Common Specifications

•Normal Operating Conditions

Operating temperature range[1]: -20 to 60°C (when not using the MX120 or MX125 output modules)
-20 to 50°C (when using the MX120 or MX125 output modules)
Operating humidity range[2, 3]: 20-80% RH for -20-40°C
10-50% RH for 40-50°C
5-30% RH for 50-60°C
Rated power supply voltage: AC power supply: 100-240 VAC (with or without AC adapter)
DC power supply: 12-28 VDC
Range of operating power supply voltage: AC power supply: 90-250 VAC (with or without AC adapter)
DC power supply: 10-32 VDC
Power supply frequency: 50 Hz ±2%, 60 Hz ±2% (AC power supply)
Power consumption: Approximately 70 VA max when six modules are used (using AC power supply)
Approximately 35 VA max when six modules are used (using DC power supply)
Approximately 70 VA max when six modules are used (using DC power supply and AC adapter)
Weight: Approximately 4.3 kg (total weight with six modules installed)
Supported Standards: CSA, UL (CSA, NRTL/C), CE, C-Tick

1. Not including operating temperature range specification of accessory AC power cord and AC adapter. The operating temperature range specifications by AC power supply cord and AC adapter are as shown below.

Suffix code in the Model name (see page 8)	Standard applicable to included power cord	Operating temperature
-1D	UL/CSA	-20 to 60°C
-1F	VDE	-15 to 60°C
-1R	SAA	-15 to 60°C
-1Q	BS	-15 to 60°C
-1H	GB (CCC)	-15 to 60°C

The operating temperature range of the AC adapter is 0 to 40°C.

2. The operating humidity range of the AC adapter is 20-80% RH at 0-40°C. (no condensation)
3. NO condensation

Model-Specific Specifications

●Main Module (MW100)

Basic Functions

Main functions: Control of the power supply and I/O modules, communications with the PC, and storage of data on the CF card.
Measurement interval: 10/50/100/200/500 ms, or 1/2/5/10/20/30/60 sec
Note that the configurable measurement intervals differ depending on the modules.
Also, the following limitations apply to the measurement interval and number of measurement channels.

Measurement Interval	Max number of measurement channels	Notes
10ms	10	Modules whose measurement interval is not set to 10 ms or 50 ms can be set to 100 ms or higher.
10 ms and 50 ms mixed	10	
50 ms	30	

Multi-interval (measurement groups): Three measurement intervals can be set for each module within a unit.
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 MX110-UNV-H04 and the MX115-Dxx-H10. Channels within the MX110-UNV-M10, MX110-V4R-M06, and M112 input modules are asynchronous due to the scanner type.
Filter function: First-order lag filter can be set on each channel.
Operation after failure recovery: After recovery from a power failure, the operation before the failure is continued.

Input MATH Function (Functions Available from the Main Module without the MATH Option (/M1)):
Differential computation between channels, linear scaling computation, remote RJC, initial balance (with the MX112 Strain Module)

Alarm Functions

Channels: Measurement and MATH channels
Number of alarms: Four levels per channel
Alarm types: Upper limit, lower limit, differential upper limit, differential lower limit, rate of change upper limit, rate of change lower limit.
Differential upper limit and differential lower limit only available for differential input measurement channels. Only upper limit and lower limit alarms can be set on MATH channels.
Hysteresis: Can be set for each channel (however, fixed at 0 for MATH channels and with rate of change alarms)
Number of relay outputs: 1 to 60 points depending on the number of mounted MX125 Digital Output Modules.
Output mode: Excitation/non-excitation, AND/OR, Hold/Non-hold, reflash alarm
Alarm ACK: If set to Hold using the alarm status or relay output Hold/Non-hold function, the hold status is cleared.
Alarm update interval: 100 ms (not synchronized with the measurement interval)

Digital Output Function (Available Only When the MX125 Digital Output Module Is Installed)
Alarm output, communication command output (output in response to digital output requests from the PC), error output, and other outputs
Output interval: 100 ms (not synchronized with the measurement interval)

Analog Output Function (Available Only When the MX120-VAO-M08 Analog Output Module Is Installed)
Communication command output (output in response to analog output requests from the PC), transmission output, error output, and other outputs
Output interval: 100 ms (not synchronized with the measurement interval)

MATH Function Specifications (/M1 Option)
Number of MATH channels
Number of channels for computation: 60 (can also be used as communication input channels)
Number of channels for communication input: 240
Computations: Basic math functions (+, -, x, ÷, power)
Relational operators (>, ≧, =, ≦, <, ≠)
Logical operators (AND, OR, XOR, NOT)
Arithmetic operators (SQR, ABS, LOG, EXP)
TLOG computations (max, min, max-min, average, integration, pulse integration)
CLOG computations (max, min, max-min, average)
Conditional expressions ([EXPR1?EXPR2:EXPR3])
MATH reference channels: The following types of channels can be incorporated into expressions.
Measurement channels, MATH channels, communication input channels, flag input channels, MATH constants, and broken-line input channels.
Characters used in expressions: Up to 120 per channel
For communication input channels, a maximum of 8 characters can be used per channel.
MATH constants: 60
Flag input channels: 60
Flag value (0 or 1) can be substituted in computational expressions.
Varies according to the action of the Event/Action function.
Broken-line input channels: 3
The output from the MX120 output modules can be executed according to the broken lines specified on these channels.
Computation alarm function: Four levels per channel. Upper limit and lower limit types only.
MATH interval: Assigned to one of the measurement groups (of measurement interval 100 ms or more)

Recording Function Specifications

Main functions: Measured values, computed values, thinned values, setting values, data acquisition log, and alarm summary can be saved to CF card.
Supported external media: CF card Type II x 1 slot (Type I can also be used)
Maximum allowable card size: 2 GB
Internal backup memory: Uses the main unit's internal backup memory (SRAM) to save data to CF card without loss before a power failure.
Saving/Loading settings: Saves all settings to CF card. Loads settings from the CF card.

•Measured and Computed Value Recording Function:
Record start/stop: Starts and stops recording to CF card according to the START/STOP key, Event/Action function, or communication commands.
Recording operation: Measured values and computed values are recorded in separate files on the CF card. If measured values are divided by group, a separate file is created and saved on the CF card for each group.
Measurement groups: Measurement channels can be divided into up to 3 groups by module.
Recording mode: Select a record complete action for each measurement group of Single, Full stop, or Rotate.
Trigger function: Included. Pre-triggers can also be set.
Recording interval: Set the recording interval for each measurement group as an integer multiple (multiples restricted) of the measurement interval.
File name: Generated automatically in sequence using the date and time (cannot be specified by the user).
Recording channels: Recording can be turned ON/OFF independently on each channel.
Writing message: During execution of the recording action, a message synchronized with the recorded data can be included in the file. Five messages of up to 15 characters each are available for including in a single file, up to ten messages per file.

•Thinned Value Recording Function
Record start/stop: Executed simultaneously upon recording of the measured values and computed values. No trigger functions are available.
Recording Mode: Select a record stop action of Single, Full stop, or Rotate.
Thinning time: Data recording is set for 1 per thinning time (the thinning time restricted).
File name: Generated automatically in sequence using the date and time (cannot be specified by the user).
Recording channels: Can be specified for each channel (settings for recording of measured and computed values are set separately)
Writing message: During execution of the recording action, a message synchronized with the recorded data can be included in the file. Five messages of up to 15 characters each are available for writing to a single file, up to ten messages per file.

Event/Action Function

Overview: By linking the Event and Action in the setting items, you can control the operations of the main unit.
Events: Digital input information, alarm occurrence, relay output, internal timer time up, match time, user function key, and others.
Actions: Recording start/stop, activate trigger, MATH start/stop/reset/clear, reset timer, alarm ACK, flag input, write message, and others.

Communication Specifications

Overview: Ethernet interface comes standard with the Main Module (MW100).
Also, either an RS-232 or RS-422A/485 interface can be added to the main module as an option.

•Ethernet Interface Specifications
Interface: Ethernet (10Base-T)
Main protocols: FTP, SMTP, SNTP, DHCP, DNS, HTTP, ModbusTCP, and a dedicated MW100 protocol.
Communication services: Send/receive setting values, send measured values and computed values, maintenance/diagnosis of the communication connection, and others.
Login function: Use when accessing a setting/measurement server, maintenance/diagnostic server, FTP server, or HTTP server. Up to 10 users can be registered.
DHCP function: The IP address is automatically obtained from the DHCP server
SNTP function
Client function: Gets time information from the specified serer such as when power is turned ON and when recording starts.
Server function: Supplies time information to any MW100s connected to the network.
Mail function: Sends timing information via e-mail including the time of alarm activation/release, specified time, file creation time, time at which free memory space drops below specified amount, time power turned ON, and time errors occur.
FTP function
Client function: Files from the CF card containing measured values, computed values, and thinned values are automatically sent to the FTP server.
A primary and secondary destination server can be specified.
Server function: File transfers from the CF card, directory manipulation within the CF card, deletion of files from the CF card, and other functions can be carried out through requests from the computer.
HTTP function: Enables entry of settings on the MW100 and real time monitoring of measured and computed values using a Web browser, and file acquisition on the CF card using WebDAV, and other functions.
Supported OS and browser: Windows 2000/XP, Internet Explorer 5.5 and 6.0

•RS-232 Interface Specifications (/C2 Option)
Connection method: Point-to-point
Baud rate: Select 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200 bps
Protocol: Dedicated protocol and Modbus/RTU
Communication services: Send/receive setting values, send measured and computed values.

•RS-422A/485 Interface (/C3 Option)
Connection method: Multidrop, 4-wire 1:32, 2-wire 1:31
Baud rate: Select 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200 bps
Protocol: Dedicated protocol and Modbus/RTU
Communication services: Send/receive setting values, send measured and computed values.

•Communication input function: All settings on the main unit other than dip switch and power switch operation can be performed with communication commands.

•Communication output function: Using communication commands, the most recent measured data, the most recent computed values, and other information can be output.

•Modbus Function
Communication media: Ethernet
RS-232
RS-422A/485
For Ethernet
Transmission mode: Modbus/TCP sever, client
/M1 option must be selected to use the Modbus/TCP client function.
For RS-232 and RS-422A/485
Transmission mode: Modbus/RTU slave, master
/M1 option must be selected to use the Modbus/TCP master function.
Supported functions: Reading from registers, and writing to registers.

Other Specifications

Tags: Select channel or tag display for all channels together.
Internal clock accuracy: ±100 ppm
Summer/winter time: The time on the internal clock is updated on the specified month, week, day of the week and time.
Power consumption: Approximately 8 W for the main module alone.
Common-mode voltage: 150 VACrms (50/60 Hz) between DC power supply terminal and earth terminal.
Insulation resistance: 20 MΩ or more (500 VDC) between power supply terminal and earth terminal
Withstand voltage:
AC power: 1500 VACrms (50/60 Hz) between power supply terminal and earth terminal for 1 minute.
DC power: 1000 VACrms (50/60 Hz) between power supply terminal and earth terminal for 1 minute.
Weight: Approximately 1 kg (MW100 main module alone)

Input/Output modules

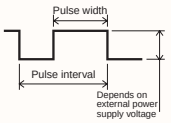
•Universal Input Modules (MX110)
Measurement range:
DC voltage[1]: 20/60/60 (high resolution)/200 mV, 1/2/6/6 (high resolution)/20/100 V
Thermocouple[2]: R, S, B, K, E, J, T, L, U, N, W, KpvsAu7Fe, PLATINEL, PR40-20, NiNiMo, WRe3-25, W/WRe26, Type-N (AWG14), TXK GOST
RTD[1]: Pt50, Pt100, Pt100 (high resolution), JPt100, JPt100 (high resolution), Pt25 (JPt100×1/4), Ni100 SAMA, Ni100 DIN, Ni120, Cu10 GE, Cu10 GE (high resolution), Cu10 L&N, Cu10 L&N (high resolution), Cu10 WEED, Cu10 WEED (high resolution), Cu10 BAILEY, Cu10 BAILEY (high resolution), Cu10 at 20°C alpha=0.00392, Cu10 at 20°C alpha=0.00393, Cu25 at 0°C alpha=0.00425, Cu53 at 0°C alpha=0.00426035, Cu100 at 0°C alpha=0.00425, J263B, Pt100 GOST, Cu100 GOST, Cu50 GOST, Cu10 GOST
RTD[3]: Pt100 (high noise resistance), JPt100 (high noise resistance)
RTD[4]: Pt500, Pt1000
DI[1]: Non-voltage contact, level (5V logic)
Resistance[4]: 20/200/2k Ω
1: Specifications Common to the MX110-UNV-H04, MX110-UNV-M10, and MX110-V4R-M06
2: Specifications Common to the MX110-UNV-H04 and MX110-UNV-M10
3: Specifications Specific to the MX110-UNV-H04
4: Specifications Specific to the MX110-V4R-M06

•Strain Input Modules (MX112)
Types of measurement: Strain gauge or strain gauge sensor (static strain)
Gauge connection method: Single-gauge (2 or 3 wire), opposed-side two-gauge, adjacent-side two-gauge or four-gauge
Applicable gauge resistance: 100 to 1000 Ω. Built-in resistance of 120 Ω for -B12, and 350 Ω for -B35.
Bridge voltage: 2 VDC fixed (accurate to ±5%)
Applicable gauge factor: 2.0 fixed, gauge factor correction possible with scaling function
Measurement ranges: 2000/20000/200000 μ strain

•Digital Input Modules (MX115)
Types of input[1]: Non-voltage contact, level (5 V logic), open collector
Type of input[2]: Level (24 V logic)
1: Specifications Specific to the MX115-D05-H10
2: Specifications Specific to the MX115-D24-H10

•Analog Output Module (MX120-VAO-M08)
Main functions: Output of set and computed values, retransmission of measured and computed values, and other functions.
Rated output range: Voltage: -10 to 10 V, current: 0 to 20 mA, sourcing (4 to 20 mA is output at 1 to 5 V output)
External power supply (used for current output): 24 V ±10% and current capacity of 250 mA or more.

•PWM Output Module (MX120-PWM-M08)
Main functions: Output of set and computed values, retransmission of measured and computed values, and other functions.
Output waveform: Outputs a pulse width. External power supply required.



Pulse interval: 1 ms to 300 s
External power supply: 4 V to 28 V
Output capacity: Max 1 A/channel, however, the total of one module is 4 A or less

Note: If temperature (thermocouple), resistance, or strain measurements are taken by the MX110 or MX112 at an integral time of 1.67 ms, the measured values may be susceptible to inaccuracies due to power supply frequency noise. If this is the case, set the integral time to 16.67 ms or longer (for a power supply frequency of 60 Hz), or 20 ms or longer (for a power supply frequency of 50 Hz). On DAQMASTER, the integral time is automatically set when selecting the measurement interval, but the relationship between the integral time and the measurement interval differs depending on the modules. If measured values are inconsistent, consult the user's manual for guidance on how to select a measurement interval that will yield a sufficient integral time.

See GS 04M10B01-01E for detailed specifications of main module and I/O modules other than the above.

Model Name

Model	Suffix Code	Option Code	Description
MW100			Main module (with MW100 Viewer Software)[1,2]
Language	-E		English (with English user's manual)[3]
Power supply voltage	-1		100 VAC–240 VAC
	-2		12 VDC–28 VDC, with AC adapter[4]
	-3		12 VDC–28 VDC, without AC adapter[5]
Power supply inlet and power supply cord	D		AC power: 3-pin power inlet with UL/CSA cable DC power: Screw terminal, UL/CSA cable for AC adapter
	F		AC power: 3-pin power inlet with VDE cable DC power: Screw terminal, VDE cable for AC adapter
	R		AC power: 3-pin power inlet with SAA cable DC power: Screw terminal, SAA cable for AC adapter
	Q		AC power: 3-pin power inlet with BS cable DC power: Screw terminal, BS cable for AC adapter
	H		AC power: 3-pin power inlet with GB (CCC) cable DC power: Screw terminal, GB (CCC) cable for AC adapter
	W		Screw terminal, power supply cord not included[4,5]
Options		/C2	RS-232 communication interface[6,7]
		/C3	RS-422A/485 communication interface[6,7]
		/M1	MATH function[7,8]

1. CF card does not come standard.
2. Modbus/TCP server function comes standard.
3. Displays Celsius or Fahrenheit, Winter/Summer time can be set.
4. "W" cannot be selected with "-2"
5. "-3" can only be selected with "W"
6. "/C2" and "/C3" may not be selected together
7. "/C2" or "/C3" must be selected to use the Modbus/RTU slave function. Also, "/M1" must be selected for use of the Modbus/RTU master function.
8. "/M1" must be selected to use the Modbus/TCP client function.

Model	Suffix Code	Option Code	Description
MX110			Analog input module
Input type	-UNV		DCV/TC/DI/3-wire RTD[1]
	-V4R		DCV/DI/4-wire RTD/4-wire resistance[1]
Measurement interval, number of channels	-H04		4 channels, high speed (shortest measurement interval: 10 ms)
	-M06		6 channels, medium speed (shortest measurement interval: 100 ms)[1]
	-M10		10 channels, medium speed (shortest measurement interval: 100 ms)[2]
Option		/NC	The plate with clamp terminals is not attached.[2]

1. "-M06" must be specified when "-V4R" is specified.
"-M06" can not be specified when "-UNV" is specified.
2. "/NC" can be specified only when "-M10" is specified.

Model	Suffix Code	Description
MX112		Strain input module
Input type	-B12	Built-in bridge resistance: 120 Ω
	-B35	Built-in bridge resistance: 350 Ω
	-NDI	For connection to external bridge head and strain gauge type sensor (NDIS connector)
Measurement interval, number of channels	-M04	4 channels, Medium speed (Shortest measurement interval: 100 ms)

Model	Suffix Code	Option Code	Description
MX115			Digital input module
Input type	-D05		Non-voltage contact, 5 V logic, open collector
	-D24		24 V logic
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.

Model	Suffix Code	Description
MX120		Analog output module
Output type	-VAO	Voltage/Current output (allows mixed voltage and current output)
	-PWM	Pulse width modulation output
Measurement interval, number of channels	-M08	8 channels, output update cycle: 100 ms

Model	Suffix Code	Description
MX125		Digital output module
Output type	-MKC	"A" contact (SPST)
Output update cycle, number of channels	-M10	10 channels, output update cycle: 100 ms

Model	Suffix Code	Description
MX150		Base plate
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 modules
	-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

Accessories

Model	Description
772061	Ten-Channel Screw (M4) Terminal Block (RJC included)

Note: The 772061 model is applicable only to the MX110-UNV-M10 (Ten-Channel Medium-Speed Universal Input Module), the MX115-D05-H10 (Ten-Channel High-Speed 5 V Digital Input Module) or the MX115-D24-H10 (Ten-Channel High-Speed 24 V Digital Input Module).

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 the MX110-UNV-M10 (Ten-Channel Medium-Speed Universal Input Module) and the Screw Terminal Block (772061), between the MX115-D05-H10 (Ten-Channel High-Speed 5 V Digital Input Module) and the Screw Terminal Block (772061) or between the MX115-D24-H10 (Ten-Channel High-Speed 24 V Digital Input Module) and the Screw Terminal Block (772061).

Model	Description
772063	Plate with clamp terminals (RJC included)

Note: The 772063 model is applicable only to the MX110-UNV-M10 (Ten-Channel Medium-Speed Universal Input Module), the MX115-D05-H10 (Ten-Channel High-Speed 5 V Digital Input Module) or the MX115-D24-H10 (Ten-Channel High-Speed 24 V Digital Input Module).

Model	Description
772064	Clamp terminals

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

Accessories

Model	Description
772065	Clamp terminals

Note: The 772065 model is applicable only to the MX120-VAO-M08 (Eight-Channel Medium-Speed Analog Output Module), the MX120-PWM-M08 (Eight-Channel Medium-Speed PWM Output Module) or the MX125-MKC-M10 (Ten-Channel Medium-Speed Digital output Module).

Model	Description
772066	Connector cover for base plate

Model	Description
772067	Plate with clamp terminals

Note: The 772067 model is applicable only to the MX110-V4R-M06 (Six-Channel Medium-Speed 4-Wire RTD and Resistance Input Module).

Model	Description
772068	Plate with clamp terminals (Built-in bridge resistance of 120 Ω)

Note: The 772068 is applicable only to the MX112-B12-M04 (Four-Channel Medium Speed Strain Input Module, 120 Ω), or the MX112-B35-M04 (Four-Channel Medium Speed Strain Input Module, 350 Ω).

Model	Description
772069	Plate with clamp terminals (Built-in bridge resistance of 350 Ω)

Note: The 772069 is applicable only to the MX112-B35-M04 (Four-Channel Medium Speed Strain Input Module, 350 Ω), or the MX112-B12-M04 (Four-Channel Medium Speed Strain Input Module, 120 Ω).

Model	Description
772080	Screw (M3) terminal plate (RJC included)

Note 1) The 772080 is applicable only to the MX110-UNV-M10 (Ten-channel Medium Speed Universal Input Module), the MX115-D05-H10 (Ten-channel High Speed 5 V DI Module), and the MX115-D24-H10 (Ten-channel High Speed 24 V DI Module).
Note 2) Terminal cover included
Note 3) b terminals for RTD are common (2 terminals)

Model	Suffix Code	Description
772075		AC adapter
Power supply cord	-D	Cable for UL/CSA
	-F	Cable for VDE
	-R	Cable for SAA
	-Q	Cable for BS
	-H	Cable for GB (CCC)

Model	Specifications	Description
438920	250 Ω ± 0.1%	Shunt Resistance (for clamp terminals)
438921	100 Ω ± 0.1%	
438922	10 Ω ± 0.1%	
415920	250 Ω ± 0.1%	Shunt Resistance (for screw (M4) terminals)
415921	100 Ω ± 0.1%	
415922	10 Ω ± 0.1%	
772090		Adapter for CompactFlash Memory Card
772091	128 MB[1]	CompactFlash Memory Card (CF card only)
772092	256 MB[1]	
772093	512 MB[1]	
772094	1 GB[1]	

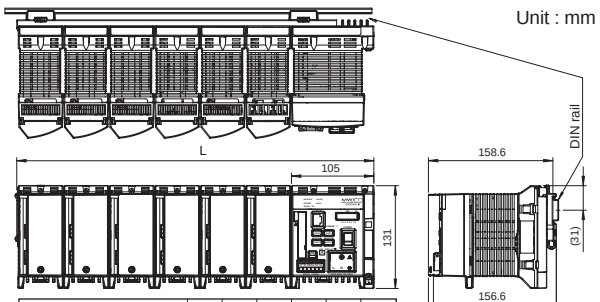
1. Operating temperature range: -40 to 85°C

Application Software

Model	Description
MW180	MW100 Viewer Software

Exterior Dimensions

Unit : mm



Number of equipped input/output modules	1	2	3	4	5	6
L	165	223	281	339	397	455

See GS 04M10B01-01E for the dimensions of the 772061 and the dimension for installation in upper and lower directions using the DIN rail.

NOTICE

- Before operating the product, read the user's manual thoroughly for proper and safe operation.
- If this product is for use with a system requiring safeguards that directly involve personnel safety, please contact the Yokogawa sales offices.
- This product is not constructed to be explosion-proof.

YOKOGAWA