User's Manual

MW100 Data Acquisition Unit

Notice of Alterations

Please make the following alterations to the User's Manual IM MW100-01E.

■ For the MW100 with Firmware Version R3.03

The following changes have been made to procedures due to changes in functions.

Page 1-51 Note the addition of the underlined portion under "Output upon Startup, Error Occurrence, and Stopping."

Page 1-53 Note the addition of the underlined portion under "Steady Output Operation," "Output Operation during Measurement and When Performing Transmission Output."

"Transmission output execution ON" in the table is when the transmission output control is ON. "Transmission output execution OFF" in the table is when the transmission output control is OFF.

The status of transmission output execution below is for transmission output on measurement channels. For transmission on computation channels, substitute "measurement start" with "computation start," "measurement stop" with "computation stop," and "measuring" with "computing."

Output Setup	Status		Output Operation
Transmission output within unit	Meas. stop → Measurement start		Transmission output start or output value hold (depending on the transmission output execution on/off status on: transmission output starts off: output value held)
	Measuring → Measurement stop		Depending on the output operation upon stop setting Last: Holds the output value (last output value) Preset: Outputs the preset value
	Measuring	Transmission output execution off → on	Transmission start
		Transmission output execution on → off	Holds output value (last output value)
Arbitrary output	Meas. stop → Measurement start		No effect
	Measuring → Measurement stop		No effect
	Measuring	Transmission output execution off → on	No effect
		Transmission output execution on → off	No effect

Page 1-55 Note the underlined changes and additions under "Output Types."

Type	Notation	Description
Alarm	Alarm	Measurement and computation channels
Manual	Comm.Input	Manual DO operation(Relay turns ON/OFF depending on the value sent from the PC)
Media	Media	When determined that no space remains within the specified "remaining space time"
Fail	Fail	When an abnormality occurs on the CPU of the MW100 main module
Error	Error	When an error is detected on the MW100 (abnormal or missing module, etc.)

Page 1-56 Note the addition of the following after "Reflash Function."

Preset Output upon Error

The following types are available.

Output	Notation	Description
Off	Off	No forced transition to Open/Close upon error.
Open	Open	Relay output Open (De-energize) upon error.
Close	Close	Relay output Close (Energize) upon error.

The following conditions are required when the DO preset setting is enabled.
- The DO output type must be “Alarm DO”
- The Hold setting must be “Off”
- The Action must be “OR”

- The Energize/De-energize setting is enabled as in the standard specifications.
- Even if the preset setting is enabled for Alarm DO, DO preset output does not occur if no alarm DO assignment from measurement or computation channels is assigned.
- The computation error definition is for when the computed value is ±OVER.
- If multiple measurement or computation channels are set for alarm DO output, the preset output upon error is carried out if an error occurs on any one of the channels.
- Preset output upon error is cleared when errors are cleared on all measurement or computation channels set as alarm DO.

Preset Output upon Stop

The following types are available.

Output	Notation	Description
Off	Off	Holds previous value
Open	Open	Relay output Open (De-energize) upon error.
Close	Close	Relay output Close (Energize) upon error.

The stop detection/clear condition varies depending on the combination of channels set for alarm DO.

Alarm DO setting	Stop detected	Stop cleared
Measurement channels only	Measurement stop	Measurement start
Computation channels only	Computation stop	Computation start
Measurement + computation channels	Computation stop	Computation start

- If a stop is detected during preset output upon error, the preset output upon stop is carried out.

Page 1-57 Note the changes of the underlined portion to “Number of MATH Channels”

•••••••••••••••••••••••••••••••••• input. The maximum number of characters that can be used in an expression is 120 for MATH channels and <u>10</u> for communication input channels.••••••••••••••••••••••••••••••••••

Page 1-57 Note the addition of the underlined portion to “MATH Types.”

- Basic math
- Logical operations
- <u>Bit output</u>
- Relational operations

•••

Page 1-57 Note the addition of the following after “MATH Types,” “Logical Operations.”

Bit output

Type	Operator	Example	Explanation
Bit output*	BIT	C001BITB02	When bit 2 (LSB = 0) of communication input channel C001 is 1, the computed result is 1. When bit 2 of C001 is 0, the computed result is 0.

* If data is 0 or negative, the output value is 0.

Page 1-59 Note the addition of the underlined portion to “Order of Operations in Expressions”

Type	Operators
(High precedence)	
Arithmetic, TLOG, CLOG, and <u>Bit output</u>	ABS(), SQR(), LOG(), EXP(), TLOG.MAX(), TLOG.MIN(), TLOG.P-P(), TLOG.SUM(), TLOG.AVE(), TLOG.PSUM(), CLOG.MAX(), CLOG.MIN(), CLOG.P-P(), CLOG.AVE(), <u>BIT</u>
Conditional expressions	[EXPR1?EXPR2:EXPR3]
•••	

Page 1-64 Note the addition of the underlined portion to “TLOG Time Scale”

IIntegration Units	Notation	Explanation
•••		
Every hour	/hour	Σ (data)/(Number of times of computing per hour.)
<u>Every day</u>	<u>/day</u>	<u>Σ (data)/(Number of times of computing per day.)</u>

Page 3-2 Note the addition of the underlined portion to “MW100 Operation Screens,” “Top Screen.”

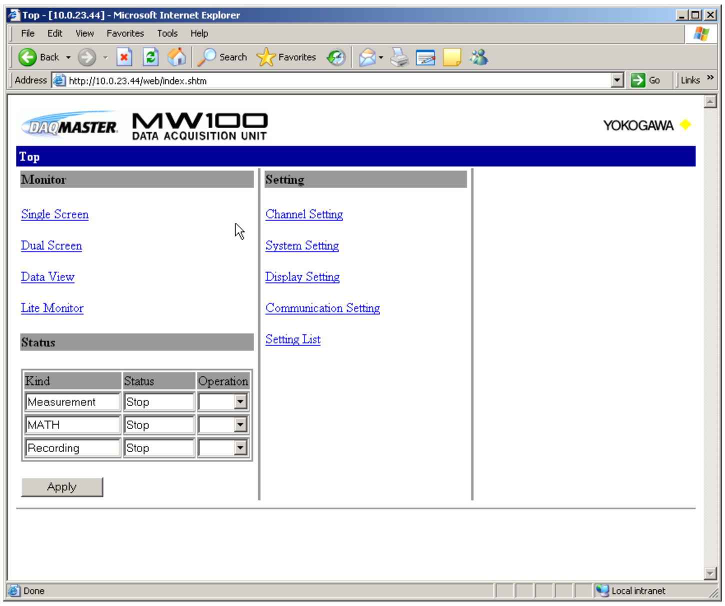
Top Screen

- **Monitor**

  Single screen, Dual screen, Data View, and <u>Lite Monitor</u>
- **Setting**

  Channel Setting, System Setting, Display Setting, Communication Setting, and <u>Setting List</u>.
- **Status**

  Measurement, MATH, and Recording status changes



Data View

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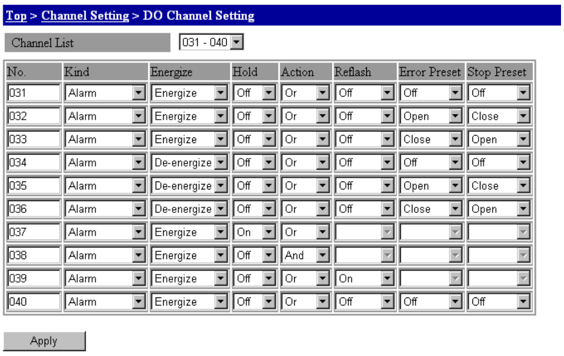
<u>Lite Monitor</u>

<u>For simplified display of data from the MW100.</u>

Page 3-35 Note the addition of the underlined portion and the following to “Relay Settings.”

You can set the operation type, excitation status, hold, operation, reflash, <u>error preset, and stop preset.</u>



Top > Channel Setting > DO Channel Setting

Channel List 031 - 040

No.	Kind	Energize	Hold	Action	Reflash	Error Preset	Stop Preset
031	Alarm	Energize	Off	Or	Off	Off	Off
032	Alarm	Energize	Off	Or	Off	Open	Close
033	Alarm	Energize	Off	Or	Off	Close	Open
034	Alarm	De-energize	Off	Or	Off	Off	Off
035	Alarm	De-energize	Off	Or	Off	Open	Close
036	Alarm	De-energize	Off	Or	Off	Close	Open
037	Alarm	Energize	On	Or			
038	Alarm	Energize	Off	And			
039	Alarm	Energize	Off	Or	On		
040	Alarm	Energize	Off	Or	Off	Off	Off

Apply

••

Preset Output upon Error

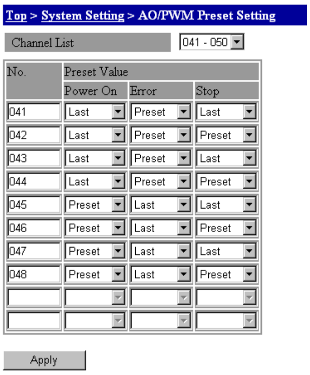
8. In the **Error Preset** box, select Off, Open, or Close. The preset value is output to the DO channel if an error occurs on a measurement or computation channel set for alarm DO. If set to Off, operation occurs per the standard specification.

Preset Output upon Stop

9. In the **Stop Preset** box, select Off, Open, or Close. The preset value is output if measurement stop or computation stop is executed on a DO channel.
10. Click the **Apply** button. The setting changes take effect.

Page 3-39 Note the addition of the underlined portion and the following to "Output Operation Settings."

You can set the operation upon power ON, or when an error and <u>a stop occur.</u>



••

Setting the Operation upon Stop

5. In the **Stop** box, select Last (previous value) or Preset (preset value). When a Stop occurs, the value per the selected operation is output.

6. Click the **Apply** button. The setting changes take effect.

Page 3-55 Note the addition of the underlined portion to section "3.16, Measured Data Monitor Display/ Settings."

You can monitor-display data measured on the MW100.

The available screen formats are Single Screen, Dual Screen, <u>Lite Monitor</u>, and Data View.

Single Screen and Dual Screen:••

<u>Lite Monitor: Use this for digital display.</u>

Data View: ••

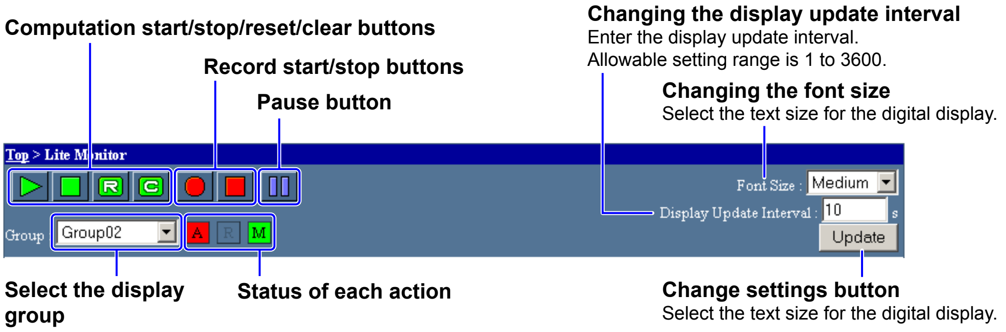
Page 3-60 Note the addition of the following after "Overview Display."

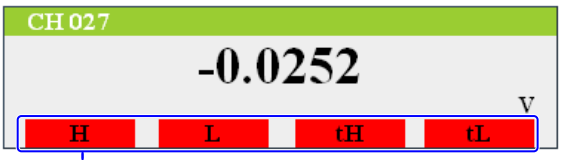
- **Lite Monitor screen**

  Displays measured data in a simplified format.

Parts of the Display

This is a description of the icons and areas for displaying measured data in the Lite Monitor screen.





Alarm Statuses
Turn red when alarms occur.
Not displayed if alarms do not occur, or are not set.

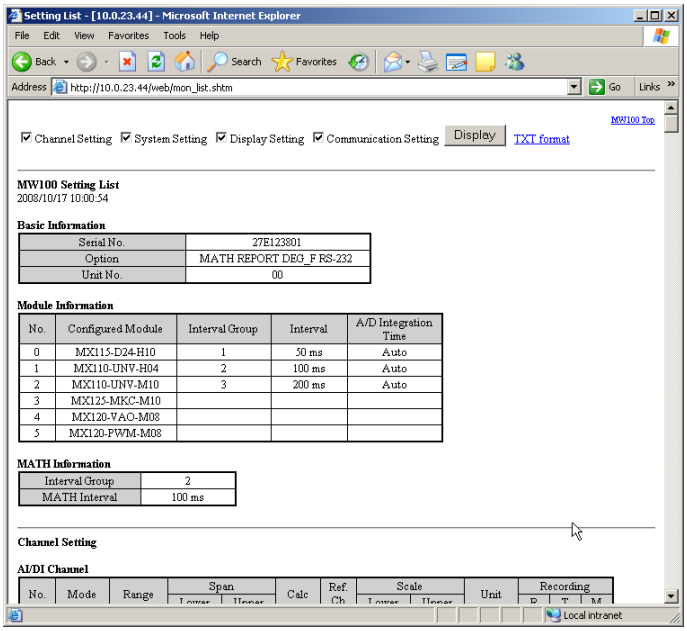
Note

- Depending on the operating environment, approximately 4 KB of PC memory can be consumed for a single screen update. If the PC runs out of memory, close then reopen the Web screen.
- When accessing the screen with general user privileges, the computation start/stop/reset/clear and recording start/stop buttons are not available.

Page 3-67 Note the addition of the following after "Log Information."

Setting List

1. From the top screen, click **Setting List**.



2. Select the check boxes of the settings you wish to display (Channel Setting, System Setting, Display Setting, Communication Setting), then click the **Display** button.
3. You can click the TXT Format link to display the list in text format.
   To save text-formatted screens, click **File** > **Save As** from the browser's menu. Set the format to text (.txt), then save the file.

Note

- To convert the file to CSV format, change the file's extension to .csv.
- Saved CSV files cannot be reloaded onto the MW100.

Page 5-4 Note the changes of the underlined portion to "Characters used in expressions:"

Up to 120 per channel
For communication input channels only, a maximum of 10 characters can be used per channel.

Page 5-20 Note the addition of the underlined portion to "Modbus Slave Function."

Supported function: The functions that the MW100 supports are as follows.

Function Code	Function	Operation
1	Read coils (0xxxx)	MW100 reads the statuses of coils.
2	Read input relays (1xxxx)	MW100 reads the statuses of input relays.
3	Read hold registers (4XXXX)	MW100 read communication input data 16 written by function code 6 or 16
4	Read Input registers (3XXXX)	MW100 reads the main instrument's measured, computed, and time data.
5	Write single coil (0xxxx)	MW100 turns status of a single coil.
6	Write hold registers (4XXXX)	MW100 writes to the main instrument's communication input data.
8	Loop back test	MW100 performs the loop back test on the main instrument. Main instrument only support message return (diagnostic code (0x00)).
15	Write multiple coils (0xxxx)	MW100 turns status of multiple coils.
16	Write hold registers (4XXXX)	MW100 writes to the main instrument's communication input data.

Page 5-20 Note the addition of the following after "Register Assign (Modbus Server Functions and Sharing)."

Coils for mapping data on communication input channels (C001 to C300) have been added to the Modbus slave function. Communication input channel coils are 0 (Off) when data is zero, infinite (+Inf, –Inf), or NaN, and 1 (On) when data is one or non-infinite.

Coil	Data	Data type
00001	Data on communication input channel C001	Bit
00002	Data on communication input channel C002	Bit
:	:	:
00300	Data on communication input channel C300	Bit

Input relays of measurement and computation channels are 0 (Off) when data is zero, infinite or of a special value (+Over, –Over, Skip, No Channel, Error, Invalid, or Lack), and 1 (On) when data is one or non-infinite.

Special values held by measurement and computation channels

Value type	Name/description of value	Value per Modbus register		
		Int 32	Float	Bit*1
+Over	+Over Data value greater than the upper limit	2,147,450,879 (0x7fff 7fff)	+Inf(0x7f80 0000)	0
–Over	–Over Data value smaller than the lower limit	–2,147,385,343 (0x80001 8001)	–Inf(0xff80 0000)	0
Skip	Skip Channel disabled	–2,147,319,806 (0x8002 8002)	–NaN(0xff80 0002)	0
No Channel	No channels No channels exist	–2,147,254,269 (0x8003 8003)	–NaN(0xff80 0003)	0
Error	Error Error in computation of data value*2	–2,147,188,732 (0x8004 8004)	–NaN(0xff80 0004)	0
Invalid	Undefined Data value is undefined*3	–2,147,123,195 (0x8005 8005)	–NaN(0xff80 0005)	0
Lack	Computation omitted Computation not processed	–2,147,057,658 (0x8006 8006)	–NaN(0xff80 0006)	0
Valid	Data	Data*4 (mantissa)	Data(physical qty.)	Data(0, 1)

*1 The value of the bit alone is insufficient to determine whether it is a special value. Mode (18000's, 38000's) and other information must also be used to determine whether it is a special value or other value.

*2 If the data to be computed or the computed result is NaN, an error occurs. Furthermore, data resulting in an error is replaced with +Over or –Over according to the "Operation upon Computation Error" setting.

*3 After turning the power to the MW100 ON, data values are undefined (Invalid) until initial measurement and computation are finished (until the first data of measurement and computation channels is created).

*4 Only the mantissa of values can be acquired from Int 32 format data of measurement and computation channels. Decimal place information of some form must be acquired separately from the MW100 in order to convert to physical values.

Note

This is an example of acquiring decimal place information.

- For measurement channels
  - In the Web browser’s Input Range Setting screen, check the values in the Decimal columns under Scale (when scaling is not used, the decimal place of the value in the Span column).
  - Acquire channel information using an SR command query of the MW100-specific communication service.
  - Output measurement channels using the FD command of the MW100-specific communication service, then check the “Exponent” value.
- For computation channels
  - In the Web browser’s “Expression Settings” screen, check the value in the Decimal column under Span.
  - Acquire channel information using an SO command query of the MW100-specific communication service.
  - Output computation channels using the FD command of the MW100-specific communication service, then check the “Exponent” value.

Input relays indicating mode information are 1 (On) during operation in the relevant mode, and 0 (Off) when stopped.

Input relay	Data	Data type
10001	Data on measurement channel 001	Bit
10002	Data on measurement channel 002	Bit
:	:	:
10060	Data on measurement channel 060	Bit
13001	Data on computation channel A001	Bit
13002	Data on computation channel A002	Bit
:	:	:
13300	Data on computation channel A300	Bit
18001	Measuring	Bit
18002	Computing	Bit
18003	Recording	Bit
18004	Alarm occurring	Bit
18005	Waiting to confirm alarm status	Bit

Page 5-21 Note the addition of the following before “Input Registers.”

Input registers for mapping main unit mode information have been added to the Modbus slave function.
Input registers indicating mode information are 1 (On) during operation in the relevant mode, and 0 (Off) when stopped.

Input register	Data	Data type
38001	Measuring	Int 16
38002	Computing	Int 16
38003	Recording	Int 16
38004	Alarm occurring	Int 16
38005	Waiting to confirm alarm status	Int 16

Page 5-23 Note the changes of the underlined portion to “Event Action” “Event detection:”“ Level:”

Level: Continue operation •••
•• enabled
<u>The same start function cannot be set to edge start or multiple settings simultaneously. When setting the start operation to time up on the timer, match time, or user function key, then computation start/stop, recording start/stop, and flag input 0/1 repeat alternately.</u>

Page 5-25 Note the changes of the underlined portion to “Log Information”

Maximum no. of saved logs: <u>250</u> (if this number exceeded, old files are overwritten by new ones)

■ For the MW100 with Firmware Version R3.02

The following changes have been made to procedures due to changes in functions.

Page 1-27 Added to “Communication Specifications” of “1.3 Functions of the Main Module”

EtherNet/IP Server Function

The Ethernet/IP client can connect to the MW100 acting as the Ethernet/IP server to read data from MW100 measurement channels and math channels, and read/write data on communication input channels.

Note

You can download the EDS file, mw100_eds.zip, from the following web site.

http://www.yokogawa.com/ns/mw100/

Page 1-31 “Communication Specifications” of “1.3 Functions of the Main Module”

Item	Notation	Request Type
••••••••		
CIP server log	CIP server log	Max. number of displayed logs
PCCC slave log	PCCC slave log	Max. number of displayed logs

Page 1-50 “Mail Client Setting 1” of “Mail Client Settings”

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7. To require authorization (POP before SMTP) when sending e-mail, select **POP3** in the User Authorization list, or if SMTP Authentication is required, select **AUTH**. This enables entry of the User Authorization items.
8. Enter the name for logging into the POP3 server in the User box under User Authorization.

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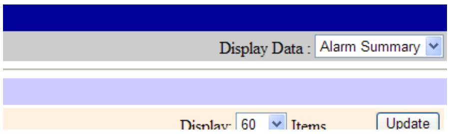
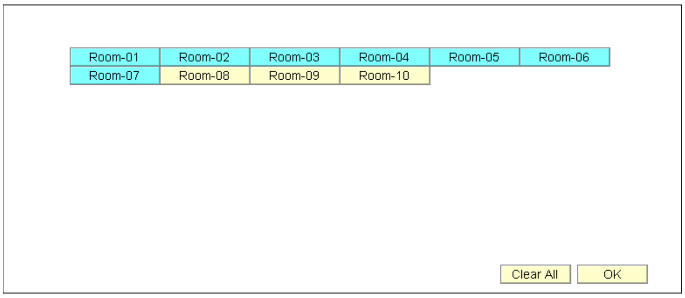
Page 3-61 “Data View”

From the Display Data list, select Alarm Summary, Manual Sample, Report - Digital, or Report - Graph.



Page 3-63 “Channel selection screen”

Selects the channels and tag names displayed in the graph.
Up to 10 channels can be selected. You can clear all selections with **Clear All** button.
Click the OK button to return to the Report - Graph screen.



Page 5-15 “Ethernet port” of “Communication”

List of services: The port number of each server is the default number.

Server Type	Application	Port Number	Number of Simultaneous Connections
••••••••			
EtherNet/IP server	EtherNet/IP	44818	10

••

Timeout function: Connection to server from which no communication is made over a specified period is forcibly dropped.

Server Type	Timeout Value
••	
EtherNet/IP server	10 minutes

Page 5-16 "Ethernet port" of "Communication"

E-Mail function: Sends e-mail according to timing of: alarm activation/release, specified time intervals, file creation time, time at which free memory space drops below specified amount, time power turned on, when specified errors occur, when reports are created, and other events.
Recipients: Two mail recipient locations can be set
Number of characters: Multiple addresses using up to 150
User Authentication: POP before SMTP(PLAIN, APOP), SMTP Authentication (PLAIN, CRAM-MD5)

Page 5-18 "Communication Output Function" of "Communication"

Item	Description
•••	
Modbus master connection status	Outputs Modbus master connection status
CIP server log	Outputs CIP server infomation
PCCC slave log	Outputs PCCC slave information
Status	Status byte information

Page 5-22 Added to "Communication"

EtherNet/IP Server Function

The server function enables you to read measured data from MW100 measurement channels, and computed data from MW100 math channels, and read/write data on communication input channels.

Specifications	Descriotion
Implementation	Level 2 (Message Server + I/O Server)
Connection	Max. 20 connections (10 sessions)
Protocol	EIP / PCCC, EIP / native
Messaging	Explicit (UCMM, Class 3) + I/O (Class 1)
Object	Assembly, PCCC, Data Table, Identity, Message Router, Connection Manager, Ethernet Link, TCP/IP Interface

■ Page 1-22 "Performing a Manual Sample" of "Manual Sample Function"

Note

- A new manual sample cannot be performed while the manual sample file is being written to.
- A manual sample cannot be performed at an interval shorter than the specified slowest measurement interval.

■ Page 2-27 "Serial Interface Converter"

The following are recommended models of converters.
SysmexRA CORP./MODEL RC-770X, LINE EYE/SI-30FA, YOKOGAWA/ML2