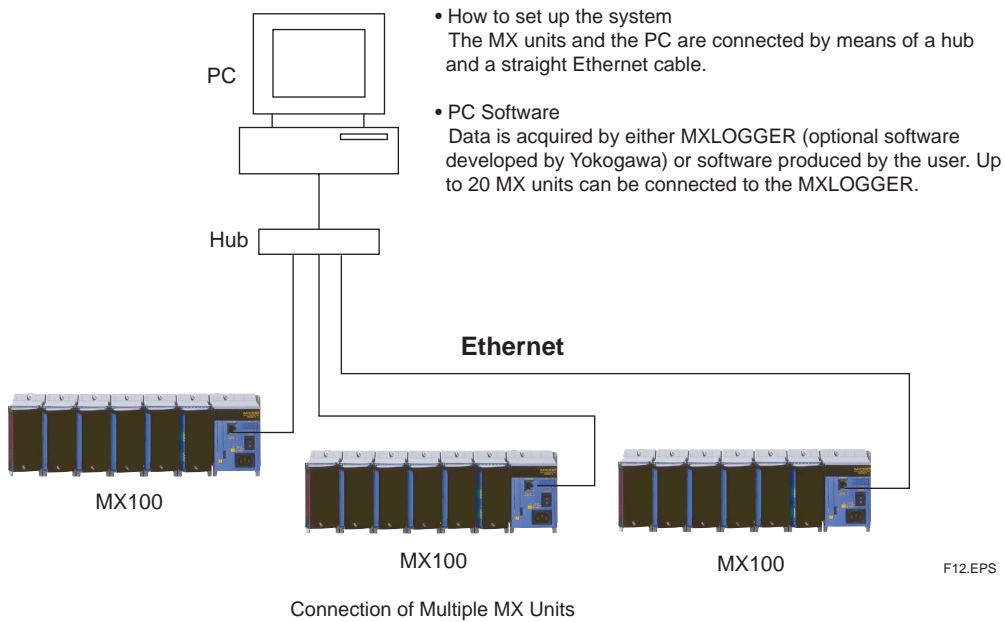
In order to build an actual measurement system, a personal computer and network devices (such as hubs and cables) are required in addition to the MX. These are to be provided by the user.

(1) Connection between the PC and a single MX unit

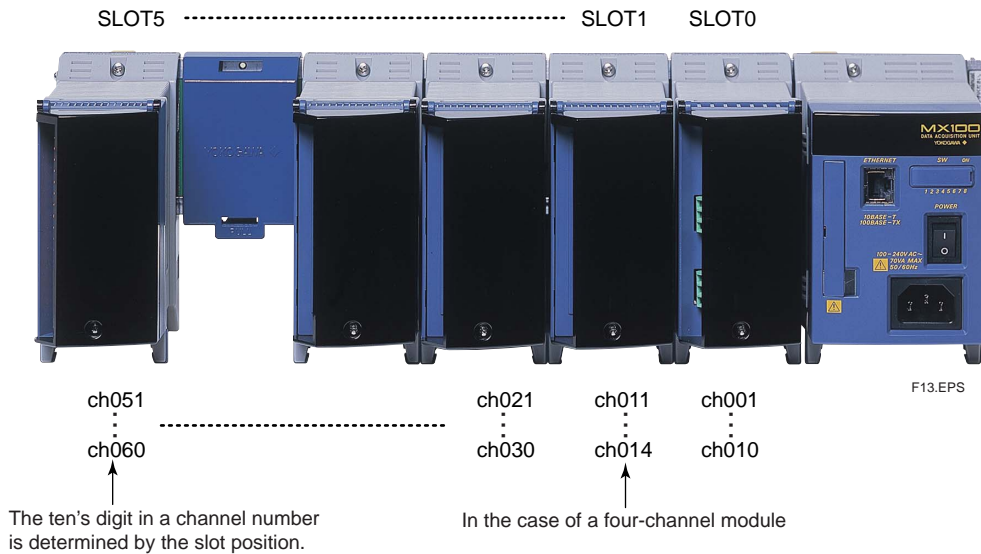
One MX Unit is a combination of a main module, input/output modules, and a base plate. This configuration centers on a single main module.



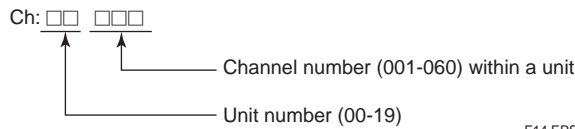
(2) Connection between the PC and multiple MX units



(3) Definitions of unit no., slot no. and channel no.



How to describe channel numbers:



Functional Overview

- Input types: Voltage, temperature (TC or RTD), digital (non-voltage contact, open collector, level (5 V logic))
- Output types: "A" contact (SPST)
- Number of measurement points: Up to 60 channels per unit. Multiple units are integrated by PC software.
- Number of output points: Up to 60 channels per unit. Multiple units are integrated by PC software.
- Measurement interval: The shortest measurement interval is 10 ms, or 50 ms for temperature. It depends on the types of modules and number of measurement points.
- Multi-interval: Possible to set different measurement intervals per module and to set up to three types in a system
- Computation: To be performed by PC software (some functions are performed in the main unit)
- Display: To be performed by PC software
- Settings: To be performed by PC software
- Save: To the PC. If communication between the PC and the main unit is interrupted, data is saved to the CF card.
- Interface: 100 Base-TX/10 Base-T Ethernet

An input module performs measurement according to specified measurement intervals. The main module acquires measured data every 100 ms at maximum speed.

The main module transfers the data to the PC after the computations for compensation, physical volume conversions, etc. In the same unit, it is possible to execute the digital output directly from the main module to the digital output module without going through the PC according to the alarm information on measured values.

The PC software (in the case of software developed by Yokogawa) acquires data from the main module. It also performs computations, displays or saves data. If necessary, it generates output commands to produce outputs from an output module via the main module.

Hardware Specifications

Common Specifications

- **Normal operating conditions**
 - Operating temperature range: 0-50°C
 - Operating humidity range:
 - 20-80% RH for 0-40°C
 - 10-50% RH for 40-50°C
 - Rated power supply voltage:
 - AC power supply, 100-240 VAC
 - Range of operating power supply voltage:
 - AC power supply, 90-250 VAC
 - Power supply frequency: 50 Hz ±2%, 60 Hz ±2%
 - Power consumption: Up to approximately 70 VA when six modules are used

Vibration: 10-60 Hz, 0.2m/s² or less
 Shock: Not tolerated
 Magnetic field: 400 A/m or less (50/60 Hz)
 Attitude: To be used horizontally with legs extended downward
 Location for use: Indoors
 Altitude for use: 2,000 m or less
 Installation category: II (according to IEC1010-1)
 Degree of pollution: 2 (according to IEC1010-1)

• **Conditions for transportation and storage**

Environmental conditions for the transportation/storage of equipment from the time of delivery until the start of use, as well as for the transportation/storage when the use of equipment is temporarily suspended.
 Ambient temperature during storage: -25-60°C
 Ambient humidity during storage: 5-95%
 Vibration: 10-60 Hz, 4.9 m/s² or less
 Shock: 392 m/s² or less (in a packaged condition)

• **Mechanical specifications**

How to mount: Desktop/on the floor/
 Panel mount with DIN rails
 Material: Steel plate, aluminum die-cast, plastic mold resin

• **Supported standards**

| | | |
|-----|---------------------------------|---|
| CSA | Obtained CSA22.2 No. 1010.1 | |
| UL | Obtained UL 3111-1 (CSA NRTL/C) | |
| CE | EMC directive | EN61326-1 |
| | Low voltage directive | EN61010-1 Installation category: II , Degree of pollution: 2 |

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Model-Specific Specifications

• **Specifications of main module**

Main functions: Control of the input/output modules, communication with the PC, storage of data on the CF card (during a communication failure), supply of power.

Number of maximum connectable input/output modules: 6 (arbitrary for six modules or less)

Measurement interval: Up to three types can be set to a system (multi-interval)

Types of measurement intervals are 10/50/100/200/500 ms, 1/2/5/10/20/30/60 sec.

Note that configurable measurement intervals differ depending on modules.

Transfer cycle of measured data to the PC: Minimum 100 ms

Synchronization between modules: Synchronized within the same measurement interval (within the same unit)

Synchronization between channels: Synchronized between channels in the same module for the Four-Channel High-Speed Universal Input Module (MX110-UNV-H04). Not synchronized between channels for the Ten-Channel Medium-Speed Universal Input Module (MX110-UNV-M10), because it is a scanner-type module.

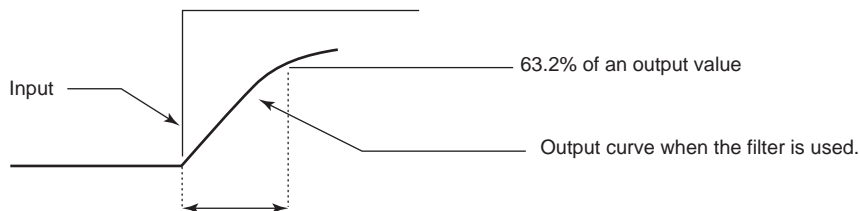
Time stamp for measured data: Both the time stamp of the main module and the time stamp sent from the PC are used.

Filter function: First-order lag filter. The function can be set for each channel. Time constant = measurement interval × N (where N is any number of the following: 5, 10, 20, 25, 40, 50, and 100). Choose a time constant corresponding to a measurement interval from the table on the next page:

List of Time Constants

| Measurement interval (sec.) | Time Constant (sec.) | | | | | | |
|-----------------------------|----------------------|------|------|------|------|------|-------|
| | N=5 | N=10 | N=20 | N=25 | N=40 | N=50 | N=100 |
| 0.01 | 0.05 | 0.1 | 0.2 | 0.25 | 0.4 | 0.5 | 1 |
| 0.05 | 0.25 | 0.5 | 1 | 1.25 | 2 | 2.5 | 5 |
| 0.1 | 0.5 | 1 | 2 | 2.5 | 4 | 5 | 10 |
| 0.2 | 1 | 2 | 4 | 5 | 8 | 10 | 20 |
| 0.5 | 2.5 | 5 | 10 | 12.5 | 20 | 25 | 50 |
| 1 | 5 | 10 | 20 | 25 | 40 | 50 | 100 |
| 2 | 10 | 20 | 40 | 50 | 80 | 100 | 200 |
| 5 | 25 | 50 | 100 | 125 | 200 | 250 | 500 |
| 10 | 50 | 100 | 200 | 250 | 400 | 500 | 1000 |
| 20 | 100 | 200 | 400 | 500 | 800 | 1000 | 2000 |
| 30 | 150 | 300 | 600 | 750 | 1200 | 1500 | 3000 |
| 60 | 300 | 600 | 1200 | 1500 | 2400 | 3000 | 6000 |

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- A time constant described in the above (List of Time Constants).
- Time required to achieve 63.2% of an output value.

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Input computation function (computation function that can be executed in the main module)

Computation of differences between channels:
 differential computation between arbitrary channels (DCV, TC, RTD, DI; also possible when the scaling is set)

Linear scaling computation
 Possible range for scaling: DCV, TC, RTD, DI
 Possible scope for scaling: -30000-30000
 Position of the decimal point: any digit (0-4)

Alarm (alarm function can be executed in the main module. This function is enabled even during a communication failure).

Alarm types: Upper limit, lower limit, differential upper limit, and differential lower limit
 Number of settings: two items per channel
 Possible range for alarm setting: DCV, TC, RTD, DI, scaling
 Hysteresis: Alarm "ON/OFF" values are set arbitrarily.
 Number of alarm output points: 10-60 points according to the number of mounted "DO" modules
 Output mode: Excitation/non-excitation or hold/non-hold, command output

Saving the data

Save function: Backup in case of a communication failure during data acquisitions by the PC.
 Supported external media: CF Card (up to 2 GB) Type I, II × one slot
 Save trigger: While the PC is storing data and also when timeout (60 s) is detected after a communication failure.

Save channel: A channel being monitored by the PC is saved.

Save cycle: Data is saved automatically (approximately every 60 s)

Stopping the save function: If the PC's data acquisition is recovered or if the CF Switch is pressed.

Data guarantee during a power failure: Guaranteed until data is written immediately before the MX is turned off (for example, power failure). The backup operation will not continue after the system recovers from a power failure.

Data length: 4 bytes/channel

Data file: 5 Mbytes/file (data is saved automatically up to 5 Mbytes). Data files are created for the number of measurement intervals (number of multi-intervals). When the size of the files at the highest speed reaches 5 Mbytes, files of other measurement intervals are closed. Then, new files are created.

File calculation formulas: File size = header size + (data size × number of samples)

Calculation of header size (estimation): 420 bytes + 180 × number of saved channels

Calculation of data size (estimation): 4 bytes × number of saved channels × number of samples

Format: Only the quick (logic) format is supported.

File system: FAT

File save folder: Route (Up to 512 files can be saved.)

Reference Information for Sampling Time by CF Card Size

| Number of saved channels | Measurement interval | 32M | 64M | 128M | 256M | 512M |
|--------------------------|----------------------|------------|-------------|------------|----------|-----------|
| 10ch | 10 ms | 2 hours | 4 hours | 9 hours | 18 hours | 36 hours |
| | 50 ms | 10 hours | 21 hours | 45 hours | 3 days | 7 days |
| | 100 ms | 21 hours | 43 hours | 3.5 days | 7 days | 15 days |
| | 200 ms | 43 hours | 3 days | 7 days | 15 days | 30 days |
| | 500 ms | 4.5 days | 9 days | 18.5 days | 38 days | 75.5 days |
| | 1 s | 9 days | 18 days | 37 days | 77 days | 154 days |
| | 2 s | 18 days | 36 days | 75.5 days | 154 days | 303 days |
| 24ch | 10 ms | 54 minutes | 100 minutes | 3.5 hours | 7 hours | 15 hours |
| | 50 ms | 4 hours | 9 hours | 18 hours | 38 hours | 77 hours |
| | 100 ms | 9 hours | 18 hours | 37 hours | 77 hours | 6 days |
| | 200 ms | 18 hours | 36 hours | 75 hours | 6 days | 12 days |
| | 500 ms | 45 hours | 3 days | 7.5 days | 16 days | 31.5 days |
| | 1 s | 3 days | 7 days | 15 days | 32 days | 64 days |
| | 2 s | 7.5 days | 15 days | 31.5 days | 64 days | 126 days |
| 60ch | 10 ms | 18 minutes | 40 minutes | 75 minutes | 3 hours | 5 hours |
| | 50 ms | 1 hour | 3 hours | 7 hours | 15 hours | 30 hours |
| | 100 ms | 3.5 hours | 7 hours | 15 hours | 30 hours | 2.5 days |
| | 200 ms | 7 hours | 14 hours | 30 hours | 2 days | 5 days |
| | 500 ms | 18 hours | 36 hours | 3 days | 6 days | 12.5 days |
| | 1 s | 36 hours | 3 days | 6 days | 12 days | 25 days |
| | 2 s | 3 days | 6 days | 12.5 days | 25 days | 50 days |

Note: Minutes/hours/days are approximate.

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Indication

- LED: Indication of Ethernet status.
Orange: LINK, connected. Green: ACT, data being transmitted/received
- 7-segment indication: MX status indication by 7 segments in 2 digits (Unit No., operation status indication, indication of error occurrence, indication of messages concerning the CF Card, etc.)

Communication functions

- Interface: 100 Base-TX/10 Base-T (automatic detection) Ethernet
- Basic protocol: TCP, IP, UDP, ARP, ICMP
- Transmission function: Transmission of measured values and setting values
- Receiving function: Reception of setting values

Other functions

- Accuracy of internal clock: ±100 ppm. The delay (one second or less) that occurs every time the power supply is turned on/off is not included.
- Switch: 8-bit dip switch (for IP address initialization, etc.)

General specifications

- Power consumption: Approximately 8W for main module only
- Insulation resistance: 20 MΩ or more (500 VDC) between the power supply terminal and the ground terminal

- Withstand voltage: 1500 VAC (50/60 Hz) between the power supply terminal and the ground terminal, one minute
- External dimension: Approximately 92 × 131 × 137 mm
- Weight: Approximately 0.85 kg

• **Base Plate (MX150)**

- Number of main modules that can be equipped: 1 (always equipped)
- Number of I/O modules that can be equipped: 1-6 (to be specified according to the suffix codes)

• **Four-Channel High-Speed Universal Input Module (MX110-UNV-H04)**

Types of measurement: DC voltage, thermocouple, RTD, DI (non-voltage contact, level (5 V logic))

Number of measurement points: 4 channels

Input method: Floating unbalanced input, isolation between channels

A/D resolution: $\pm 20000/\pm 6000$ (16-bit A/D is used)

Measurement interval and A/D integral time: A/D integral time is determined by measurement intervals

| Measurement interval | Integral time | Noise rejection/remarks |
|----------------------|---------------|---|
| 10 ms | 1.67 ms | 600 Hz and its integer multiples (Note) Temperature cannot be measured. |
| 50 ms | 16.67 ms | 60 Hz and its integer multiples |
| | 20 ms | 50 Hz and its integer multiples |
| | Auto | Power supply frequency is automatically detected and is set to 16.67/20 ms automatically. |
| 100 ms | 36.67 ms | 50/60 Hz, and the respective integer multiples |
| 200 ms | | |
| 500 ms | 100 ms | 10 Hz and its integer multiples |
| 1 s | 200 ms | Fc = 5 Hz low pass filter |
| 2,5,10,20,30s,60 s | | |

T04.EPS

Measurement Ranges and Accuracies

| Input | Type | Rated measurement range | Measurement accuracy integral time 16.67 ms or more | Measurement accuracy integral time 1.67 ms | Maximum resolution (1 digit) |
|--|-------------------------|-------------------------|---|--|------------------------------|
| Voltage | 20 mV | -20.000 to 20.000 mV | $\pm(0.05\%$ of rdg. +5 digits) | $\pm(0.1\%$ of rdg. +25 digits) | 1 μ V |
| | 60 mV | -60.00 to 60.00 mV | $\pm(0.05\%$ of rdg. +2 digits) | | 10 μ V |
| | 200 mV | -200.00 to 200.00 mV | | | 10 μ V |
| | 2 V | -2.0000 to 2.0000 V | $\pm(0.05\%$ of rdg. + 5 digits) | | 100 μ V |
| | 6 V | -6.000 to 6.000 V | | | 1 mV |
| | 20 V | -20.000 to 20.000 V | $\pm(0.05\%$ of rdg. +2 digits) | | 1 mV |
| | 100 V | -100.00 to 100.00 V | | | 10 mV |
| Thermocouple RJC accuracy not included. Burn-out setting during "OFF." | R | 0.0 to 1760.0°C | $\pm(0.05\%$ of rdg. + 1°C) However, R, S: 0 to 100°C: $\pm 3.7^\circ\text{C}$ 100 to 300°C: $\pm 1.5^\circ\text{C}$ B: 400 to 600C: $\pm 2^\circ\text{C}$ Less than 400°C: accuracy not guaranteed | Measurement not possible | 0.1°C |
| | S | | | | |
| | B | 0.0 to 1820.0°C | | | |
| | K | -200.0 to 1370.0°C | | | |
| | E | -200.0 to 800.0°C | | | |
| | J | -200.0 to 1100.0°C | | | |
| | T | -200.0 to 400.0°C | | | |
| | L | -200.0 to 900.0°C | | | |
| | U | -200.0 to 400.0°C | | | |
| | N | 0.0 to 1300.0°C | | | |
| | W | 0.0 to 2315.0°C | | | |
| RTD measurement current (1 mA) | KpvsAu7Fe | 0.0 to 300.0 K | $\pm(0.05\%$ of rdg. + 0.7 K) | Measurement not possible | 0.1 K |
| | Pt100 | -200.0 to 600.0°C | $\pm(0.05\%$ of rdg. + 0.3°C) | | |
| | JPt100 | -200.0 to 550.0°C | | | |
| | Pt100: high resolution | -140.00 to 150.00°C | $\pm(0.05\%$ of rdg. + 0.3°C) | | |
| | JPt100: high resolution | -140.00 to 150.00°C | | | |
| | Ni100SAMA | 200.0 to 250.0°C | | | |
| | Ni100 DIN | -60.0 to 180.0°C | $\pm(0.05\%$ of rdg. + 0.3°C) | Measurement not possible | 0.1°C |
| | Ni120 | -70.0 to 200.0°C | | | |

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Measurement Ranges and Accuracies (continued)

| Input | Type | Rated measurement range | Measurement accuracy integral time 16.67 ms or more | Measurement accuracy integral time 1.67 ms | Maximum resolution (1 digit) |
|--------------------------------|-------------------------|--|---|--|------------------------------|
| RID measurement current (2 mA) | Pt100 | -200.0 to 250.0°C | ±(0.05% of rdg. + 0.3°C) | Measurement not possible | 0.1°C |
| | JPt100 | -200.0 to 250.0°C | | | |
| | Pt100: high resolution | -140.00 to 150.00°C | ±(0.05% of rdg. + 0.3°C) | Measurement not possible | 0.01°C |
| | JPt100: high resolution | -140.00 to 150.00°C | | | |
| | Pt50 | -200.0 to 550.0°C | ±(0.1% of rdg. + 0.7°C) | Measurement not possible | 0.1°C |
| | Cu10 GE | -200.0 to 300.0°C | | | |
| | Cu10 L&N | -200.0 to 300.0°C | | | |
| | Cu10 WEED | -200.0 to 300.0°C | | | |
| | Cu10 BAILEY | -200.0 to 300.0°C | ±(0.05% of rdg. + 0.3 K) | Measurement not possible | 0.1 K |
| J263B | 0.0 to 300.0 K | | | | |
| DI | Level | V _{th} = 2.4 V | Threshold level accuracy ±0.1 V | | |
| | Non-voltage contact | 100 Ω or less: ON, 10 kΩ or more: OFF *1 | | | |

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*1: To be determined at the measurement current of 1 mA and within the range of 2 V. The threshold level is approximately 0.8 V.

The ranges below can be used for MXLOGGER (optional software) or API.

| Input | Type | Rated measurement range | Measurement accuracy integral time 16.67 ms or more | Measurement accuracy integral time 1.67 ms | Maximum resolution (1 digit) |
|--|-------------------------------|-------------------------|--|--|------------------------------|
| Voltage | 60 mV (high resolution) | 0 to 60.000 mV | ±(0.05% of rdg. + 20 digits) | ±(0.1% of rdg. + 100 digits) | 1 μV |
| | 1 V | -1.0000 to 1.0000 V | ±(0.05% of rdg. + 2 digits) | ±(0.1% of rdg. + 10 digits) | 100 μV |
| | 6 V (high resolution) | 0 to 6.0000 V | ±(0.05% of rdg. + 20 digits) | ±(0.1% of rdg. + 100 digits) | 100 μV |
| Thermocouple RJC accuracy not included | PLATINEL | 0.0 to 1400.0°C | ±(0.05% of rdg. + 1°C) | Measurement not possible | 0.1°C |
| | PR40-20 | 0.0 to 1900.0°C | ±(0.05% of rdg. + 2.5°C) However, 300 to 700°C: ±6°C Less than 300°C: accuracy is not guaranteed | | |
| | NiNiMo | 0.0 to 1310.0°C | ±(0.05% of rdg. + 0.7°C) | | |
| | WRe3-25 | 0.0 to 2400.0°C | ±(0.05% of rdg. + 2°C) However, 0 to 200°C: ±2.5°C 2000°C or more: ±(0.05% of rdg. + 4°C) | | |
| | W/WRe26 | 0.0 to 2400.0°C | ±(0.05% of rdg. + 2°C) However, 100 to 300°C: ±4°C Less than 100°C: accuracy is not guaranteed | | |
| | Type-N (AWG14) | 0.0 to 1300.0°C | ±(0.05% of rdg. + 0.7°C) | | |
| RTD measurement current (1 mA) | Pt100: high noise resistance | -200.0 to 600.0°C | ±(0.05% of rdg. + 0.3°C) | Measurement not possible | 0.1°C |
| | JPt100: high noise resistance | -200.0 to 550.0°C | | | |

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Measurement Ranges and Accuracies

The ranges below can also be used for MXLOGGER (optional software) or API.

| Input | Type | Rated measurement range | Measurement accuracy integral time 16.67 ms or more | Measurement accuracy integral time 1.67 ms | Maximum resolution (1 digit) |
|--------------------------------|--------------------------------|-------------------------|---|--|------------------------------|
| RTD measurement current (2 mA) | Cu10 at 20°C alpha=0.00392 | -200.0 to 300.0°C | ±(0.1% of rdg. + 0.7°C) | Measurement not possible | 0.1°C |
| | Cu10 at 20°C alpha=0.00393 | -200.0 to 300.0°C | | | |
| | Cu25 at 0°C alpha=0.00425 | -200.0 to 300.0°C | ±(0.1% of rdg. + 0.5°C) | Measurement not possible | 0.1°C |
| | Cu53 at 0°C alpha=0.00426035 | -50.0 to 150.0°C | ±(0.05% of rdg. + 0.3°C) | Measurement not possible | 0.1°C |
| | Cu100 at 0°C alpha=0.00425 | -50.0 to 150.0°C | | | |
| | Pt25(JPt100*1/4) | -200.0 to 550.0°C | ±(0.1% of rdg. + 0.5°C) | Measurement not possible | 0.1°C |
| | Cu10 GE (high resolution) | -200.0 to 300.0°C | ±(0.1% of rdg. + 0.7°C) | Measurement not possible | 0.1°C |
| | Cu10 L&N (high resolution) | -200.0 to 300.0°C | | | |
| | Cu10 WEED (high resolution) | -200.0 to 300.0°C | | | |
| | Cu10 BAILEY (high resolution) | -200.0 to 300.0°C | | | |
| | Pt100 (high noise resistance) | -200.0 to 250.0°C | ±(0.05% of rdg. + 0.3°C) | Measurement not possible | 0.1°C |
| | JPt100 (high noise resistance) | -200.0 to 250.0°C | | | |

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Reference junction compensation:

External/internal switchover can be performed for each channel.
The Remote RJC function is available.

Reference junction compensation accuracy:

During the measurement of 0°C or more and during the input terminal temperature balance
Type R, S, W: ±1°C
Type K, J, E, T, N, L, U: ±0.5°C
Type N, PLATINEL, NiNiMo, WRe3-25, W/WRe26: ±1°C
Internal reference junction compensation for Type B and PR40-20 is fixed to 0°C.

Maximum input voltage:

200 mVDC range or less, thermocouple, RTD, DI (contact only): ±10 VDC (continuous)
Other measurement ranges: ±120 VDC (continuous)

Allowable normal mode voltage:

DCV, TC, DI (level): 1.2 times of rated range or less (50/60 Hz, peak values including signals)
RTD 100Ω system: 50 mV peak
RTD 10, 25, 50Ω systems: 10 mV peak

Normal mode rejection ratio (NMRR):

40 dB or more when the integral time is 16.67 ms or more (50/60 Hz ±0.1%)
50/60 Hz is not rejected when the integral time is 1.67 ms.

Common mode voltage:

600 VACrms (50/60 Hz), double insulation

Common mode rejection ratio (CMRR):

120 dB or more when the integral time is 16.67 ms or more
80 dB or more when the integral time is 1.67 ms
(50/60 Hz ±0.1%, 500 Ω imbalance, between the negative measurement terminal and the ground)

Common mode between channels:

250 VACrms (50/60 Hz), double insulation

Noise rejection: Rejection by the integrating A/D and the use of low pass filters

Input resistance: 10 MΩ or more for the DC voltage of

200 mV range or less and also for the thermocouple range
Approximately 1 MΩ if the DC voltage is 2 V range or more
Approximately 1 MΩ while the measurement operation is stopped

Insulation resistance:

20 MΩ or more between the input and the ground (500 VDC)

Input bias current: 10 nA or less (except for the burn-out setting)

Withstand voltage:

2300 VAC (50/60 Hz) between input terminals, one minute
3700 VAC (50/60 Hz) between an input terminal and the ground, one minute

Input signal source resistance:
2 kΩ or less for DC voltage and thermocouple
10Ω or less per cable for RTD 50 Ω or 100 Ω systems
1Ω or less per cable for RTD 10 Ω or 25 Ω systems

Thermocouple burn-out:
Superposed electric current system, detection within the thermocouple range ("ON/OFF" possible), the up/down setting possible, detection current at approximately 100 nA, 2 kΩ or less being normal, and 10 MΩ or more being disconnected.
Influence on measurement accuracy: ±15 μV or less (influence on signal source resistance is not included)

Parallel capacity during RTD: 0.01 μF or less

Power consumption: Approximately 3 W

External dimension: Approximately 57 × 131 × 150 mm (including the terminal cover)

Weight: Approximately 0.5 kg

Terminal type: Clamp terminal. Attachable/detachable per channel.

Applicable cable size: 0.2-2.5 mm² (AWG24-12)

Influence of operating conditions (applicable if the integral time is 16.67 ms or more)

Warm-up time: 30 minutes or more after the power supply is turned on.

Influence of ambient temperature:
Influence on a change in ambient temperature of 10°C is within ±(0.05% of rdg. + 0.05% of range). However, during Cu10Ω : ±(0.2% of range + 1 digit)

Influence of power supply fluctuations:
Specifications of accuracy are satisfied at AC power 90-132 V or 180-250 V.

Influence of external magnetic fields:
Fluctuations on external magnetic fields of alternate current (50/60 Hz) and direct current (400 A/m) are ±(0.1% of rdg. + 10 digits) or less.

Influence of signal source resistance:
Influences on fluctuations of signal source resistance (1 kΩ) of voltage and thermocouple are:
Voltage: 200 mV range or less ±10 μV or less
2 V range or more ±0.15% of rdg. or less

Thermocouple: ±10 μV or less. However, ±150 μV or less when the burn-out is set

RTD: Fluctuation (one common resistance value for three cables) on a change of 10 Ω per cable for 100 Ω systems is ±0.1°C or less (±1.0°C or less for other systems). Fluctuation on the difference of 40 mΩ in resistance values among conductors (maximum difference among three cables) shall be

approximately 0.1°C (during Pt100)

Influence of attitude:
Basically, the system shall be used in a horizontal position with its legs extended downward.

Influence of vibrations:
Fluctuations when sine wave vibrations in the frequency of 10-60 Hz and at an acceleration of 0.2 m/s² are applied for two hours respectively in three axis directions shall be ±(0.1% of rdg. + 1 digit) or less.

• **Ten-Channel Medium-Speed Universal Input Module (MX110-UNV-M10)**

Types of measurement: DC voltage, thermocouple, RTD, DI (non-voltage contact, level (± 5 V logic))

Number of measurement points: 10 (scanning of 10 channels with one A/D)

Input method: Floating unbalanced input, isolation between channels (Note that RTD is common among “b” terminals.)

A/D resolution: $\pm 20000/\pm 6000$ (16-bit A/D is used)

Measurement interval and A/D integral time: A/D integral time is determined by measurement intervals.

| Measurement interval | Integral time | B.O. detection cycle | Noise rejection /remarks |
|----------------------|---------------|----------------------|--|
| 100 ms | 1.67 ms | 1 s (*1) | 600 Hz and its integer multiples |
| 200 ms | | | 60 Hz and its integer multiples |
| 500 ms | 16.67 ms | Measurement interval | 50 Hz and its integer multiples |
| | 20 ms | | Power supply frequency is automatically detected and is set to 16.67/20 ms |
| | Auto | | 50/60 Hz and the respective integer multiples |
| 1 s | 36.67 ms | | 10 Hz and its integer multiples |
| 2 s | 100 ms | | Fc = 5 Hz low pass filter |
| 5 s | 200 ms | | |
| 10, 20, 30, 60 s | | | |

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(*1) This is because the burn-out cannot be detected until up to 10 measurements have occurred (about one second) if measurement is started in the burn-out state. (If a measurement interval is 100 ms, the burn-out detection executed in one measurement interval is for one channel only.)

Measurement Ranges and Accuracies

| Input | Type | Rated measurement range | Measurement accuracy integral time 16.67 ms or more | Measurement accuracy integral time 1.67 ms | Maximum resolution (1 digit) | | |
|--|----------------|-------------------------------|--|--|----------------------------------|--|--|
| Voltage | 20 mV | -20.000 to 20.000 mV | $\pm(0.05\%$ of rdg. + 5 digits) | $\pm(0.1\%$ of rdg. + 25 digits) | 1 μ V | | |
| | 60 mV | -60.00 to 60.00 mV | $\pm(0.05\%$ of rdg. + 2 digits) | | 10 μ V | | |
| | 200 mV | -200.00 to 200.00 mV | | | 10 μ V | | |
| | 2 V | -2.0000 to 2.0000 V | $\pm(0.05\%$ of rdg. + 5 digits) | | $\pm(0.1\%$ of rdg. + 10 digits) | 100 μ V | |
| | 6 V | -6.000 to 6.000 V | $\pm(0.05\%$ of rdg. + 2 digits) | | | 1 mV | |
| | 20 V | -20.000 to 20.000 V | | | | 1 mV | |
| | 100 V | -100.00 to 100.00 V | | | | 10 mV | |
| Thermocouple RJC accuracy not included | R | 0.0 to 1760.0°C | $\pm(0.05\%$ of rdg. + 1°C) However, R, S: 0 to 100°C: $\pm 3.7^\circ\text{C}$ 100 to 300°C: $\pm 1.5^\circ\text{C}$ B: 400 to 600°C: $\pm 2^\circ\text{C}$ Less than 400°C: accuracy not guaranteed | $\pm(0.1\%$ of rdg. + 4°C) However, R, S: 0 to 100°C: $\pm 10^\circ\text{C}$ 100 to 300°C: $\pm 5^\circ\text{C}$ B: 400 to 600°C: $\pm 7^\circ\text{C}$ Less than 400°C: accuracy not guaranteed | 0.1°C | | |
| | S | | | | | | |
| | B | 0.0 to 1820.0°C | | | | | |
| | K | -200.0 to 1370.0°C | | | | $\pm(0.05\%$ of rdg. + 0.7°C) However, -200 to -100°C: $\pm(0.05\%$ of rdg. + 1°C) | $\pm(0.1\%$ of rdg. + 3.5°C) However, -200 to -100°C: 0.1% of rdg. + 6°C |
| | E | -200.0 to 800.0°C | | | | $\pm(0.05\%$ of rdg. + 0.5°C) However, J, L: -200 to -100°C: $\pm(0.05\%$ of rdg. + 0.7°C) | $\pm(0.1\%$ of rdg. + 2.5°C) However, -200 to -100°C: $\pm(0.1\%$ of rdg. + 5°C) |
| | J | -200.0 to 1100.0°C | | | | | |
| | T | -200.0 to 400.0°C | | | | | |
| | L | -200.0 to 900.0°C | | | | | |
| | U | -200.0 to 400.0°C | | | | | |
| | N | 0.0 to 1300.0°C | | | | $\pm(0.05\%$ of rdg. + 0.7°C) | $\pm(0.1\%$ of rdg. + 3.5°C) |
| | W | 0.0 to 2315.0°C | | | | $\pm(0.05\%$ of rdg. + 1°C) | $\pm(0.1\%$ of rdg. + 7°C) |
| KpvsAu7Fe | 0.0 to 300.0 K | $\pm(0.05\%$ of rdg. + 0.7 K) | $\pm(0.1\%$ of rdg. + 3.5 K) | 0.1 K | | | |

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Measurement Ranges and Accuracies (continued)

| Input | Type | Rated measurement range | Measurement accuracy integral time 16.67 ms or more | Measurement accuracy integral time 1.67 ms | Maximum resolution (1 digit) |
|-----------------------------------|-------------------------|---|---|--|------------------------------|
| RTD Measurement current (1 mA) | Pt100 | -200.0 to 600.0°C | ±(0.05% of rdg. + 0.3°C) | ±(0.1% of rdg. + 1.5°C) | 0.1°C |
| | JPt100 | -200.0 to 550.0°C | | | |
| | Pt100: high resolution | -140.00 to 150.00°C | ±(0.05% of rdg. + 0.3°C) | ±(0.1% of rdg. + 1.5°C) | 0.01°C |
| | JPt100: high resolution | -140.00 to 150.00°C | | | |
| | Ni100SAMA | -200.0 to 250.0°C | ±(0.05% of rdg. + 0.3°C) | ±(0.1% of rdg. + 1.5°C) | 0.1°C |
| | Ni100 DIN | -60.0 to 180.0°C | | | |
| | Ni120 | -70.0 to 200.0°C | | | |
| | Pt50 | -200.0 to 550.0°C | ±(0.1% of rdg. + 2°C) | ±(0.2% of rdg. + 5°C) | |
| | Cu10 GE | -200.0 to 300.0°C | | | |
| | Cu10 L&N | -200.0 to 300.0°C | | | |
| | Cu10 WEED | -200.0 to 300.0°C | | | |
| | Cu10 BAILEY | -200.0 to 300.0°C | ±(0.05% of rdg. + 0.3 K) | ±(0.1% of rdg. + 1.5 K) | 0.1 K |
| J263B | 0.0 to 300.0 K | | | | |
| DI | Level | V _{th} = 2.4 V | Threshold level accuracy ±0.1 V | | |
| | Non-voltage contact | 1 kΩ or less: ON, 100 kΩ or more: OFF (parallel capacity is 0.01 μF or less) *1 | | | |

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*1: To be determined at the measurement current of approximately 10 μA and within the range of 200 mV. The threshold level is 0.1 V.

The range below can be used for MXLOGGER (optional software) or API.

| Input | Type | Rated measurement range | Measurement accuracy integral time 16.67 ms or more | Measurement accuracy integral time 1.67 ms | Maximum resolution (1 digit) |
|---|-------------------------|-------------------------|--|---|------------------------------|
| Voltage | 60 mV (high resolution) | 0 to 60.000 mV | ±(0.05% of rdg. + 20 digits) | ±(0.1% of rdg. + 100 digits) | 1 μV |
| | 1 V | -1.0000 to 1.0000 V | ±(0.05% of rdg. + 2 digits) | ±(0.1% of rdg. + 10 digits) | 100 μV |
| | 60 mV (high resolution) | 0 to 6.0000 V | ±(0.05% of rdg. + 20 digits) | ±(0.1% of rdg. + 100 digits) | 100 μV |
| Option Thermocouple RJC accuracy not included | PLATINEL | 0.0 to 1400.0°C | ±(0.05% of rdg. + 1°C) | ±(0.1% of rdg. + 4°C) | 0.1°C |
| | PR40-20 | 0.0 to 1900.0°C | ±(0.05% of rdg. + 2.5°C) However, 300 to 700°C: ±6°C Less than 300°C: accuracy not guaranteed | ±(0.1% of rdg. + 12°C) However, 300 to 700°C: ±25°C Less than 300°C: accuracy not guaranteed | |
| | NiNiMo | 0.0 to 1310.0°C | ±(0.05% of rdg. + 0.7°C) | ±(0.1% of rdg. + 2.7°C) | |
| | WRe3-25 | 0.0 to 2400.0°C | ±(0.05% of rdg. + 2°C) However, 0 to 200°C: ±2.5°C 200°C or more: ±(0.05% of rdg. + 4°C) | ±(0.1% of rdg. + 7°C) However, 0 to 200°C: ±12°C 200°C or more: ±(0.1% of rdg. + 11°C) | |
| | W/WRe26 | 0.0 to 2400.0°C | ±(0.05% of rdg. + 2°C) However, 100 to 300°C: ±4°C Less than 100°C: accuracy no guaranteed | ±(0.1% of rdg. + 8.5°C) However, 100 to 300°C: ±12°C Less than 100°C: accuracy no guaranteed | |
| | Type-N (AWG14) | 0.0 to 1300.0°C | ±(0.05% of rdg. + 0.7°C) | ±(0.1% of rdg. + 3.5°C) | |

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Measurement Ranges and Accuracies (continued)

The range below can be used for MXLOGGER (optional software) or API.

| Input | Type | Rated measurement range | Measurement accuracy integral time 16.67 ms or more | Measurement accuracy integral time 1.67 ms | Maximum resolution (1 digit) |
|--------------------------------|----------------------------------|--------------------------|--|---|---------------------------------|
| RTD measurement current (1 mA) | Cu10 at 20°C alpha=0.00392 | -200.0 to 300.0°C | ±(0.1% of rdg. + 2°C) | ±(0.2% of rdg. + 5°C) | 0.1°C |
| | Cu10 at 20°C alpha=0.00393 | -200.0 to 300.0°C | | | |
| | Cu25 at 0°C alpha=0.00425 | -200.0 to 300.0°C | ±(0.1% of rdg. + 0.5°C) | ±(0.2% of rdg. + 2°C) | 0.1°C |
| | Cu53 at 0°C alpha=0.00426035 | -50.0 to 150.0°C | ±(0.05% of rdg. + 0.3°C) | ±(0.1% of rdg. + 1.5°C) | 0.1°C |
| | Cu100 at 0°C alpha=0.00425 | -50.0 to 150.0°C | | | |
| | Pt25(JPt100*1/4) | -200.0 to 550.0°C | ±(0.1% of rdg. + 0.5°C) | ±(0.2% of rdg. + 2°C) | 0.1°C |
| | Cu10 GE (high resolution) | -200.0 to 300.0°C | ±(0.1% of rdg. + 2°C) | ±(0.2% of rdg. + 5°C) | 0.1°C |
| | Cu10 L&N (high resolution) | -200.0 to 300.0°C | | | |
| | Cu10 WEED (high resolution) | -200.0 to 300.0°C | | | |
| | Cu10 BAILEY (high resolution) | -200.0 to 300.0°C | | | |
| | Pt100 (noise-resistant) | -200.0 to 250.0°C | | | |
| JPt100 (noise-resistant) | -200.0 to 250.0°C | ±(0.05% of rdg. + 0.3°C) | ±(0.1% of rdg. + 1.5°C) | 0.1°C | |

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Reference junction compensation:

External/internal switchover can be performed for each channel.
The Remote RJC function is available.

Reference junction compensation accuracy:

During the measurement of 0°C or more and during the input terminal temperature balance
Type R, S, W: $\pm 1^\circ\text{C}$
Type K, J, E, T, N, L, U: $\pm 0.5^\circ\text{C}$
PLATINEL, NiNiMo, WRe3-25, W/WRe26, N (AWG14): $\pm 1^\circ\text{C}$
Internal reference junction compensation for Type B and PR40-20 is fixed to 0°C.

Maximum input voltage:

200 mVDC range or less, thermocouple, RTD, DI (contact): ± 10 VDC
Other measurement ranges: ± 120 VDC

Allowable normal mode voltage:

DCV, TC, DI (level): 1.2 times of the rated range or less (50/60 Hz, peak values including signals)

RTD 100 Ω system: 50 mV peak

RTD 10, 25, 50 Ω systems: 10 mV peak

Normal mode rejection ratio (NMRR):

40 dB or more when the integral time is 16.67 ms or more (50/60 Hz $\pm 0.1\%$)
50/60 Hz is not rejected when the integral time is 1.67 ms.

Common mode voltage:

600 VACrms (50/60 Hz), double insulation

Common mode rejection ratio (CMRR):

120 dB or more when the integral time is 16.67 ms or more
80 dB or more when the integral time is 1.67 ms
(50/60 Hz $\pm 0.1\%$, 500 Ω imbalance, between the minus measurement terminal and the ground)

Common mode voltage between channels:

120 VACrms (50/60 Hz)

Noise rejection:

Rejection by an integrating A/D and the use of low pass filters

Input resistance:

10 M Ω or more for the DC voltage of 200 mV range or less and also for the thermocouple range
Approximately 1 M Ω if the DC voltage is in the 2 V range or more

Insulation resistance:

20 M Ω or more between the input and the ground (500 VDC)

Input bias current:

10 nA or less (except when burn-out has been set)

Withstand voltage:

1000 VAC (50/60 Hz) between input terminals, one minute
3700 VAC (50/60 Hz) between an input terminal and the ground, one minute

Input signal source resistance:

2 k Ω or less for DC voltage and thermocouple
10 Ω or less per cable for RTD 50 Ω or 100 Ω systems
1 Ω or less per cable for RTD 10 Ω or 25 Ω systems

Thermocouple burn-out:

Checking of the burn-out at a detection cycle specified for each measurement interval, the up/down setting possible, 2 k Ω or less being normal, 200 k Ω or more being disconnected. Detection current shall be approximately 10 μA . Detection time shall be approximately 2 ms. Parallel capacity shall be 0.01 μF or less.

Parallel capacity during RTD: 0.01 μF or less

Power consumption: Approximately 1.2 W

External dimension:

Approximately 57 × 131 × 150 mm (including the terminal cover)

Weight: Approximately 0.5 kg

Terminal type: Clamp terminal. The plate with clamp terminals can be attached/detached.

Applicable cable size: 0.14-1.5 mm² (AWG26-16)

Influence of operating conditions (applicable if the integral time is 16.67 ms or more)

Warm-up time: 30 minutes or more after the power supply is turned on.

Influence of ambient temperature:

Influence on a change in ambient temperature of 10°C is within $\pm(0.05\%$ of rdg. + 0.05% of range).
However, during Cu10 Ω : $\pm(0.2\%$ of range + 1 digit)

Influence of power supply fluctuations:

Specifications of accuracy are satisfied at AC power 90-132 V or 180-250 V.

Influence of external magnetic fields:

Fluctuations of external magnetic fields of alternate current (50/60 Hz) and direct current (400 A/m) are $\pm(0.1\%$ of rdg. + 10 digits) or less.

Influence of signal source resistance:

Influences on fluctuations of signal source resistance of voltage and thermocouple are:
Voltage: 200 mV range or less
 ± 10 μV or less
2 V range or more
 $\pm 0.15\%$ of rdg. or less

Thermocouple: ± 10 μV or less

RTD: Fluctuation (one common resistance value for three cables) on a change of 10 Ω per cable for 100 Ω systems is $\pm 0.1^\circ\text{C}$ or less ($\pm 1.0^\circ\text{C}$ or less for other systems).

Fluctuation on the difference of 40 m Ω in resistance values among conductors (maximum difference among three cables) shall be approximately 0.1°C (during Pt100).

Influence of attitude:

Basically, the system shall be used in a horizontal position with its legs extended downward.

Influence of vibrations:

Fluctuations when sine wave vibrations in the frequency of 10-60 Hz and at an acceleration of 0.2 m/s² are applied for two hours respectively in three axis directions shall be $\pm(0.1\%$ of rdg. + 1 digit) or less.

• Ten-Channel High-Speed Digital Input Module (MX115-D05-H10)

Input type: Non-voltage contact, level (5 V logic), open collector

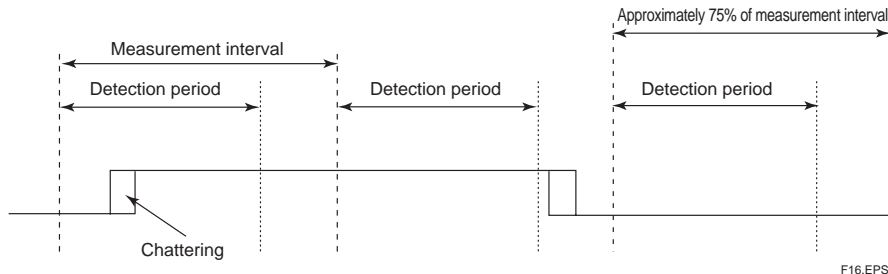
Number of channels: 10

Input format: Pull-up at approximately 5 V/approximately 5 k Ω . No isolation between channels

Measurement interval: 10/50/100/200/500 ms, 1/2/5/10/20/20/60 s

Filter: To be determined by majority for the period corresponding to approximately 75% of a measurement interval if the measurement interval is 5 seconds or less

To be determined by majority for approximately 4.5 seconds if the measurement interval is 5 seconds or more



If a measurement interval is set to four times or more of the chattering continuation time, measurement can be performed without being influenced by chattering. (Reference information: The chattering of the general relays is approximately 20 ms.)

Minimum detection pulse width: two times or more of a measurement interval

Input threshold level:

Non-voltage contact, open collector: "On" for 100 Ω or less, "Off" for 100 k Ω or more

Level (5 V logic): "Off" for 1 V or less, "On" for 3 V or more

Hysteresis width: Approximately 0.1 V

Contact, rated transistor:

Rated contact with 15 VDC or more and 30 mA or more

Rated transistor with $V_{ce} > 15$ Vdc and $I_c > 30$ mA

Insulation resistance:

20 M Ω or more (500 VDC) between an input terminal and the ground

Withstand voltage: 2300 VAC between an input terminal and the ground, one minute

Power consumption: Approximately 1.5 W

External dimension: Approximately 57 \times 131 \times 150 mm (including the terminal cover)

Weight: Approximately 0.5 kg

Terminal type: Clamp terminal. The plate with clamp terminals can be attached/detached.

Applicable cable size: 0.14-1.5 mm² (AWG26-16)

• Ten-Channel Medium-Speed Digital Output Module (MX125-MKC-M10)

Output types: Alarm output, PC command output (manual output), failure output, error output

Number of output points: 10

Contact mode: "A" contact (SPST)

Update cycle: output per 100 ms (not synchronized with measurement intervals)

Contact capacity: 250 VDC/ 0.1 A, 250 VAC/2 A, 30 VDC / 2 A (resistance load)

Insulation resistance:

20 M Ω or more (500 VDC) between an output terminal and the ground

20 M Ω or more (500 VDC) between output terminals

Withstand voltage: 2300 VAC between an output terminal and the ground, one minute

2300 VAC between output terminals, one minute

Power consumption: Approximately 2 W (when all relays are turned on)

External dimension: Approximately 57 \times 131 \times 150 mm (including the terminal cover)

Weight: Approximately 0.5 kg

Terminal type: Clamp connector (detachable every 5 channels)

Applicable cable size: 0.08-2.5 mm² (AWG28-12)

Others: The excitation/non-excitation switchover and the hold/non-hold switchover are available.

■ PC software specifications

- **MX100 standard software (attached to the main module of MX100): for connection with a single MX unit**

- **Integrated Monitor (main functions):**

Setting of the basic connection, setting of various conditions (range, interval, computation, tag), monitor display (digital, trend), 32 channels in one group, 10 groups, logging, computation function (60 channels), alarm output, manual DO (command DO), etc.

- **Viewer (main functions):**

Re-display of saved data files, 32 channels in one group, 50 groups, data synchronization processing, file merge display (limited to files that can be merged), multi-interval supported (If channels with different intervals are assigned to the same group, windows are split (up to four splits) and displayed.), graph, digital display/print, cursor value display, interval arithmetic, mark display, file information display, tag, tag comment, channel display switchover, etc.

- **Calibration software (main function): calibration function**

- **Operating environment**

CPU: Intel Pentium II 400 MHz or more (recommended: Pentium III and 1 GHz or more)

Memory: 256 MB or more (recommended: 512 MB or more)

OS: Windows 98/Me/NT 4.0/2000 (recommended)/XP

Hard disk capacity: Free space of 50 MB or more (recommended: Hard disk with free space of 1 GB or more that operates at maximum speed)

Communication interface: Ethernet that can be used for Windows (recommended: 100 Base-TX supported)

CD-ROM drive: CD-ROM drive that can be used for Windows

Printer: printer that can be used for Windows (to be used for printing)

- **MXLOGGER (optional)**

This is used to connect multiple MX units. Up to 20 units can be connected.

- **Setting/Logger (main functions):**

Setting of the basic connection, setting of various conditions (range/alarm, interval, computation), project functions (project switchover, copy, deletion), logging, computation function (60 channels, computation across units possible), alarm output, file split function save, manual DO (command DO), activation of various types of software, etc.

- **Monitor (main functions):**

Display-related settings, 32 channels in one group, 50 groups, monitor displays (trend, digital, meter, alarm), multi-interval supported (If channels with different intervals are assigned to the same group in trend graphs, windows are split (up to four splits) and displayed.), temporary suspension, tag, tag comment, channel display switchover, marking function, etc.

- **Viewer (main functions):**

Re-display of saved data files, data synchronization processing, file merge display (limited to files that can be merged), 32 channels in one group, 50 groups, multi-interval supported (If channels with different intervals are assigned to the same group in trend graphs, windows are split (up to four splits) and displayed.), graph, digital display/print, cursor value display, interval arithmetic, mark display, file information display, tag, tag comment, channel display switchover, etc.

- **Monitor Server (main functions):**

Retention of 1,800-point data/channels, connection with DAQLLOGGER/AddObserver/AddMulti possible, etc.

- **Operating environment:**

CPU: Intel Pentium III 800 MHz or more (recommended: Pentium 4, 1.6 GHz or more)

Memory: 512 MB or more (recommended: 1 GB or more)

OS: Windows 98/Me/NT 4.0/2000 (recommended)/XP

Hard disk capacity: Free space of 100 MB or more (recommended: Hard disk with free space of 2 GB or more that operates at maximum speed)

Communication interface: Ethernet that can be used for Windows (recommended: 100 Base-TX supported)

CD-ROM drive: CD-ROM drive that can be used for Windows (to be used for installation)

Printer: printer that can be used for Windows (to be used for printing)

- **API for MX100/DARWIN (optional): a suite of functions for creating PC software**

Supported models: MX100/DARWIN series

Supported OS: Windows 98/NT 4.0 SP3 or later/2000 (recommended)/XP

Communication system: TCP/IP (Ethernet)

User development environment: MS Visual Studio 6.0 SP5 or later (recommended)

Supported language: Visual C, Visual C++, Visual Basic

Model Name

Main Module

| Model | Suffix Code | Description |
|---------------------------------------|-------------|---|
| MX100 | | Main module |
| IM Language | -E | With English instruction manual |
| Power supply voltage | -1 | 100 VAC-240 VAC |
| Power supply inlet, power supply cord | D | 3-pin power inlet with UL, CSA cable |
| | F | 3-pin power inlet with VDE cable |
| | R | 3-pin power inlet with SAA cable |
| | Q | 3-pin power inlet with BS cable |
| | H | 3-pin power inlet with CCC (China standard) cable |
| | W | Screw terminal without power cord |

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Input/Output Module

| Model | Suffix Code | Option Code | Description |
|--|-------------|-------------|--|
| MX110 | | | Analog input module for MX |
| Input type | -UNV | | DCV/TC/DI/RTD |
| Measurement interval, number of channels | -H04 | | 4 channels, high speed (shortest measurement interval: 10 ms) |
| | -M10 | | 10 channels, medium speed (shortest measurement interval: 100 ms) *1 |
| Option | | /NC | The plate with clamp terminals is not attached. *1 |

*1: "/NC" can be specified only when "-M10" is specified.

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| Model | Suffix Code | Option Code | Description |
|--|-------------|-------------|--|
| MX115 | | | Digital input module for MX |
| Input type | -D05 | | Non-voltage contact, 5 V logic, open collector |
| Measurement interval, number of channels | -H10 | | 10 channels, high speed (shortest measurement interval: 10 ms) |
| Option | | /NC | The plate with clamp terminals is not attached. |

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| Model | Suffix Code | Description |
|-------------------------------------|-------------|---|
| MX125 | | Digital output module for MX |
| Output type | -MKC | "A" contact (SPST) |
| Output interval, number of channels | -H10 | 10 channels, shortest output interval: 100 ms |

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| Model | Suffix Code | Description |
|--------------|-------------|--|
| MX150 | | Base plate for MX |
| Base type | -1 | For connection with one main module and one input/output module |
| | -2 | For connection with one main module and two input/output module |
| | -3 | For connection with one main module and three input/output modules |
| | -4 | For connection with one main module and four input/output modules |
| | -5 | For connection with one main module and five input/output modules |
| | -6 | For connection with one main module and six input/output modules |

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Accessories

| Model | Description |
|--------|----------------------------------|
| 772061 | Ten-Channel Screw Terminal Block |

Note: The 772061 model is applicable only to MX110-UNV-M10 (Ten-Channel Medium-Speed Universal Input Module) or MX115-D05-H10 (Ten-Channel High-Speed Digital Input Module). T19.EPS

| Model | Suffix Code | Description |
|--------------|-------------|--|
| 772062 | | Cable for connection between the input module and the screw terminal block |
| Cable length | -050 | 50 cm cable |
| | -100 | 100 cm cable |

Note: The 772062 model is applicable only between MX110-UNV-M10 (Ten-Channel Medium-Speed Universal Input Module) and the Screw Terminal Block (772061) or between MX115-D05-H10 (Ten-Channel High-Speed Digital Input Module) and the Screw Terminal Block (772061). T20.EPS

| Model | Description |
|--------|----------------------------|
| 772063 | Plate with clamp terminals |

Note: The 772063 model is applicable only to MX110-UNV-M10 (Ten-Channel Medium-Speed Universal Input Module) or MX115-D05-H10 (Ten-Channel High-Speed Digital Input Module). T21.EPS

| Model | Description |
|--------|-----------------|
| 772064 | Clamp terminals |

Note: The 772064 model is applicable only to MX110-UNV-H04 (Four-Channel High-Speed Universal Input Module). T22.EPS

| Model | Description |
|--------|-----------------|
| 772065 | Clamp terminals |

Note: The 772065 model is applicable only to MX125-MKC-M10 (Ten-Channel Digital Output Module). T23.EPS

| Model | Description |
|--------|--------------------------------|
| 772066 | Connector cover for base plate |

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Accessories (available separately)

| Name | Model (Part No.) | Specifications |
|--|------------------|----------------|
| Shunt Resistance (for clamp terminals) | 438920 | 250Ω ± 0.1% |
| | 438921 | 100Ω ± 0.1% |
| | 438922 | 10Ω ± 0.1% |
| Shunt Resistance (for screw terminals) | 415920 | 250Ω ± 0.1% |
| | 415921 | 100Ω ± 0.1% |
| | 415922 | 10Ω ± 0.1% |

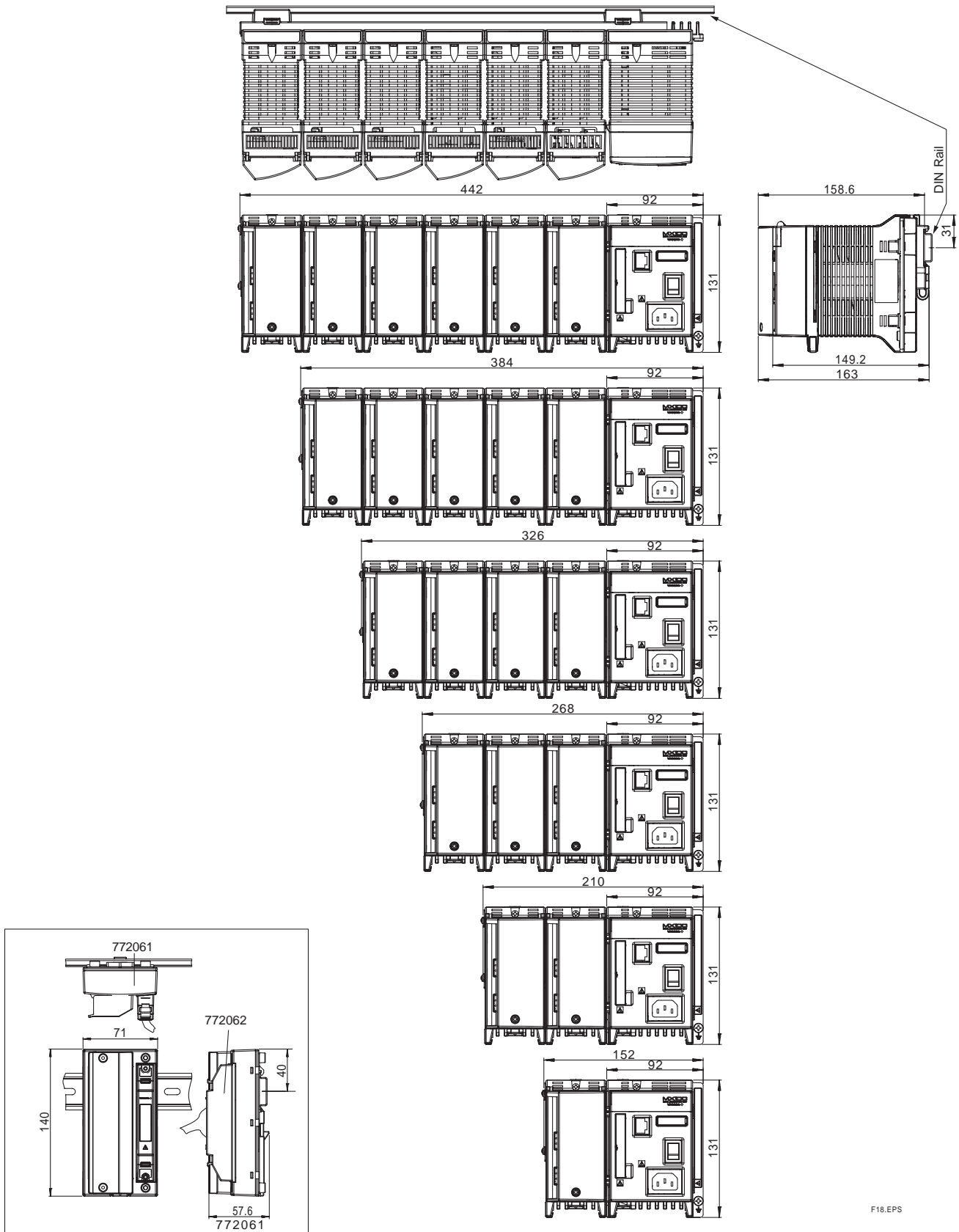
T25.EPS

Application Software

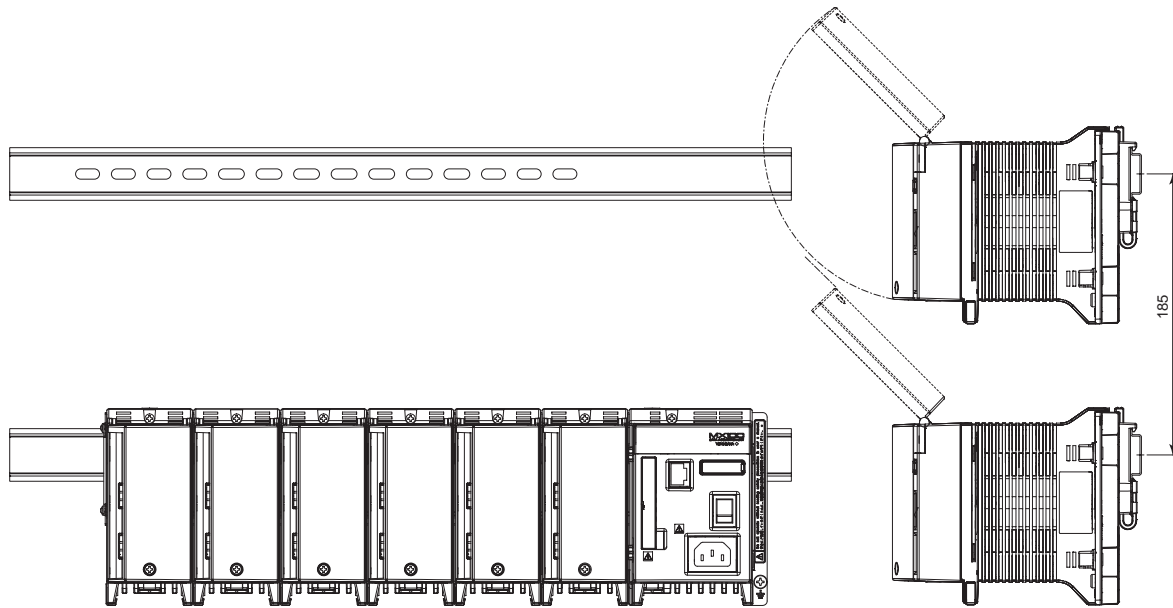
| Model | Description |
|-------|--|
| MX180 | MX100 Standard Software (For connection with one MX unit) |
| WX103 | MXLOGGER (For connection with multiple MX units. Up to 20 units) |
| MX190 | API for MX100/DARWIN (Suite of functions for creating programs) |

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External Drawing



F18.EPS



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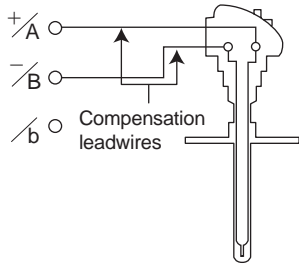
Dimension for installation in upper and lower directions using the DIN rail.

Caution when mounting the DIN rail:

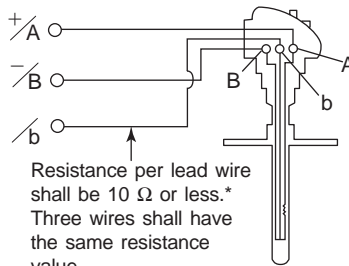
Be sure to fix the DIN rail (such as by screws) at three or more points including both ends of the equipment and the center. If it is fixed at two points or less, the equipment may bend.

■ Wiring

Thermocouple input:

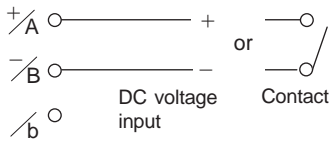


RTD input:

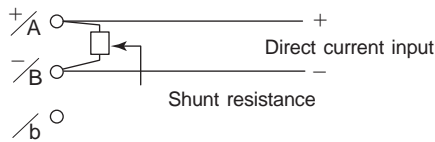


* Applicable to Pt100 Ω and Pt50 Ω.
Resistance shall be 1 Ω or less for Cu10 Ω, Cu25 Ω, and other cases.

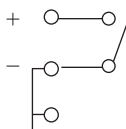
DC voltage input/ DI (contact) input:



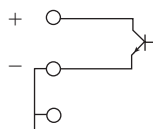
Direct current input:



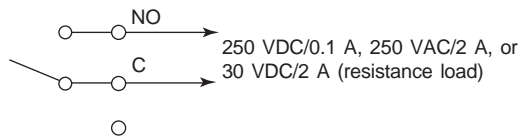
Contact input



Transistor input



Contact output



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