

Yokogawa MW100 LabVIEW Driver Library User Manual

The MW100 LabVIEW driver library allows a LabVIEW developer to build a custom application that can fully configure and operate an MW100 with any complement of I/O modules and acquire all available measure and math channel data in real-time. This manual describes the contents of the MW100 LabVIEW driver library and provides general information on the MW100 and how to communicate with it. A description of each VI is included along with the Yokogawa communication command used to create the VI. To more fully understand the communication method and operation of the MW100, please refer to the MW100 Communication Command Manual, part number IM MW100-17E, and the MW100 User's Manual, part number IM MW100-01E.

Driver Name

YKMW100- LabVIEW driver for YOKOGAWA MW100 Using the Ethernet and Serial Interface

All VIs have the prefix 'YKMW100'.

MW100 System Description

The MW100 is a flexible and scalable, high performance data acquisition/data-logging platform designed for both PC-controlled data acquisition and stand-alone data logging operations.

The MW100 is fully web-enabled. All system settings can be configured with a standard web browser via the Ethernet interface. A JAVA applet allows a web browser to display real time data acquired from the MW100. On a newly assembled MW100 system, or when network settings are to be changed, the Yokogawa IPConfig software included with the MW100 is used to set the MW100 communication parameters. The MW100 is now ready to communicate with a web browser or with the LabVIEW driver on the Ethernet port using the known IP address.

A complete library of communication commands is provided that allows a software developer to build a custom software application that can utilize every operating mode and feature of the MW100. All commands are supported on the standard Ethernet interface or optional RS-232C or RS-422A serial interface. The VIs comprising the LabVIEW driver library use these commands to control each associated function.

LabVIEW Driver Description and MW100 Communications

The LabVIEW driver library contains VIs allowing a LabVIEW developer to fully access all of the setting, measurement, and computation functions of the MW100. Each VI uses a single Yokogawa command or combination of corresponding commands to access a given function. With this driver library, a LabVIEW developer can create a custom application with the same configuration functionality as provided by the MW100 web browser interface, and real-time data displays using the full range of LabVIEW's capability. Please refer to the MW100 Communication Command Manual if you would like to know more about the commands and MW100 communications functions. Also note that knowledge of the Yokogawa MW100 command library is not a requirement to use the LabVIEW driver VIs, rather this information helps you to understand how the drivers are written and how they control the MW100.

If you are building a LabVIEW application that will configure the MW100, it will be very helpful to use and learn the MW100 setting functions and real-time data monitor modes via its native web browser operation before starting development work. By doing so, you will know which MW100 settings are needed for your specific application and you can identify the corresponding LabVIEW VIs and know in advance how they interact with the MW100, thus reducing the development time.

Ethernet Communication Port

This driver will normally communicate with the MW100 via the Ethernet interface. The driver will use the general purpose Ethernet port 34318. Port 34318 allows up to 4 simultaneous connections, allowing other applications to communicate with the MW100 at the same time. As an example, an OPC server can be acquiring MW100 channel data at the same time the LabVIEW driver is running. A VISA connection with the MW100 is established by specifying the IP address, and port 34318.

Login Function

A log in function on the MW100 can be enabled that allows only registered users to obtain communication access. For details, see section 3.2, “Connecting to the MW100” in the main MW100 instruction manual, part number IM MW100-01E.

There are two levels of user access, and up to 10 logins can be assigned:

Level	Notation	Description
Administrator privileges	Admin	All functions are available.
User privileges	User	Measured/computed data, settings, log information, alarm summaries, and status information can be obtained.

Administrator privileges are required to switch operation modes, start/stop computation and recording, or to change settings such as the measurement range.

Both administrator and user levels can execute queries.

Operating Modes

The MW100 has two operation modes:

- Setting Mode- in this mode, setting commands can be issued to and accepted by the MW100 and only when measurement, computation, and recording are stopped.
- Measurement Mode- in this mode, certain commands can be can be issued to and accepted by the MW100 when measurement is running.

If a command intended for use in one mode is executed while in a different mode, an error results. Switch to the proper mode before executing the command. Queries can be used regardless of the mode.

Acquiring Channel Data

There are two methods, FIFO and channel, to acquire the data from the instrument. The MW100 is ready to provide channel data only after the appropriate input module(s) have been installed on the base plate, a reconstruct operation has been executed, and the input channels have been properly configured to measure the input signals in use (i.e. TC for thermocouples, RTD for RTD inputs, etc.). Following this, the unit must be placed in Measurement mode. Reconstruct and channel settings (and all other MW100 settings) can be done with a web browser or with a custom LabVIEW application using the VIs described in this manual.

If an MX series I/O module is added to, removed from, or re-located to a new slot location on the base plate, you should reconstruct the MW100 via the web browser before running the driver.

YKMW100 Driver Library

Files Contained in the MW100 Driver Library

File	Description
YKMW100.TXT	General information
YKMW100.llb	Library of VIs
YKMW100U.llb	Library of VIs that the end user should not access directly
dir.mnu	Top Menu
config.mnu	Menu of Configure VIs
acstat.mnu	Menu of Action or Status VIs
applic.mnu	Menu of Getting Started and Applications VIs
data.mnu	Menu of Data
util.mnu	Menu of Utility VIs

VI Tree and Getting Started

VI Name	Description	Yokogawa Command	Operation Mode
YKMW100 VI Tree.vi	This VI shows the icons of all VIs in YKMW100.llb.	N/A	N/A
YKMW100 Getting Started.vi	This is a ready to run project that uses all of the VIs needed to establish communications with the MW100 and to display digital and trend data for specified channels. Use this VI as an example of how to build a project that acquires real-time data from the MW100.	Numerous	Measurement

Application Examples

VI Name	Description	Yokogawa Command	Operation Mode
YKMW100 App Example Config Range.vi	<p>Uses all of the VIs needed to set channel ranges on the MW100.</p> <p>There are 10 range types (SKIP, VOLT, TC, RTD, DI, OHM, STRAIN, DELTA, AO, PWM). Follow these steps to complete the settings:</p> <ol style="list-style-type: none"> Specify the channels. Select the range type. Enter the range detail data according to the range type chosen. Example- If you select VOLT in range type, select the Volt Range that you need and ignore the other settings in the range detail area. <p>If AO or PWM range type is chosen, enter the other associated settings in the range detail area.</p> <p>If DELTA range type is chosen, enter the delta type and relative range in range detail.</p> <ol style="list-style-type: none"> Specify the span. If you need to scale, first set scale ON, then specify scaling. If you select DELTA, AO, or PWM in range type, ensure you specify the reference channel you need. 		Setting
YKMW100 App Example Config Interval.vi	Sets the measurement interval for the specified measurement group.	XV	
YKMW100 App Example Measurement Channel Data.vi			
YKMW100 App Example Measurement FIFO Data.vi			

Initialize

VI Name	Description	Yokogawa Command	Operation Mode
YKMW100 Initialize.vi	This VI passes the addressing information in the instrument descriptor to the Instr Open VI and returns the instrument ID. You can optionally reset the instrument by setting the front panel reset control. You must run this VI before using any of the instrument driver VIs for this instrument.		

Close

VI Name	Description	Yokogawa Command	Operation Mode
YKMW100 Close.vi	Closes the I/O interface with the instrument. If you use serial to communicate with the instrument, please confirm your serial type.		

Configuration

Config VIs are used to change configuration settings.

VI Name	Description	Yokogawa Command	Operation Mode
YKMW100 Config Range SKIP.vi	Sets the specified channel to skip. Channels set to skip are not measured.	SR	Setting
YKMW100 Config Range VOLT.vi	Sets the specified channel for VOLT (voltage) measurement.	SR	Setting
YKMW100 Config Range TC.vi	Sets the specified channel for TC (thermocouple) measurement	SR	Setting
YKMW100 Config Range RTD.vi	Sets the specified channel for RTD measurement	SR	Setting
YKMW100 Config Range DI.vi	Sets the specified channel for DI measurement	SR	Setting
YKMW100 Config Range OHM.vi	Sets the specified channel for OHM (resistance) measurement	SR	Setting
YKMW100 Config Range STRAIN.vi	Sets the specified channel for STR (strain) measurement	SR	Setting
YKMW100 Config Range DELTA.vi	Sets the specified channel math type to delta. Specified channel returns the difference value between itself and the specified reference channel.	SR	Setting
YKMW100 Config Range RRJC.vi	Sets the specified channel for RRJC (remote reference	SR	Setting

	junction compensation) measurement. A reference channel that measures the reference junction temperature is also specified		
YKMW100 Config Range AO.vi	Sets the AO (analog output) range for the specified channel.	AO	Setting
YKMW100 Config Range PWM.vi	Sets the PWM (pulse width modulation) range for the specified channel.	AO	Setting
YKMW100 Config Burnout.vi	Sets burnout parameters.	XB	Setting
YKMW100 Config Filter.vi	Sets the filter coefficient for the specified channel.	SF	Setting
YKMW100 Config RJC Type.vi	Sets the RJC (Reference Junction Compensation).	XJ	Setting
YKMW100 Config Alarm.vi	Sets all alarm parameters.	SA	Setting and Measurement
YKMW100 Config Computing.vi	Sets the math expression for math channels. This command is used only when the /M1 MATH option is present.	SO	Setting
YKMW100 Config Constant.vi	Sets the math constants. This command is used only when the /M1 MATH option is present.	SK	Setting
YKMW100 Config Interval.vi	Sets the measurement interval for the specified measurement group.	XV	Setting
YKMW100 Config Computing Interval.vi	Sets the math interval. This command is used only when the /M1 MATH option is present.	VM	Setting
YKMW100 Config Initial Balance.vi	Sets the balance on/off for strain measurements.	BA	Setting
YKMW100 Config Unit Number.vi	Sets the MW100 unit number, as indicated on the LED display.	UN	Setting
YKMW100 Config Message.vi	Sets the text messages.	SG	Setting
YKMW100 Config Date Time.vi	Sets current date and time.	SD	Setting

Action/Status

VI Name	Description	Yokogawa Command	Operation Mode
YKMW100 Measurement.vi	Selects either Setting or Measurement operating mode. The operating mode cannot be changed when recording or math computation is active.	DS	Setting and Measurement
YKMW100 Computing.vi	Changes the math status (start, stop, reset, clear). This command is used only when the /M1 MATH option is present.	EX	Measurement

YKMW100 Record.vi	Starts and Stops data recording to the Compact Flash media on the MW100.	PS	Measurement
YKMW100 Message.vi	Triggers one of the 5 pre-set text messages.	MS	Measurement
YKMW100 Initial Balance.vi	Changes the balance status (execute or reset) on a strain input module channel that has initial balancing enabled (YKMW100 Config Initial Balance.vi and BA command)	BL	Setting
YKMW100 Output AO.vi	Sets the output value of a channel assigned to COM, AO, or PWM. Used in conjunction with YKMW100 Config Range AO.vi and AO command.	SP	Measurement
YKMW100 Output Relay.vi	Turns a designated relay output on or off.	VD	Setting and Measurement
YKMW100 Alarm Status.vi	Sends an ACK for alarms.	AK	Measurement

Data

VI Name	Description	Yokogawa Command	Operation Mode
YKMW100 Measurement Binary Data.vi	Requests output of the latest measured/computed data in binary format.	FD	Setting and Measurement
YKMW100 Measurement ASCII Data.vi	Requests output of the latest measured/computed data in ASCII format.	FD	Setting and Measurement
YKMW100 Measurement FIFO Data.vi	Requests output of measured, computed, and thinned FIFO data. This VI gets the data between start position number and end position number by measurement group. If the value of start position number and end position number are -1, this VI gets instantaneous measurement data number.	FF	Setting and Measurement
YKMW100 Output Binary Data.vi	Requests output of the latest output data in binary format.	FO	Setting and Measurement
YKMW100 Output ASCII Data.vi	Requests output of the latest output data in ASCII format.	FO	Setting and Measurement

YKMW100 Unit Decimal Point.vi	Requests the decimal place and units in ASCII format.	FE	Setting and Measurement
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Utility

VI Name	Description	Yokogawa Command	Operation Mode
YKMW100 Self-Test.vi	This VI causes the instrument to perform a self-test and returns the results. A numeric indicator indicates if the instrument passed all self-tests, and a string indicator contains the instrument's response. If a self test is not supported, the VI returns a warning code.		
YKMW100 Error Message.vi	This VI contains all the instrument specific error codes and descriptions. Use this VI after executing several instrument driver VIs to recognize and display any errors that may have occurred.		
YKMW100 Error Query.vi	This VI reads an error from the instrument. It expects to see errors in SCPI format (#,"error message"). If an error query is not supported, it returns a warning.		
YKMW100 Reset.vi	This VI resets the instrument, and then sends a set of default setup commands to the instrument. If a Reset command is not supported, it will return a warning.		
YKMW100 Revision Query.vi	<p>This VI queries the current instrument firmware revision and instrument driver revision.</p> <p>The instrument driver's revision number is "REV 0.12, 02/2006, LV 7.0"</p> <p>The instrument firmware revision is not supported.</p> <p>(MW100) Created By: Yokogawa Electric Corporation Release Date: Feb. 2006 Originally Developed in LabVIEW Version: 7.0/J</p> <p>Modification History:</p>		

	Update Date:		
YKMW100 Send Message.vi	This VI sends the message. Then it returns the response.		
YKMW100 Receive String.vi	This VI receives ASCII code string which ends with terminator "CRLF" from the instrument. This VI returns read buffer except CRLF.		
YKMW100 Response Check.vi	This VI checks the message, then returns the internal error type. If the message is an error message, the VI sets "command are not processed successfully" to error out.		
YKMW100 Get ASCII.vi	This VI gets ASCII data. Send message, then receive the response. If response type is ASCII, remained data is received by this VI.		
YKMW100 Get Binary.vi	This VI gets binary data. Send message, then receive the response. If response type is binary, remained data is received by this VI.		
YKMW100 Make Data.vi	This VI converts an integer which is a part of measurement block data (binary) with decimal place to a float.		

NOTES

This driver uses VISA and was created with LabVIEW 7.0/J, Windows 2000 Japanese Edition.

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