NI-DMM

June 2008, 372469A-01

Use the NI-DMM VIs to develop applications for your NI digital multimeter.

Palette Object	Description
	 This VI completes the following tasks: Creates a new IVI instrument driver session. Opens a session to the device you specify for the Instrument Descriptor parameter. If the ID Query parameter is set to TRUE (1), this VI queries the instrument ID and checks that it is valid for this instrument driver. If the Reset parameter is set to TRUE (1), this VI resets the instrument to a known state. Sends initialization commands to set the instrument to the state necessary for the operation of the instrument driver. Returns a ViSession handle that you use to identify the instrument in all subsequent VIs.
<u>Initialize</u> <u>With</u>	 This VI completes the following tasks: Creates a new IVI instrument driver session and optionally sets the initial state of the following session properties: Range Check, Query Instrument Status, Cache, Simulate, and Record Value Coercions. Opens a session to the device you specify for the Instrument Descriptor parameter. If the ID Query parameter is set to TRUE (1), this function queries the instrument ID and checks that it is valid for this instrument driver. If the Reset Device parameter is set to TRUE (1), this VI resets the instrument to a known state. Sends initialization commands to set the instrument to the state necessary for the operation of the instrument driver. Returns a ViSession handle that you use to identify the instrument in all subsequent instrument driver function calls.
<u>niDMM</u>	Closes the specified session and deallocates resources that it

<u>Close</u> reserved.

Subpalette	Description
<u>Configuration</u>	Use the NI-DMM Configuration VIs for hardware-specific configuration and control.
<u>Acquisition</u>	Use the NI-DMM Acquisition VIs to acquire data from a measurement.
<u>Calibration</u>	Use the NI-DMM Calibration VIs to perform a self- calibration or external calibration on the DMM.
Utility	Use the NI-DMM Utility functions for optional functionality in your application.

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niDMM Initialize

This VI completes the following tasks:

- Creates a new IVI instrument driver session.

- Opens a session to the device you specify for the **Instrument Descriptor** parameter.

- If the **ID Query** parameter is set to TRUE (1), this VI queries the instrument ID and checks that it is valid for this instrument driver.

- If the **Reset** parameter is set to TRUE (1), this VI resets the instrument to a known state.

- Sends initialization commands to set the instrument to the state necessary for the operation of the instrument driver.

- Returns a ViSession handle that you use to identify the instrument in all subsequent VIs.



Instrument Descriptor contains the resource name of the device to initialize.

The resource name is assigned in Measurement & Automation Explorer (MAX). Refer to <u>Related Documentation</u> for the *NI Digital Multimeters Getting Started Guide* for more information about configuring and testing the DMM in MAX. Valid Syntax:

- NI-DAQmx name
- DAQ::NI-DAQmx name[::INSTR]
- DAQ::Traditional NI-DAQ device number[::INSTR]
- IVI logical name



ID Query verifies that the device you initialize is one that the driver supports. NI-DMM automatically performs this query, so setting this parameter is not necessary.

TRUE (default)	1	Perform ID Query
FALSE	0	Skip ID Query

Reset specifies whether to reset the instrument during the initialization procedure.

TRUE (default)	1	Reset device
FALSE	0	Do not reset device

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information

about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Initialize With Options

This VI completes the following tasks:

- Creates a new IVI instrument driver session and optionally sets the initial state of the following session properties: Range Check, Query Instrument Status, Cache, Simulate, and Record Value Coercions.

- Opens a session to the device you specify for the Instrument **Descriptor** parameter. If the **ID Query** parameter is set to TRUE (1), this function gueries the instrument ID and checks that it is valid for this instrument driver.

- If the **Reset Device** parameter is set to TRUE (1), this VI resets the instrument to a known state.

 Sends initialization commands to set the instrument to the state necessary for the operation of the instrument driver.

- Returns a ViSession handle that you use to identify the instrument in all subsequent instrument driver function calls.



Instrument Descriptor contains the resource name of the device to initialize.

The resource name is assigned in Measurement & Automation Explorer (MAX). Refer to Related Documentation for the NI Digital Multimeters Getting Started Guide for more information about configuring and testing the DMM in MAX. Valid Syntax:

- NI-DAQmx name
- DAQ::NI-DAQmx name[::INSTR]
- DAQ::Traditional NI-DAQ device number[::INSTR]
- IVI logical name



Caution All IVI names for the **Instrument Descriptor**, such as logical names or virtual names, are case-sensitive. If you use logical names, driver session names, or virtual names in your program, you must make sure that the name you use matches the name in the IVI Configuration Store file exactly,

without any variations in the case of the characters in the name.

ID Query verifies that the device you initialize is one that the driver supports. NI-DMM automatically performs this query, so setting this parameter is not necessary.

TRUE (default)	1	Perform ID Query
FALSE	0	Skip ID Query

Reset Device specifies whether to reset the instrument during the initialization procedure.

TRUE (default)	1	Reset device
FALSE	0	Do not reset device

Option String sets the initial value of certain properties for the session.

The following table lists the properties and the name you use in this parameter to identify the attribute:

Range Check	TRUE	1
Query Instrument Status	FALSE	0
<u>Cache</u>	TRUE	1
<u>Simulate</u>	FALSE	0
Record Value Coercions	FALSE	0
Driver Setup	""—empty string	

The format of this string is "PropertyName=Value." To set multiple properties, separate their assignments with a comma.

If you pass NULL or an empty string for this parameter, the session uses the default values for the property. You can override the default values by assigning a value explicitly in an **Option String** parameter. You do not have to specify all of the properties and may leave any of them out (those left out use the default value).

Refer to Simulating NI Digital Multimeters for more information.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the

error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> <u>Error Message</u> to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Close

Closes the specified session and deallocates resources that it reserved.

error in (no error)

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.

status is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.

E322 code is the error or warning code. The default is 0. If status is

TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.

source describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

NI-DMM/Switch Express

Configures and acquires a signal using NI-DMM with National Instruments digital multimeters (DMMs) and PXI or SCXI switch modules.

Note NI 4050 and NI 4060 DMMs are not supported.

When you place this Express VI on the block diagram, the NI-DMM/Switch Express configuration page opens. To edit an existing configuration, double-click the NI-DMM/Switch Express VI.

Dialog Box Options Block Diagram Inputs Block Diagram Outputs Examples

Dialog Box Options

Parameter	Description
Data	Displays the measurement, formatted according to the function, range, and resolution.
Resolution string	Displays the absolute resolution.
Table data	Displays the measurement(s) per channel, formatted according to the function, range, and resolution. The first column lists the channel(s) being scanned, and the second column lists the last measured sample from the associated channel.
Chart data	Displays the measurements per channel.
Autoscale	Scales the amplitude axis of the chart. The default value is True.
	 Specifies if the chart indicator is visible. Contains the following options: True—The chart indicator is visible. False (default)—The chart indicator is not visible. The numeric indicator is visible when no switch modules are added to the Switch devices list. The table indicator is visible when some switch modules are added.
Configuration	 Contains the following options: Device—Contains the resource name of the device. Basic Parameters—Contains the following options: Measurement function—Specifies the measurement function used to acquire the measurement. Refer to the Devices section of the NI Digital Multimeters Help at ni.com/manuals for a list of valid ranges. The default value is DC Volts. Range method—Specifies whether auto

range is used. Contains the following options:

- Auto Range—Performs an auto range before acquiring the measurement.
- **Specify Range** (default)—Sets the range to the present **Auto Range** value and uses this range for all subsequent measurements until the measurement configuration is changed.
- Range value—Sets the range for the present measurement. The default value changes with the selected Measurement function. Range values are coerced up to the closest input range. Refer to the Devices section of the NI Digital Multimeters Help at ni.com/manuals for a list of valid ranges.
- **Range units**—Displays the units for the present measurement.
- Resolution digits—Sets the digits of resolution of the measurement. Resolution cannot be selected when you are auto ranging for frequency and period measurements on the DMM or for capacitance and inductance measurements on the NI 4072. To achieve better resolution for such measurements, use

Measurements to average. The default value is 6.5 digits.

- **Measurements to average**—Specifies the number of LC measurements that are averaged to produce one reading. The default value is 10.
- **Powerline frequency**—Specifies the powerline frequency in hertz. The default value is 60 Hz.

- Measurement-specific parameters—
 - Auto Zero—Specifies the Auto Zero mode.
 - Auto (default)—NI-DMM selects the Auto Zero setting based upon the configured Measurement function and resolution.
 - Off—Disables Auto Zero.
 - **On**—The DMM internally disconnects the input signal following each measurement and takes a zero reading. It then subtracts the zero reading from the preceding reading.
 - Note For NI 4065 devices, Auto Zero is always ON. Auto Zero is an integral part of the signal measurement phase and adds no extra time to the overall measurement.
 - ADC calibration—Specifies the ADC calibration setting.
 - Auto (default)—The DMM enables or disables ADC calibration based upon the configured **Measurement** function and resolution.
 - **Off**—The DMM does not compensate for changes to the gain.
 - **On**—The DMM measures an internal reference to calculate the correct gain for the measurement.
 - Min frequency (Hz)—Specifies the minimum expected frequency component of the input signal in hertz. This parameter affects the DMM only when you set Measurement function to AC measurements. NI-DMM uses this parameter to calculate the proper aperture for the measurement. The default value is

20.0.

- Offset compensated ohms—Enables or disables offset compensated ohms.
 - Note The NI 4065 is not supported.
 - **Off** (default)—Disables offset compensated ohms.
 - **On**—Enables offset compensated ohms.
- **Current source**—Specifies the current source provided during diode measurements. Refer to the *Devices* section of the *NI Digital Multimeters Help* at ni.com/manuals for valid ranges. The default value is 1 mA.
- Frequency voltage range method—
 Specifies whether the frequency voltage auto range is used.
 - Auto Range (default)—Configures the DMM to take an auto range measurement to calculate the voltage range before each frequency or period measurement.
 - **Specify Range**—Disables auto ranging. NI-DMM sets the voltage range to the last calculated voltage range.
- Frequency voltage range value—Sets the expected maximum amplitude of the input signal. The minimum peak-to-peak signal amplitude that can be detected is 10% of the specified voltage range. Refer to the *Devices* section of the *NI Digital Multimeters Help* at ni.com/manuals for valid ranges. The default value is 50 V.
- Frequency voltage range units—Displays the volts units for frequency and period measurements.

- Cable compensation type—Specifies the type of cable compensation that is used for the present range.
 - **None** (default)—No cable compensation.
 - **Open**—Open cable compensation.
 - Short—Short cable compensation.
 - **Open and Short**—Open and short cable compensation.
- Perform cable compensation—Performs cable compensation of the specified type and returns the corresponding parameters. The default value is False.
- Conductance—Specifies the active part (conductance) of the open cable compensation. The valid range is any real number >0. The default value, NaN, indicates that compensation has not taken place. If you change the range after performing the cable compensation, you may have to perform it again to obtain the compensation parameters for the present range.
- Susceptance—Specifies the reactive part (susceptance) of the open cable compensation. The valid range is any real number >0. The default value, NaN, indicates that compensation has not taken place. If you change the range after performing the cable compensation, you may have to perform it again to obtain the compensation parameters for the present range.
- Resistance—Represents the active part (resistance) of the short cable compensation. The valid range is any real number >0. The default value, NaN,

	 indicates that compensation has not taken place. If you change the range after performing the cable compensation, you may have to perform it again to obtain the compensation parameters for the present range. Reactance—Represents the reactive part (reactance) of the short cable compensation. The valid range is any real number >0. The default value, NaN, indicates that compensation has not taken place. If you change the range after performing the cable compensation, you may have to perform it again to obtain the compensation parameters for the present range.
Timing	 Contains the following options: Acquire—Configures the Acquisition mode. 1 Sample (default)—Configures a single-point acquisition. N Samples—Configures a finite multipoint acquisition. Continuous—Configures a continuous multipoint acquisition. Continuous—Configures a continuous multipoint acquisition. Samples per channel—Sets the number of measurements the DMM makes in each measurement sequence initiated by a sample trigger. Measurements are taken in an interleaved fashion. For example, if you set Samples per channel to 2 and scan three channels (ch0, ch1, and ch2), the NI-DMM/Switch Express VI returns one reading from each channel in the following order: ch0, ch1, ch2, ch0, ch1, ch2. The maximum number of measurements for a finite acquisition is (number of channels) × (Samples per channel). For continuous acquisitions, up to 100,000 points can be returned at once. The default value is 1.

	 Max time (s)—Specifies the maximum time in seconds allowed for the VI to complete acquisition. If the acquisition does <i>not</i> complete within this time interval, the timeout error is returned and no data is displayed. This behavior may occur if an external trigger has <i>not</i> been received or if the specified timeout is not enough for the acquisition to complete. The default value allows NI-DMM to calculate the timeout automatically. The default value is default –1 s. Sample interval (s)—Sets the amount of time in seconds the DMM waits between measurements. Specify a sample interval to add settling time between measurements or to decrease the measurement rate. Sample interval (s) only applies when acquiring multiple samples and when no switch modules are added to the Switch devices list or in the synchronous scanning of switch modules; in both of these cases, the sample trigger is set to Interval. When Sample interval (s) is set to 0, the DMM does not settle between measurements. When no switch modules are used, the default value is -1 and it ensures that the DMM settles for a recommended time. To configure the Sample interval when in the synchronous scanning of switch module settling tab page. The default Sample interval in that case will depend on your switch module settling time. Auto sample interval (s)—Specifies if Sample interval (s) is automatically selected by NI-DMM. True (default)—Allows NI-DMM to choose the Sample interval (s) value. False—Sets the Sample interval to the present value.
Switching	Contains the following options:

 Add device—Displays the Add Switch Device(s) dialog box, where you can select the additional switch module(s).
 Remove device—Removes the switch module you select from the Switch devices list.
 Switch devices—Contains the resource name of the switch module.
 Topologies—Lists the possible topologies for the associated switch module.
• Add channel—Displays the Add Switch Channel(s) dialog box, where you can select the additional channel(s) from which to acquire data on the switch module.
 Remove channel—Removes the channel(s) you select from the Scan list.
 Scan list—Specifies the scan list to use. NI- DAQmx uses this value to set the Scan List attribute.
 Up—Moves up the channel(s) you select from Scan list.
 Down—Moves down the channel(s) you select from Scan list.
 All channels—Selects or deselects all channels in the Scan list.
 Advanced—Displays the Advanced Configuration dialog box, where you can configure additional parameters.

Block Diagram Inputs

Parameter	Description
close	Used for optimization in a loop. If TRUE, closes all references and reinitializes the device the next time called. If FALSE, uses the current device handle on the next call. The default is appended to the control name.
error in	Describes error conditions that occur before this VI or function runs. If an error occurred before this VI runs, the VI passes the error in value to error out . This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out . Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
max time (s)	Specifies the timeout value for the Express VI configured for multipoint or continuous acquisition.

Block Diagram Outputs

Parameter	Description
signal out	Returns the data collected by the DMM.
U	Returns whether the measurement value is within the configured range.
error out	Contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.

Examples

LabVIEW users can use the LabVIEW Example Finder to search or browse examples. NI-DMM examples are classified by keyword, so you can search for a particular device or measurement function.

To browse the NI-DMM examples available in LabVIEW, launch LabVIEW, click **Find Examples**, and navigate to **Hardware Input and Output»Modular Instruments»NI-DMM (Digital Multimeters)**.

You can find the installed locations of example programs in the NI-DMM Readme File.

niDMM Property Node

The niDMM Property Node is used to set, get, or check properties.

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Configuration

Owning Palette: <u>NI-DMM</u>

Use the NI-DMM Configuration VIs for hardware-specific configuration and control.

Palette Object	Description
<u>niDMM</u> <u>Config</u> <u>Measurement</u>	Specifies the measurement resolution in digits or in absolute units. This VI is polymorphic. To change the selected instance of this polymorphic VI, right-click the VI and choose Select Type followed by Resolution in Digits or Absolute Resolution.
<u>niDMM</u> <u>Configure</u> <u>Multi Point</u>	Configures the properties for multipoint measurements.
<u>niDMM</u> <u>Configure</u> <u>Waveform</u> <u>Acquisition</u>	Configures the NI 4070/4071/4072 for waveform acquisitions.

Subpalette	Description
Measurement Options	Use the NI-DMM Measurement Options VIs for additional configuration functionality.
<u>Trigger</u>	Use the NI-DMM Trigger VIs to customize the triggering functionality for your application.
Actual Values	Use the NI-DMM Actual Values VIs to return optional values.

niDMM Config Measurement

Specifies the measurement resolution in digits or in absolute units. This VI is polymorphic. To change the selected instance of this polymorphic VI, right-click the VI and choose **Select Type** followed by Resolution in Digits or Absolute Resolution.

Use the pull-down menu to select an instance of this VI.

Select an instance

niDMM Configure Measurement Digits

Configures the common properties of the measurement.

These properties include Function, Range, and Digits Resolution.

Supported Devices: NI 4050, NI 4060, NI 4065, NI 4070, NI 4071, NI 4072



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Function specifies the measurement function used to acquire the measurement. NI-DMM sets the Function property to this value.

Resolution in Digits specifies the resolution of the measurement in digits. This parameter is ignored when Range is set to AUTO RANGE ON (-1.0) or AUTO RANGE ONCE (-3.0). The default is 5.5 Digits

NI-DMM sets the Digits Resolution property to this value.

M **Note** NI-DMM ignores this parameter for capacitance and inductance measurements on the NI 4072. To achieve better resolution for such measurements, use the Number of LC Measurements to Average property.

Range specifies the range for the measurement. Sets the range for the function specified in the **Function** control. Range values are coerced up to the closest input range.

Refer to the <u>Device Overview</u> in the *Digital Multimeters Help* for a list of valid ranges. NI-DMM sets the <u>Range</u> property to this value. The default is 0.02 V.



Note The NI 4050, NI 4060, and NI 4065 only support Auto Range when the trigger and sample trigger are set to IMMEDIATE.

AUTO (-1.0) NI-DMM performs an Auto Range before acquiring

RANGE ON		the measurement.
AUTO RANGE OFF	(-2.0)	NI-DMM sets the Range to the current <u>Auto Range</u> <u>Value</u> and uses this range for all subsequent measurements until the measurement configuration is changed.
AUTO RANGE ONCE	(-3.0)	NI-DMM performs an Auto Range before acquiring the next measurement. The <u>Auto Range Value</u> is stored and used for all subsequent measurements until the measurement configuration is changed.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Measurement Absolute

Configures the common properties of the measurement. These properties include <u>Function</u>, <u>Range</u>, and <u>Absolute Resolution</u>.

Supported Devices: NI 4050, NI 4060, NI 4065, NI 4070, NI 4071, NI 4072



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Function specifies the measurement function used to acquire the measurement. NI-DMM sets the Function property to this value.

Resolution specifies the absolute resolution of the measurement. This parameter is ignored when Range is set to AutoRange ON or AutoRange ONCE. (default 0.001V)

NI-DMM sets the Absolute Resolution property to this value.

Range specifies the range for the measurement. Sets the range for the function specified in the **Function** control. Range values are coerced up to the closest input range.

Refer to the <u>Device Overview</u> in the *Digital Multimeters Help* for a list of valid ranges. NI-DMM sets the <u>Range</u> property to this value. The default is 0.02 V.

Note The NI 4050, NI 4060, and NI 4065 only support Auto Range when the trigger and sample trigger are set to IMMEDIATE.

AUTO RANGE ON	NI-DMM performs an Auto Range before acquiring the measurement.
AUTO RANGE OFF	NI-DMM sets the Range to the current <u>Auto Range</u> <u>Value</u> and uses this range for all subsequent measurements until the measurement configuration is changed.

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	(-3.0)	NI-DMM performs an Auto Range before acquiring
RANGE		the next measurement. The <u>Auto Range Value</u> is
ONCE		stored and used for all subsequent measurements
		until the measurement configuration is changed.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.

source describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Waveform Acquisition

Configures the NI 4070/4071/4072 for waveform acquisitions.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Function specifies the measurement function used in a waveform acquisition.

NI-DMM sets the Function property to this value.

WAVEFORM VOLTAGE (default)	1003	Waveform Voltage
WAVEFORM CURRENT	1004	Waveform Current

Rate specifies the rate of the acquisition in samples per second.

NI-DMM sets the <u>Waveform Rate</u> property to this value. The valid rate is 10.0 - 1,800,000 S/s. Values are coerced to the closest integer divisor of 1,800,000. The default value is 1,800,000.

Waveform Points specifies the number of points to acquire before the waveform acquisition completes.

NI-DMM sets the <u>Waveform Points</u> property to this value. To calculate the maximum and minimum number of **Waveform Points** that you can acquire in one acquisition, refer to <u>Waveform</u> <u>Acquisition Measurement Cycle</u>. The default value is 500.

Range specifies the expected maximum amplitude of the input signal and sets the range for the measurement function.

NI-DMM sets the <u>Range</u> property to this value. Range values are coerced up to the closest input range. The default value is 10.0.

Auto-ranging is not supported during waveform acquisitions.

For valid ranges, refer to the <u>Devices</u> section of the *NI Digital Multimeters Help*.

error in (no error) describes error conditions that occur before this

VI runs. If an error occurred before this VI runs, the VI passes the **error in** value to **error out**. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in **error out**. Use <u>niDMM</u> <u>Error Message</u> to display the description of the error code. Use **error in** and **error out** to check errors and to specify execution order by wiring **error out** from one node to **error in** of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

Measurement Options

Owning Palette: Configuration

Use the NI-DMM Measurement Options VIs for additional configuration functionality.

Palette Object	Description
niDMM Configure Powerline Frequency	Specifies the powerline frequency.
<u>niDMM</u> <u>Configure</u> <u>Auto Zero</u>	Configures the DMM for auto zero. When Auto Zero is ON, the DMM internally disconnects the input and takes a zero reading. It then subtracts the zero reading from the measurement. This prevents offset voltages present on the input circuitry of the DMM from affecting measurement accuracy. When Auto Zero is OFF, the DMM does not compensate for zero reading offset.
niDMM Configure ADC Calibration	(NI 4070/4071/4072 only) Allows the DMM to compensate for gain drift since the last external or self-calibration. When ADC Calibration is ON, the DMM measures an internal reference to calculate the correct gain for the measurement. When ADC Calibration is OFF, the DMM does not compensate for changes to the gain.
<u>niDMM</u> <u>Configure</u> <u>Offset</u> <u>Comp</u> <u>Ohms</u>	(NI 4070/4071/4072 only) Allows the DMM to compensate for voltage offsets in resistance measurements. When Offset Compensated Ohms is enabled, the DMM measures the resistance twice (once with the current source on and again with it turned off). Any voltage offset present in both measurements is cancelled out. Offset Compensated Ohms is useful when measuring resistance values less than 10 kOhms.
niDMM Configure AC Bandwidth	Configures the Min Frequency and Max Frequency properties that the DMM uses for AC measurements.

niDMM Configure Frequency Voltage Range	(NI 4070/4071/4072 only) Specifies the expected maximum amplitude of the input signal for frequency and period measurements.
niDMM Configure Current Source	Configures the current source for diode measurements. The NI 4050 and NI 4060 are not supported.
<u>niDMM</u> <u>Configure</u> <u>Waveform</u> <u>Coupling</u>	(NI 4070/4071/4072 only) Configures instrument coupling for voltage waveforms.

Subpalette	Description
and	Use the NI-DMM Capacitance and Inductance VIs for control of the inductance and capacitance capabilities on the NI 4072.
<u>Temperature</u>	Use the NI-DMM Temperature VIs to configure for temperature measurements.

Capacitance and Inductance

Owning Palette: Measurement Options

Use the NI-DMM Capacitance and Inductance VIs for control of the inductance and capacitance capabilities on the NI 4072.

Palette Object	Description
niDMM Configure Cable Comp Type	(NI 4072) Sets the <u>Cable Compensation Type</u> property for the current capacitance/inductance mode range.
niDMM Configure Open Cable Comp Values	(NI 4072 only) Configures the <u>Open Cable Comp</u> <u>Conductance</u> and <u>Open Cable Comp Susceptance</u> properties.
niDMM Configure Short Cable Comp Values	(NI 4072 only) Configures the <u>Cable Comp Resistance</u> and <u>Short Cable Comp Reactance</u> properties.
niDMM Perform Open Cable Comp	(NI 4072 only) Performs the open cable compensation measurements for the current capacitance/inductance range, and returns open cable compensation Conductance and Susceptance values.
niDMM Perform Short Cable Comp	(NI 4072 only) Performs the short cable compensation measurements for the current capacitance/inductance range and returns short cable compensation Resistance and Reactance values. This VI returns an error if the value of the Function property is not set to CAPACITANCE (1005) or INDUCTANCE (1006).
niDMM Configure Cable Comp Type

(NI 4072) Sets the <u>Cable Compensation Type</u> property for the current capacitance/inductance mode range.

Cable Comp Type error in (no error)

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- **Cable Comp Type** specifies the type of cable compensation that is used for the current range.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- instrument handle out returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and

select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Open Cable Comp Values

(NI 4072 only) Configures the <u>Open Cable Comp Conductance</u> and <u>Open</u> <u>Cable Comp Susceptance</u> properties.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- **Susceptance** specifies the open cable compensation susceptance.
- **Conductance** specifies the open cable compensation conductance.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error

information. Otherwise, it describes the error status that this VI produces. Right-click the **error out** indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Short Cable Comp Values

(NI 4072 only) Configures the <u>Cable Comp Resistance</u> and <u>Short Cable</u> <u>Comp Reactance</u> properties.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- **Reactance** specifies the short cable compensation reactance.
- **Resistance** specifies the short cable compensation resistance.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information

about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.

niDMM Perform Open Cable Comp

(NI 4072 only) Performs the open cable compensation measurements for the current capacitance/inductance range, and returns open cable compensation **Conductance** and **Susceptance** values.

This VI returns an error if the value of the <u>Function</u> property is not set to CAPACITANCE or INDUCTANCE. You can use the return values of this VI as inputs to <u>niDMM Configure Open Cable Comp Values</u>.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

status is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.

- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Conductance** is the measured value of open cable compensation

conductance.

- **Susceptance** is the measured value of open cable compensation susceptance.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **Source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Perform Short Cable Comp

(NI 4072 only) Performs the short cable compensation measurements for the current capacitance/inductance range and returns short cable compensation **Resistance** and **Reactance** values. This VI returns an error if the value of the Function property is not set to CAPACITANCE (1005) or INDUCTANCE (1006).

You can use the return values of this VI as inputs to <u>niDMM Configure</u> <u>Short Cable Comp Values</u>.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

- **Resistance** is the measured value of short cable compensation resistance.
- **Reactance** is the measured value of short cable compensation reactance.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

Temperature

Owning Palette: Measurement Options

Use the NI-DMM Temperature VIs to configure for temperature measurements.

Palette Object	Description			
niDMM Configure Transducer Type	Configures the transducer type.			
niDMM Configure Thermocouple	Configures the thermocouple type and reference junction type for a chosen thermocouple.			
niDMM Configure Fixed Reference Junction	Configures the fixed reference junction temperature for a thermocouple with a fixed reference junction type.			
niDMM Configure RTD Type	Configures the RTD Type and RTD Resistance parameters for an RTD.			
niDMM Configure RTD Custom	Configures the A, B, and C parameters for a custom RTD.			
niDMM Configure Thermistor Type	Configures the thermistor type.			
niDMM Configure Thermistor Custom	Configures the A, B, and C parameters for a custom thermistor.			

niDMM Configure Transducer Type

Configures the transducer type.

instrument handle and a second second

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Transducer Type specifies the type of device used to measure the temperature. NI-DMM uses this value to set the Transducer Type property. The default is Thermocouple.

Thermocouple (1)	Performs thermocouple measurements.
Thermistor (2)	Performs thermistor measurements.
2-Wire RTD (3)	Performs 2-wire RTD measurements.
4-Wire RTD (4)	Performs 4-wire RTD measurements.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

error out contains error information. If **error in** indicates that an error occurred before this VI ran, **error out** contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the **error out** indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.

niDMM Configure Thermocouple

Configures the thermocouple type and reference junction type for a chosen thermocouple.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- Thermocouple Type specifies the type of thermocouple used to measure the temperature. NI-DMM uses this value to set the Thermocouple Type property. The default is J (6).
 - **B** (1) Thermocouple type B
 - **E** (4) Thermocouple type E

J (6) Thermocouple type J

- K (7) Thermocouple type K
- N (8) Thermocouple type N
- **R** (9) Thermocouple type R
- **S** (10) Thermocouple type S
- T (11) Thermocouple type T
- **Reference Junction Type** specifies the type of reference junction to be used in the reference junction compensation of a thermocouple measurement. NI-DMM uses this value to set the Reference Junction Type property. The only supported value is Fixed (2).
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next

node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Fixed Reference Junction

Configures the fixed reference junction temperature for a thermocouple with a fixed reference junction type.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Fixed Reference Junction specifies the reference junction temperature when a thermocouple with a fixed reference junction type is used to take the temperature measurement. The units are degrees Celsius. NI-DMM uses this value to set the Fixed Reference Junction property. The default is 25 °C.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an

error occurred before this VI ran, **error out** contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the **error out** indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **Source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure RTD Type

Configures the RTD Type and RTD Resistance parameters for an RTD.

instrument handle www.instrument handle out RTD Type RTD Resistance error in (no error)

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

RTD Type specifies the type of RTD used to measure temperature. NI-DMM uses this value to set the RTD Type property. The default value is Pt3851 (2).

Custom (0)	Performs Callendar-Van Dusen RTD scaling with the user-specified A, B, and C coefficients.	
Pt3750Performs scaling for a Pt3750 RTD.(1)		
Pt3851 (2)	Performs scaling for a Pt3851 RTD.	
Pt3911 (3)	Performs scaling for a Pt3911 RTD.	
Pt3916 (4)	Performs scaling for a Pt3916 RTD.	
Pt3920 (5)	Performs scaling for a Pt3920 RTD.	
Pt3928 (6)	Performs scaling for a Pt3928 RTD.	

- **RTD Resistance** specifies the RTD resistance at 0 degrees Celsius. NI-DMM uses this value to set the RTD Resistance property. The default is 100 ohms.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u>

Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure RTD Custom

Configures the A, B, and C parameters for a custom RTD.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- A specifies the Callendar-Van Dusen A coefficient for RTD scaling when RTD Type parameter is set to Custom in the <u>niDMM</u> <u>Configure RTD Type</u>. NI-DMM uses this value to set the RTD A property.
- **B** specifies the Callendar-Van Dusen B coefficient for RTD scaling when RTD Type parameter is set to Custom in the <u>niDMM</u> <u>Configure RTD Type</u>. NI-DMM uses this value to set the RTD B property.
- C specifies the Callendar-Van Dusen C coefficient for RTD scaling when RTD Type parameter is set to Custom in the <u>niDMM</u> <u>Configure RTD Type</u>. NI-DMM uses this value to set the RTD C property.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE,

code is 0 or a warning code.

- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Thermistor Type

Configures the thermistor type.

Instrument handle Thermistor Type error in (no error)

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Thermistor Type specifies the type of thermistor used to measure the temperature. NI-DMM uses this value to set the Thermistor Type property. The default is 44006 (2).

Performs Steinhart-Hart thermistor scaling with the user-specified A, B, and C coefficients.	
Performs scaling for an Omega Series 44004 thermistor.	
Performs scaling for an Omega Series 44006 thermistor.	
Performs scaling for an Omega Series 44007 thermistor.	

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.

- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Thermistor Custom

Configures the A, B, and C parameters for a custom thermistor.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- A specifies the Steinhart-Hart A coefficient for thermistor scaling when Thermistor Type is set to Custom in the <u>niDMM Configure</u> <u>Thermistor Type</u>. NI-DMM uses this value to set the Thermistor A property.
- **B** specifies the Steinhart-Hart B coefficient for thermistor scaling when Thermistor Type is set to Custom in the <u>niDMM Configure</u> <u>Thermistor Type</u>. NI-DMM uses this value to set the Thermistor B property.
- **C** specifies the Steinhart-Hart C coefficient for thermistor scaling when Thermistor Type is set to Custom in the <u>niDMM Configure</u> <u>Thermistor Type</u>. NI-DMM uses this value to set the Thermistor C property.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> <u>Error Message</u> to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE,

code is 0 or a warning code.

- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Powerline Frequency

Specifies the powerline frequency.

NI-DMM sets the <u>Powerline Frequency</u> property to this value. The NI 4060 and NI 4050 use this value to select an aperture time to reject powerline noise by selecting the appropriate internal sample clock and filter. The NI 4065 and NI 4070/4071/4072 use this value to select a timebase for setting the <u>Aperture Time</u> property in powerline cycles (PLCs).

After configuring **Powerline Frequency**, set the <u>Aperture Time Units</u> property to PLCs. When setting the <u>Aperture Time</u> property, select the number of PLCs for the Powerline Frequency. For example, if Powerline Frequency = 50 Hz (or 20ms) and aperture time in PLCs = 5, then aperture time in Seconds = 20ms * 5 PLCs = 100 ms. Similarly, if Powerline Frequency = 60 Hz (or 16.667 ms) and aperture time in PLCs = 6, then aperture time in Seconds = 16.667 ms * 6 PLCs = 100 ms.

Note When using a resolution of 6.5 digits on the NI 4065 and NI 4070/4071/4072, 50 Hz and 60 Hz noise will be rejected automatically. This is due to the selection of default aperture times on the devices, which appropriately filter out noise.

instrument handle ~	NIDMM instrument handle out
error in (no error) • Powerline Frequency -	error out
romenine rrequercy	

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Powerline Frequency specifies the powerline frequency in hertz.

NI-DMM sets the <u>Powerline Frequency</u> property to this value.

50 HERTZ 50 Hz 60 HERTZ 60 Hz

Note You should set this control to the frequency of the AC power line (for 400 Hz power line use the 50 Hz setting).

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the

error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> <u>Error Message</u> to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Auto Zero

Configures the DMM for auto zero. When **Auto Zero** is ON, the DMM internally disconnects the input and takes a zero reading. It then subtracts the zero reading from the measurement. This prevents offset voltages present on the input circuitry of the DMM from affecting measurement accuracy. When **Auto Zero** is OFF, the DMM does not compensate for zero reading offset.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Auto Zero specifies the Auto Zero setting.

ON enables Auto Zero for each measurement. ONCE enables Auto Zero before the next measurement. The **Auto Zero** value is stored and used in subsequent measurements until the device is reconfigured. OFF disables **Auto Zero**. If you set **Auto Zero** to AUTO, NI-DMM determines whether to enable Auto Zero based on the measurement function that you configure.

If you configure the NI 4070/4071/4072 for a 6 1/2 digit and greater resolution DC measurement, NI-DMM sets **Auto Zero** to ON. For all other DC measurement configurations on the NI 4070/4071/4072, NI-DMM sets **Auto Zero** to ONCE. For all AC measurements or waveform acquisitions on the NI 4070/4071/4072, NI-DMM sets **Auto Zero** to OFF.

NI 4050/4060 devices, **Auto Zero** is set to OFF when AUTO is selected.

For NI 4065 devices, **Auto Zero** is always ON. Auto Zero is an integral part of the signal measurement phase and adds no extra time to the overall measurement.

Auto (default)		NI-DMM chooses the Auto Zero setting based on the configured function and resolution.	
Off	0	Disables Auto Zero.	

		Note The NI 4065 does <i>not</i> support this setting.	
On	1	 The DMM internally disconnects the input signal following each measurement and takes a zero reading. It then subtracts the zero reading from the preceding reading. Note For NI 4065 devices, Auto Zero is always 	
		ON. Auto Zero is an integral part of the signal measurement phase and adds no extra time to the overall measurement.	
Once	2	following each measurement and takes a zero reading. It then subtracts the zero reading from the preceding reading.	
		Note The NI 4060/4065 does <i>not</i> support this setting.	

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure ADC Calibration

(NI 4070/4071/4072 only) Allows the DMM to compensate for gain drift since the last external or self-calibration. When **ADC Calibration** is ON, the DMM measures an internal reference to calculate the correct gain for the measurement. When **ADC Calibration** is OFF, the DMM does not compensate for changes to the gain.

instrument handle	m instrument handle out
ADC Calibration	error out

instrument handle identifies a particular instrument calibration session.

You obtain this session handle from <u>niDMM Initialize External Cal</u>.

ADC Calibration specifies the ADC calibration setting.

NI-DMM sets the <u>ADC Calibration</u> property to this value. ON enables ADC calibration. OFF disables ADC calibration. If you set the value to AUTO, NI-DMM determines whether to enable ADC calibration based on the measurement function and resolution that you configure. If you configure the NI 4070/4071/4072 for a 6 1/2 digit and greater resolution DC measurement, NI-DMM enables ADC calibration. For all other measurement configurations, NI-DMM disables ADC calibration.

ON	-1.0	The DMM measures an internal reference to calculate the correct gain for the measurement.	
OFF	0	The DMM does not compensate for changes to the gain.	
AUTO		The DMM enables or disables ADC calibration based on the configured function and resolution.	

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next

node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Offset Comp Ohms

(NI 4070/4071/4072 only) Allows the DMM to compensate for voltage offsets in resistance measurements. When **Offset Compensated Ohms** is enabled, the DMM measures the resistance twice (once with the current source on and again with it turned off). Any voltage offset present in both measurements is cancelled out. **Offset Compensated Ohms** is useful when measuring resistance values less than 10 kOhms.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Offset Compensated Ohms enables or disables Offset Compensated Ohms.

NI-DMM sets the <u>Offset Compensated Ohms</u> property to this value. The default is OFF.

OFFSET COMP OHMS OFF	0	Disables Compensated Ohms .
OFFSET COMP OHMS ON		Enables Offset Compensated Ohms.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

Status is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.

code is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE,

code is 0 or a warning code.

- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure AC Bandwidth

Configures the <u>Min Frequency</u> and <u>Max Frequency</u> properties that the DMM uses for AC measurements.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Min Frequency specifies the minimum expected frequency component of the input signal in hertz.

This parameter affects the DMM only when you set the <u>Function</u> property to AC measurements. NI-DMM uses this parameter to calculate the proper aperture for the measurement. NI-DMM sets the <u>Min Frequency</u> property to this value. The valid range is 1 Hz-300 kHz for the NI 4070/4071/4072, 10 Hz–100 kHz for the NI 4065, and 20 Hz–25 kHz for the NI 4050 and NI 4060.

Max Frequency specifies the maximum expected frequency component of the input signal in hertz within the device limits. This parameter is used only for error checking and verifies that the value of this parameter is less than the maximum frequency of the device.

This parameter affects the DMM only when you set the <u>Function</u> property to AC measurements. NI-DMM sets the <u>Max Frequency</u> property to this value. The valid range is 1 Hz-300 kHz for the NI 4070/4071/4072, 10 Hz–100 kHz for the NI 4065, and 20 Hz–25 kHz for the NI 4050 and NI 4060.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next

node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
niDMM Configure Frequency Voltage Range

(NI 4070/4071/4072 only) Specifies the expected maximum amplitude of the input signal for frequency and period measurements.

instrument handle ************************************
error in (no error)
Frequency Voltage Range

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Frequency Voltage Range sets the expected maximum amplitude of the input signal.

Refer to the <u>NI 4070</u>, <u>NI 4071</u>, and <u>NI 4072</u> topics for a list of valid values. NI-DMM sets the <u>Frequency Voltage Range</u> property to this value. The minimum peak-to-peak signal amplitude that can be detected is 10% of the specified **Frequency Voltage Range**.

Range	Configures the DMM to take an Auto Range measurement to calculate the voltage range before each frequency or period measurement.
	Disables Auto Ranging. NI-DMM sets the voltage range to the last calculated voltage range.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

Status is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error

occurred before this VI ran. The default is FALSE.

- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Current Source

Configures the current source for diode measurements. The NI 4050 and NI 4060 are not supported.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Current Source specifies the current source provided during diode measurements.

For valid ranges on the NI 4065, NI 4070, NI 4071, or NI 4072, refer to the <u>NI 4065</u>, <u>NI 4070</u>, <u>NI 4071</u>, or <u>NI 4072</u> topics. NI-DMM sets the <u>Current Source</u> property to this value.

1 μΑ	1 MICROAMP	0.000001	NI 4070/4071/4072 only
10 µA	10 MICROAMP	0.000010	NI 4070/4071/4072 only
100 µA	100 MICROAMP	0.000100	NI 4070/4071/4072 and NI 4065
1 mA (default)	1 MILLIAMP	0.001000	NI 4070/4071/4072 and NI 4065

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> <u>Error Message</u> to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

Status is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.

code is the error or warning code. The default is 0. If **status** is

TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.

- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Waveform Coupling

(NI 4070/4071/4072 only) Configures instrument coupling for voltage waveforms.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Coupling selects DC or AC coupling.

NI-DMM sets the <u>Waveform Coupling</u> property to this value.

AC coupling		
DC coupling (default)	1	

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

Trigger

Owning Palette: Configuration

Use the NI-DMM Trigger VIs to customize the triggering functionality for your application.

Palette Object	Description
niDMM Configure Trigger	Configures the DMM trigger source and trigger delay.
<u>niDMM Send</u> Software Trigger	Sends a command to trigger the DMM.
niDMM Configure Trigger Slope	Sets the <u>Trigger Slope</u> property to either rising edge (positive) or falling edge (negative) polarity.
niDMM Configure Sample Trigger <u>Slope</u>	Sets the <u>Sample Trigger Slope</u> property to either rising edge (positive) or falling edge (negative) polarity.
niDMM Configure Meas Complete Dest	Specifies the destination of the DMM Measurement Complete (MC) signal.
niDMM Configure Meas Complete Slope	Sets the Measurement Complete signal to either rising edge (positive) or falling edge (negative) polarity.

niDMM Configure Trigger

Configures the DMM trigger source and trigger delay.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Trigger Source specifies the trigger source that initiates the acquisition.

NI-DMM sets the <u>Trigger Source</u> property to this value. NI-DMM configures the DMM to wait until <u>niDMM Send Software Trigger</u> is called before triggering the DMM.

Trigger Delay (sec) specifies the time the DMM waits after it has received a trigger before taking a measurement.

NI-DMM sets the <u>Trigger Delay</u> property to this value. By default, **Trigger Delay** is -1, which means the DMM waits an appropriate settling time before taking the measurement. On the NI 4060, if you set **Trigger Delay** to 0, the DMM does not settle before taking the measurement. The NI 4065 and NI 4070/4071/4072 use the value specified in **Trigger Delay** as additional settling time.



Note When using the NI 4050, **Trigger Delay** must be set to auto delay (-1).

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

status is TRUE (X) if an error occurred before this VI ran or

FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.

- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **Source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Send Software Trigger

Sends a command to trigger the DMM.

Use this VI if you have configured either the <u>Trigger Source</u> or <u>Sample</u> <u>Trigger</u> properties. If the Trigger Source or Sample Trigger properties are set to EXTERNAL or TTL*n*, you can use this VI to override the trigger source that you configured and trigger the NI 4065 and NI 4070/4071/4072.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error

information. Otherwise, it describes the error status that this VI produces. Right-click the **error out** indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Meas Complete Dest

Specifies the destination of the DMM Measurement Complete (MC) signal.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Measurement Complete Destination specifies the destination of Measurement Complete signal. This signal is issued when the DMM completes a single measurement. This signal is commonly referred to as Voltmeter Complete.

NI-DMM sets the <u>Measurement Complete Destination</u> property to this value.

Note To determine which values are supported by each

- device, refer to the <u>LabVIEW Trigger Routing</u> section. error in (no error) describes error conditions that occur before this
 - VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> <u>Error Message</u> to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or

warning. The default is an empty string.

- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Trigger Slope

Sets the <u>Trigger Slope</u> property to either rising edge (positive) or falling edge (negative) polarity.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Slope specifies the polarity of the trigger signal on which the measurement is triggered for values of either Falling Edge or Rising Edge.

NI-DMM sets the <u>Trigger Slope</u> property to this value.

Rising Edge	0	The driver triggers on the rising edge of the trigger signal.
Falling Edge (default)	1	The driver triggers on the falling edge of the trigger signal.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or

warning. The default is an empty string.

- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Sample Trigger Slope

Sets the <u>Sample Trigger Slope</u> property to either rising edge (positive) or falling edge (negative) polarity.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Slope specifies the polarity of the trigger signal on which the measurement is triggered for values of either falling edge or rising edge.

NI-DMM sets the <u>Sample Trigger Slope</u> property to this value.

Rising Edge	0	The driver triggers on the rising edge of the trigger signal.
Falling Edge (default)	1	The driver triggers on the falling edge of the trigger signal.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or

warning. The default is an empty string.

- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Configure Meas Complete Slope

Sets the Measurement Complete signal to either rising edge (positive) or falling edge (negative) polarity.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Slope specifies the polarity of the signal that is generated.

NI-DMM sets the <u>Measurement Destination Slope</u> property to this value.

Rising Edge	0	The driver triggers on the rising edge of the trigger signal.
Falling Edge (default)	1	The driver triggers on the falling edge of the trigger signal.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **error out** contains error information. If **error in** indicates that an error occurred before this VI ran, **error out** contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the **error out** indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

Actual Values

Owning Palette: Configuration

Use the NI-DMM Actual Values VIs to return optional values.

Palette Object	Description
<u>niDMM Get</u> <u>Auto Range</u> <u>Value</u>	Returns the actual range that the DMM is using, even when Auto Ranging is off.
niDMM Get <u>Aperture</u> Time Info	Returns the DMM aperture time and aperture time units.
<u>niDMM Get</u> <u>Measurement</u> <u>Period</u>	Returns the Measurement Period, which is the amount of time it takes to complete one measurement with the current configuration. Use this VI right before you begin acquiring data, after you have completely configured the measurement and after all configuration VIs have been called.

niDMM Get Auto Range Value

Returns the actual range that the DMM is using, even when Auto Ranging is off.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **PIEL Auto Range Value** indicates the actual range the DMM is using.

Returns the value of the <u>Auto Range Value</u> property. The units of the returned value depend on the function.

error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error

information. Otherwise, it describes the error status that this VI produces. Right-click the **error out** indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Get Aperture Time Info

Returns the DMM aperture time and aperture time units.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Aperture Time** specifies the amount of time the DMM digitizes the input signal for a single measurement. This parameter does not include settling time.

Returns the value of the <u>Aperture Time</u> property. The units of this property depend on the <u>Aperture Time Units</u> property.

On the NI 4070/4071/4072, the minimum aperture time is 8.89 μ s,

and the maximum aperture time is 149 s. Any number of powerline cycles (PLCs) within the minimum and maximum ranges is allowed on the NI 4070/4071/4072.

On the NI 4065 the minimum aperture time is 333 μ s, and the maximum aperture time is 78.2 s. If setting the number of averages directly, the total measurement time is aperture time X the number of averages, which must be less than 72.8 s. The aperture times allowed are 333 s, 667 s, or multiples of 1.11 ms—for example 1.11 ms, 2.22 ms, 3.33 ms, and so on. If you set an aperture time other than 333 μ s, 667 μ s, or multiples of 1.11 ms, the value will be coerced up to the next supported aperture time.

On the NI 4060, when the powerline frequency is 60 Hz, the PLCs allowed are 1 PLC, 6 PLC, 12 PLC, and 120 PLC. When the powerline frequency is 50 Hz, the PLCs allowed are 1 PLC, 5 PLC, 10 PLC, and 100 PLC.

Aperture Time Units indicates the units of aperture time as powerline cycles (PLCs) or seconds.

Returns the value of the <u>Aperture Time Units</u> property.

SECONDS	0	Seconds
POWER LINE CYCLES	1	Powerline Cycles

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Get Measurement Period

Returns the Measurement Period, which is the amount of time it takes to complete one measurement with the current configuration. Use this VI right before you begin acquiring data, after you have completely configured the measurement and after all configuration VIs have been called.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- Measurement Period returns the number of seconds it takes to make one measurement. The first measurement in a multipoint acquisition requires additional settling time.

This VI does not include this additional time or any <u>Trigger Delay</u> associated with the first measurement. Time required for internal measurements, such as <u>Auto Zero</u>, is included.

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **Source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

Acquisition

Owning Palette: <u>NI-DMM</u>

Use the NI-DMM Acquisition VIs to acquire data from a measurement.

Palette Object	Description
<u>niDMM</u> <u>Read</u>	Acquires a single measurement and returns the measured value.
<u>niDMM</u> <u>Read</u> <u>Multi</u> <u>Point</u>	Acquires multiple measurements and returns an array of measured values.
niDMM <u>Read</u> Waveform	(NI 4070/4071/4072 only) Acquires a waveform and returns data as an array of values or as a waveform data type. This VI is polymorphic. To change the selected instance of this polymorphic VI, right-click the VI and choose Select Type followed by the waveform data or floating point array version of the VI.
<u>niDMM Is</u> <u>Over</u> <u>Range</u>	Takes a measurement value and determines if the value is a valid measurement or a value indicating that an overrange condition occurred.
<u>niDMM Is</u> <u>Under</u> Range	Takes a measurement value and determines if the value is a valid measurement or a value indicating that an underrange condition occurred.

Subpalette	Description
	Use the NI-DMM Fetch VIs to add low-level control to your application.

niDMM Read

Acquires a single measurement and returns the measured value.

instrument handle
INDERN
INSTRUMENT INSTRUMENT Handle out
error in (no error)
Maximum Time (msec)

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Maximum Time (msec) specifies the maximum time allowed for this VI to complete in milliseconds. If the VI does not complete within this time interval, the VI returns the NIDMM_ERROR_MAX_TIME_EXCEEDED error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete. The valid range is 0–86400000. The default value is TIME LIMIT AUTO (-1). The DMM calculates the timeout automatically.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **Measurement** is the measured value returned from the DMM.

- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Read Waveform

(NI 4070/4071/4072 only) Acquires a waveform and returns data as an array of values or as a waveform data type. This VI is polymorphic. To change the selected instance of this polymorphic VI, right-click the VI and choose **Select Type** followed by the waveform data or floating point array version of the VI.

The number of elements in the waveform array is determined by the values you specify for the **Waveform Points** parameter in <u>niDMM</u> <u>Configure Waveform Acquisition</u>.

Use the pull-down menu to select an instance of this VI.

Select an instance

niDMM Read Waveform (waveform data)

(NI 4070/4071/4072 only) Acquires a waveform and returns data as a waveform data type.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Maximum Time (msec) specifies the maximum time allowed for this VI to complete in milliseconds. If the VI does not complete within this time interval, the VI returns the NIDMM_ERROR_MAX_TIME_EXCEEDED error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete. The valid range is 0–86400000. The default value is TIME LIMIT AUTO (-1). The DMM calculates the timeout automatically.

Number To Read specifies the number of waveform points to return.

You specify the total number of points that the DMM acquires in the **Waveform Points** parameter of <u>niDMM Configure Waveform</u> <u>Acquisition</u>. The default value is 1.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

Status is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.

- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- Waveform Data is an array of measurement values stored in waveform data type.
- Actual Number indicates the number of measured values actually retrieved from the DMM.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Read Waveform (floating point array)

(NI 4070/4071/4072 only) Acquires a waveform and returns data as an array of values.

The number of elements in the waveform array is determined by the values you specify for the **Waveform Points** parameter in <u>niDMM</u> <u>Configure Waveform Acquisition</u>.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Number To Read specifies the number of waveform points to return.

You specify the total number of points that the DMM acquires in the **Waveform Points** parameter of <u>niDMM Configure Waveform</u> <u>Acquisition</u>. The default value is 1.

Maximum Time (msec) specifies the maximum time allowed for this VI to complete in milliseconds. If the VI does not complete within this time interval, the VI returns the NIDMM_ERROR_MAX_TIME_EXCEEDED error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete. The valid range is 0–86400000. The default value is TIME LIMIT AUTO (-1). The DMM calculates the timeout automatically.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Measurements Array** is an array of measurements.
- Actual Number indicates the number of measured values actually retrieved from the DMM.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Is Over Range

Takes a measurement value and determines if the value is a valid measurement or a value indicating that an overrange condition occurred.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Measurement is the measured value returned from the DMM.



Note If an overrange condition occurs, the **Measurement** value contains an IEEE-defined NaN (Not a Number) value.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Over Range?** returns whether the **Measurement** value is a valid measurement or a value indicating an overrange condition.

TRUE	1	The value indicates that an overrange condition occurred.
FAI SF	0	The value is a valid measurement.

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
niDMM Is Under Range

Takes a measurement value and determines if the value is a valid measurement or a value indicating that an underrange condition occurred.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Measurement is the measured value returned from the DMM.



Note If an underrange condition occurs, the **Measurement** value contains an IEEE-defined NaN (Not a Number) value.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

status is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.

- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Under Range?** returns whether the **Measurement** value is a valid

measurement or a value indicating an underrange condition.

TRUE		The value indicates that an underrange condition occurred.
FALSE	0	The value is a valid measurement.

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

Fetch

Owning Palette: Acquisition

Use the NI-DMM Fetch VIs to add low-level control to your application.

Palette Object	Description
<u>niDMM</u> Initiate	Initiates an acquisition. After you call this VI, the DMM leaves the Idle state and enters the Wait-For-Trigger state. If trigger is set to Immediate mode, the DMM begins acquiring measurement data.
<u>niDMM</u> <u>Fetch</u>	Returns the value from a previously initiated measurement.
niDMM Fetch Multi Point	Returns an array of values from a previously initiated multipoint measurement.
<u>niDMM</u> <u>Fetch</u> Waveform	(NI 4070/4071/4072 only) Returns an array of values from a previously initiated waveform acquisition. This VI is polymorphic. To change the selected instance of this polymorphic VI, right-click the VI and choose Select Type followed by the waveform data or floating point array version of the VI.
<u>niDMM</u> <u>Read</u> <u>Status</u>	Returns measurement backlog and acquisition status.
<u>niDMM</u> <u>Abort</u>	Aborts a previously initiated measurement and returns the DMM to the Idle state.
<u>niDMM</u> <u>Control</u>	Controls the DMM. Use this VI if you want a parameter change to be immediately reflected in the hardware. Use this VI before calling <u>niDMM Initiate</u> to make the initiate call as quickly as possible. Calling this VI while the DMM is taking measurements results in an error. After the DMM is finished taking measurements, calling this VI will make any unfetched data points unavailable. The NI 4050 and NI 4060 are not supported.

niDMM Initiate

Initiates an acquisition. After you call this VI, the DMM leaves the Idle state and enters the Wait-For-Trigger state. If trigger is set to Immediate mode, the DMM begins acquiring measurement data.

Use <u>niDMM Fetch</u>, <u>niDMM Fetch Multi Point</u>, or <u>niDMM Fetch Waveform</u> to retrieve the measurement data.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI

produces. Right-click the **error out** indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **Source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Fetch

Returns the value from a previously initiated measurement.

You must call <u>niDMM Initiate</u> before calling this VI.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Maximum Time (msec) specifies the maximum time allowed for this VI to complete in milliseconds. If the VI does not complete within this time interval, the VI returns the NIDMM_ERROR_MAX_TIME_EXCEEDED error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete. The valid range is 0–86400000. The default value is TIME LIMIT AUTO (-1). The DMM calculates the timeout automatically.

instrument handle out returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

status is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.

code is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.

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source describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

- **Measurement** is the measured value returned from the DMM.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Fetch Waveform

(NI 4070/4071/4072 only) Returns an array of values from a previously initiated waveform acquisition. This VI is polymorphic. To change the selected instance of this polymorphic VI, right-click the VI and choose **Select Type** followed by the waveform data or floating point array version of the VI.

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You must call <u>niDMM Initiate</u> before calling this VI.

Use the pull-down menu to select an instance of this VI.

Select an instance

niDMM Fetch Waveform (waveform data)

(NI 4070/4071/4072 only) Acquires an array of data from a waveform. This is a polymorphic VI that returns data as an array of values or as a waveform data type. To change the selected polymorphic VI, right-click the VI and choose **Select Type** followed by the waveform data or floating point array version of the VI.

You must call <u>niDMM Initiate</u> before calling this VI.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Number To Fetch specifies the number of waveform points to return.

You specify the total number of points that the DMM acquires in the **Waveform Points** parameter of <u>niDMM Configure Waveform</u> <u>Acquisition</u>. The default value is 1.

- Maximum Time (msec) specifies the maximum time allowed for this VI to complete in milliseconds. If the VI does not complete within this time interval, the VI returns the NIDMM_ERROR_MAX_TIME_EXCEEDED error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete. The valid range is 0–86400000. The default value is TIME LIMIT AUTO (-1). The DMM calculates the timeout automatically.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next

node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- Waveform Data is an array of measurement values stored in waveform data type.
- Actual Number indicates the number of measured values actually retrieved from the DMM.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Fetch Waveform (floating point array)

(NI 4070/4071/4072 only) Acquires an array of data from a waveform. This is a polymorphic VI that returns data as an array of values or as a waveform data type. To change the selected polymorphic VI, right-click the VI and choose **SelectType** followed by the waveform data or floating point array version of the VI.

You must call <u>niDMM Initiate</u> before calling this VI.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Number To Fetch specifies the number of waveform points to return.

You specify the total number of points that the DMM acquires in the **Waveform Points** parameter of <u>niDMM Configure Waveform</u> <u>Acquisition</u>. The default value is 1.

Maximum Time (msec) specifies the maximum time allowed for this VI to complete in milliseconds. If the VI does not complete within this time interval, the VI returns the NIDMM_ERROR_MAX_TIME_EXCEEDED error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete. The valid range is 0–86400000. The default value is TIME LIMIT AUTO (-1). The DMM calculates the timeout automatically.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next

node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Measurements** is an array of measurements.
- Actual Number indicates the number of measured values actually retrieved from the DMM.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Abort

Aborts a previously initiated measurement and returns the DMM to the Idle state.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Read Status

Returns measurement backlog and acquisition status.

Note The NI 4050 is not supported.

Use this VI to determine how many measurements are available before calling <u>niDMM Fetch</u>, <u>niDMM Fetch Multi Point</u> or <u>niDMM Fetch</u> <u>Waveform</u>..



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

Status is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.

- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Backlog** specifies the number of measurements available to be

read. If the backlog continues to increase, data is eventually overwritten, resulting in an error.

Note On the NI 4060, the **Backlog** does not increase when autoranging. On the NI 4065, the **Backlog** does not increase when Range is set to AUTO RANGE ON (-1), or before the first point is fetched when Range is set to AUTO RANGE ONCE (-3). These behaviors are due to the autorange model of the devices.

Acquisition State indicates status of the acquisition.

0 Running

1 Finished with **Backlog**

2 Finished with no Backlog

3 Paused

4 No acquisition in progress

error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.

status is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.

- code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Control

Controls the DMM. Use this VI if you want a parameter change to be immediately reflected in the hardware. Use this VI before calling <u>niDMM</u> <u>Initiate</u> to make the initiate call as quickly as possible. Calling this VI while the DMM is taking measurements results in an error. After the DMM is finished taking measurements, calling this VI will make any unfetched data points unavailable.

The NI 4050 and NI 4060 are not supported.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- **Control Action** is the action you want NI-DMM to perform. The only action currently supported is Commit, which commits to hardware all of the configured attributes associated with the session.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or

warning. The default is an empty string.

- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

Calibration

Owning Palette: <u>NI-DMM</u>

Use the NI-DMM Calibration VIs to perform a self-calibration or external calibration on the DMM.

Palette Object	Description	
	(NI 4070/4071/4072 only) Executes the self-calibration routine to maintain measurement accuracy.	

Subpalette	Description
	Use the NI-DMM External Calibration VIs to perform an external calibration on the DMM.
	Use the NI-DMM Calibration Utility VIs for optional functionality when performing a calibration.

niDMM Self Cal

(NI 4070/4071/4072 only) Executes the self-calibration routine to maintain measurement accuracy.



Note This VI calls <u>niDMM Reset</u>, and any configurations previous to the call will be lost. All properties will be set to their default values after the call returns.

<u>Details</u>



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI

produces. Right-click the **error out** indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.

Details

Refer to <u>Self-Calibration</u> for more information.

External Calibration

Owning Palette: Calibration

Use the NI-DMM External Calibration VIs to perform an external calibration on the DMM.

Palette Object	Description
niDMM Initialize	The following operations are performed if the Calibration Password is valid:
<u>External Cal</u>	- Creates a new session for external calibration to the device you specify for the Instrument Descriptor parameter.
	- Resets the device and prepares the EEPROM for new calibration coefficients.
	- Returns a ViSession handle that you use to identify the instrument in all calibration adjustments and post-adjustment verification steps.
niDMM Close External Cal	Performs the specified Action , closes the specified external calibration session obtained from niDMM Initialize External Cal, and deallocates resources that it reserved.
<u>niDMM Cal</u> Adjust Gain	Calibrates the gain coefficient for the supplied Function , Range , and Input Resistance .
<u>niDMM Cal</u> Adjust Offset	Calibrates the offset and Auto Zero offset for the supplied Function , Range , and Input Resistance .
<u>niDMM Cal</u> Adjust AC Filter	(NI 4070/4071/4072 only) Calibrates the filter coefficients used for AC measurements of the supplied Function and Range .
<u>niDMM Cal</u> <u>Adjust</u> Linearization	(NI 4065 only) Compensates for any non-linearities.
<u>niDMM Cal</u> <u>Adjust</u> <u>Miscellaneous</u>	Performs a specialized calibration step depending on the specified Type .
niDMM Cal	For the NI 4072 only, performs a specialized LC

Adjust LC calibration step depending on the specified **Stage**.

niDMM Initialize External Cal

The following operations are performed if the **Calibration Password** is valid:

- Creates a new session for external calibration to the device you specify for the **Instrument Descriptor** parameter.

- Resets the device and prepares the EEPROM for new calibration coefficients.

- Returns a ViSession handle that you use to identify the instrument in all calibration adjustments and post-adjustment verification steps.

Note The NI 4050 and NI 4060 are not supported.

Refer to the NI 4065 6¹/₂ Digit DMM Calibration Procedure, the NI 4070/4072 6¹/₂ Digit FlexDMM Calibration Procedure, or the NI 4071 7¹/₂-Digit FlexDMM Calibration Procedure before using this VI. This VI creates a new session the first time you call it for a device.

If you call this VI on the same resource, an error is returned. You should use <u>niDMM Close External Cal</u> to close a session obtained using this VI.

Details



Instrument Descriptor contains the resource name of the device to initialize.

The resource name is assigned in Measurement & Automation Explorer (MAX). Refer to <u>Related Documentation</u> for the *NI Digital Multimeters Getting Started Guide* for more information about configuring and testing the DMM in MAX. Valid Syntax:

- NI-DAQmx name
- DAQ::NI-DAQmx name[::INSTR]
- DAQ::Traditional NI-DAQ device number[::INSTR]
- IVI logical name

Caution All IVI names for the **Instrument Descriptor**, such as logical names or virtual names, are case-sensitive. If you use logical names, driver session names, or virtual names in

your program, you must make sure that the name you use matches the name in the IVI Configuration Store file exactly, without any variations in the case of the characters in the name.

Calibration Password specifies the password required to enable external calibration functionality. The maximum password string length is eight characters, excluding the termination character. "NI" is the factory-default password.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- instrument handle out returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.

status is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.

- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

Details

After opening a calibration session, the device cannot take valid measurements using this session until the device has been properly adjusted. Once the adjustment phase is complete, you can use this session to verify the new calibration constants. After verification, you have the option of saving the new calibration constants or reverting to the previous calibration constants by specifying the **Action** parameter in <u>niDMM Close External Cal</u>.

If you encounter a fatal error such as a power failure or system crash while performing an external calibration, you can call <u>niDMM Restore</u> <u>Last External Cal Constants</u> to return the device to a usable state.

niDMM Cal Adjust Linearization

(NI 4065 only) Compensates for any non-linearities.



instrument handle identifies a particular instrument calibration session.

You obtain this session handle from <u>niDMM Initialize External Cal</u>.

- **Function** specifies the calibration mode used to acquire the measurement. For valid modes, refer to the *NI* 4065 6 1/2 Digit *DMM Calibration Procedure*.
- **Range** specifies the range to calibrate.

For valid ranges, refer to the 4065 6 1/2 Digit DMM Calibration Procedure, the NI 4070/4072 6 1/2 Digit FlexDMM Calibration Procedure, or the NI 4071 7 1/2 Digit FlexDMM Calibration Procedure. Auto-ranging is not supported for calibration operations.

- **Expected Value** specifies the expected value of the measurement.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.

- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **Input Resistance** specifies the input resistance that the device uses. **Input Resistance** values are coerced up to the closest input resistance.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.

niDMM Cal Adjust Gain

Calibrates the gain coefficient for the supplied **Function**, **Range**, and **Input Resistance**.

Note The NI 4050 and NI 4060 are not supported.

Refer to the 4065 6½ Digit DMM Calibration Procedure, the NI 4070/4072 6½ Digit FlexDMM Calibration Procedure, or the NI 4071 7½–Digit FlexDMM Calibration Procedure before using this VI.



instrument handle identifies a particular instrument calibration session.

You obtain this session handle from <u>niDMM Initialize External Cal</u>.

- **Function** specifies the calibration mode used to acquire the measurement. For valid ranges, refer to the *NI* 4065 6 1/2 Digit *DMM Calibration Procedure*, the *NI* 4070/4072 6 1/2 Digit FlexDMM *Calibration Procedure*, or the *NI* 4071 7 1/2 Digit FlexDMM *Calibration Procedure*.
- **Range** specifies the range to calibrate.

For valid ranges, refer to the 4065 6 1/2 Digit DMM Calibration Procedure, the NI 4070/4072 6 1/2 Digit FlexDMM Calibration Procedure, or the NI 4071 7 1/2 Digit FlexDMM Calibration Procedure. Auto-ranging is not supported for calibration operations.

- **Expected Value** specifies the expected value of the measurement.
- **Input Resistance** specifies the input resistance that the device uses. **Input Resistance** values are coerced up to the closest input resistance.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u>

Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Cal Adjust Offset

Calibrates the offset and Auto Zero offset for the supplied **Function**, **Range**, and **Input Resistance**.

Note NI 4050 and NI 4060 are not supported.

Refer to the NI 4065 6¹/₂ Digit DMM Calibration Procedure, the NI 4070/4072 6¹/₂ Digit FlexDMM Calibration Procedure, or the NI 4071 7¹/₂-Digit FlexDMM Calibration Procedure before using this VI.



instrument handle identifies a particular instrument calibration session.

You obtain this session handle from <u>niDMM Initialize External Cal</u>.

Function specifies the calibration mode used to acquire the measurement. For valid modes, refer to the NI 4065 6 1/2 Digit DMM Calibration Procedure, the NI 4070/4072 6 1/2 Digit FlexDMM Calibration Procedure, or the NI 4071 7 1/2 Digit FlexDMM Calibration Procedure.

Range specifies the range to calibrate.

For valid ranges, refer to the 4065 6 1/2 Digit DMM Calibration Procedure, the NI 4070/4072 6 1/2 Digit FlexDMM Calibration Procedure, or the NI 4071 7 1/2 Digit FlexDMM Calibration Procedure. Auto-ranging is not supported for calibration operations.

- **Input Resistance** specifies the input resistance that the device uses. **Input Resistance** values are coerced up to the closest input resistance.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> <u>Error Message</u> to display the description of the error code. Use error in and error out to check errors and to specify execution

order by wiring **error out** from one node to **error in** of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Cal Adjust Miscellaneous

Performs a specialized calibration step depending on the specified **Type**.

Note The NI 4050 and NI 4060 are not supported.

Refer to the NI4065 6½ Digit DMM Calibration Procedure, the NI 4070/4072 6½ Digit FlexDMM Calibration Procedure, or the NI 4071 7½–Digit FlexDMM Calibration Procedure before using this VI.

instrument handle NUDMM instrument handle out
error in (no error)
error in (no error)

instrument handle identifies a particular instrument calibration session.

You obtain this session handle from <u>niDMM Initialize External Cal</u>.

Type specifies which of the miscellaneous calibration steps to perform.

Voltage Reference (default)	Calibrates the voltage reference.
Resistance Reference	Calibrates the resistance reference.
Internal Impedance	Calibrates the internal impedance.
2-Wire Leakage	Calibrates the 2-wire leakage resistance.
4-Wire Leakage	Calibrates the 4-wire leakage resistance.
Section	Updates calibration information and verifies calibration completeness.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **Source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
niDMM Cal Adjust LC

For the NI 4072 only, performs a specialized LC calibration step depending on the specified **Stage**.

Refer to the 4070/4072 6¹/₂ Digit FlexDMM Calibration Procedure before using this VI.



instrument handle identifies a particular instrument calibration session.

You obtain this session handle from <u>niDMM Initialize External Cal</u>.

Stage specifies which of the LC calibration steps to perform.

L & C Open (default)	Calibrates the open compensation.
L & C Short	Calibrates the short compensation.
L & C 25 Ω	Calibrates the 25 Ω resistance.
L & C 1 kΩ	Calibrates the 1 k Ω resistance.
L & C 5 kΩ	Calibrates the 5 k Ω resistance.
L & C 100 kΩ	Calibrates the 100 k Ω resistance.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.

- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Cal Adjust AC Filter

(NI 4070/4071/4072 only) Calibrates the filter coefficients used for AC measurements of the supplied **Function** and **Range**.

Refer to the 4070/4072 6¹/₂ Digit FlexDMM Calibration Procedure or the NI 4071 7¹/₂—Digit FlexDMM Calibration Procedure before using this VI.



instrument handle identifies a particular instrument calibration session.

You obtain this session handle from <u>niDMM Initialize External Cal</u>.

Function specifies the calibration mode used to acquire the measurement.

Range specifies the range to calibrate.

For valid ranges, refer to the 4065 6 1/2 Digit DMM Calibration Procedure, the NI 4070/4072 6 1/2 Digit FlexDMM Calibration Procedure, or the NI 4071 7 1/2 Digit FlexDMM Calibration Procedure. Auto-ranging is not supported for calibration operations.

- **Expected Value** specifies the expected value of the measurement.
- **Frequency** specifies the frequency of the input signal.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> <u>Error Message</u> to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

status is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.

- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Close External Cal

Performs the specified **Action**, closes the specified external calibration session obtained from niDMM Initialize External Cal, and deallocates resources that it reserved.



Note The NI 4050 and NI 4060 are not supported.

Refer to the NI 4065 6½ Digit DMM Calibration Procedure, the NI 4070/4072 6½ Digit FlexDMM Calibration Procedure, or the NI 4071 7½–Digit FlexDMM Calibration Procedure before using this VI.



instrument handle identifies a particular instrument calibration session.

You obtain this session handle from <u>niDMM Initialize External Cal</u>.

Action specifies whether the driver saves the updated calibration constants.

	Restores the calibration constants to what they were before you started the external calibration procedure.
(delault)	before you started the external calibration procedure.
Save	Saves the new calibration constants to the device.

These calibration constants are used for any subsequent measurements.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> <u>Error Message</u> to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.

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code is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.

- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

Calibration Utility

Owning Palette: Calibration

Use the NI-DMM Calibration Utility VIs for optional functionality when performing a calibration.

Palette Object	Description
<u>niDMM Get</u> <u>Cal Count</u>	Returns the calibration count for the specified type of calibration.
niDMM Get Cal Date and <u>Time</u>	Returns the date and time of the last calibration performed.
<u>niDMM Get</u> Last Cal Temp	Returns the temperature during the last calibration procedure.
niDMM Get Dev Temp	Returns the current temperature of the device.
niDMM Get External Cal Recommended Interval	Returns the recommended interval between external recalibration in months.
niDMM Get Self Cal Supported	Returns a Boolean value that expresses whether the DMM that you are using can perform self-calibration.
<u>niDMM Get</u> <u>Cal User</u> <u>Defined Info</u> <u>Max Size</u>	Returns the maximum string length that can be stored in the EEPROM.
<u>niDMM Get</u> <u>Cal User</u> <u>Defined Info</u>	Returns the user-defined calibration information stored in the EEPROM.
niDMM Restore Last External Cal Constants	Reverts the device to the calibration constants from the last complete external calibration. This VI recovers the hardware if a fatal system error occurs during an external or self-calibration procedure.
niDMM Set Cal Password	Changes the password required to enable external calibration functionality. The maximum password string

	length is eight characters, excluding the termination character. "NI" is the default password. A password is required for external calibration. Be sure to record the password in a secure location.
niDMM Set Cal <u>User Defined</u> Info	Stores the user-defined information in the EEPROM.

niDMM Get Cal Count

Returns the calibration count for the specified type of calibration.

Note The NI 4050 and NI 4060 are not supported.

instrument handle	Instrument handle out
Cal Type	
error in (no error)	error out

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Cal Type specifies the type of calibration performed (external or self-calibration).

Internal (default)		Self-Calibration
Note The NI 4065 does not support self-calibration.		
External	1	External Calibration

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or

warning. The default is an empty string.

- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **E332** Count is the number of times calibration has been performed.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Get Cal Date and Time

Returns the date and time of the last calibration performed.

Note The NI 4050 and NI 4060 are not supported.

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Cal Type specifies the type of calibration performed (external or self-calibration).

Internal (default)		Self-Calibration
Note The NI 4065 does not support self-calibration.		
External		External Calibration

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.

- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Month** indicates the month of the last calibration.
- **Day** indicates the day of the last calibration.
- **Year** indicates the year of the last calibration.
- **Hour** indicates the hour of the last calibration.
- **Minute** indicates the minute of the last calibration.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **Source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Get Dev Temp

Returns the current temperature of the device.

Note The NI 4050 and NI 4060 are not supported.

instrument handle *******	NIDMM assesses instrument handle out
error in (no error)	Temperature

instrument handle identifies a particular instrument session.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Temperature** returns the current temperature of the device.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and

select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Get Last Cal Temp

Returns the temperature during the last calibration procedure.

Note The NI 4050 and NI 4060 are not supported.

instrument handle	NIDMM	instrument handle out
Cal Type		- Temperature
error in (no error)		error out

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Cal Type specifies the type of calibration performed (external or self-calibration).

Internal (default)		Self-Calibration
Note The NI 4065 does not support self-calibration.		
External	1	External Calibration

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or

warning. The default is an empty string.

- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Temperature** returns the temperature during the last calibration.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Get Cal User Defined Info Max Size

Returns the maximum string length that can be stored in the EEPROM.

Note The NI 4050 and NI 4060 are not supported.

Use <u>niDMM Set Cal User Defined Info</u> to store user-defined information.



instrument handle identifies a particular instrument session.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- Max Size returns the value of maximum string length that can be stored in the EEPROM using <u>niDMM Set Cal User Defined Info</u>. The Max Size value is given in characters, but it does not include the termination character.

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Get Cal User Defined Info

Returns the user-defined calibration information stored in the EEPROM.

Note The NI 4050 and NI 4060 are not supported



instrument handle identifies a particular instrument session.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Info Buffer** returns the user-defined information stored in the EEPROM.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI

produces. Right-click the **error out** indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **Source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Set Cal User Defined Info

Stores the user-defined information in the EEPROM.

Use <u>niDMM Get Cal User Defined Info Max Size</u> to learn the maximum string size that is allowed. If the **Info** string size is larger than the maximum string size, NI-DMM stores as much of the information as possible, truncates the remainder, and returns a warning.

Note The NI 4050 and NI 4060 are not supported.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Info specifies the user-defined information to be stored in the EEPROM such as the operator who performed the calibration operation or system information.

Use <u>niDMM Get Cal User Defined Info Max Size</u> to learn the maximum string size that is allowed. If the **Info** string size is larger than the maximum string size, NI-DMM stores as much of the information as possible, truncates the remainder, and returns a warning.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.

code is the error or warning code. The default is 0. If **status** is

TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.

- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Get External Cal Recommended Interval

Returns the recommended interval between external recalibration in months.

Note The NI 4050 and NI 4060 are not supported.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.

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status is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.

- **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Months** returns the recommended number of months between external calibrations.

niDMM Get Self Cal Supported

Returns a Boolean value that expresses whether the DMM that you are using can perform self-calibration.



instrument handle identifies a particular instrument session.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Self Cal Supported?** returns whether self-calibration is supported for the device specified by the given session.

True 1	The DMM that you are using can perform self-calibration.
	The DMM that you are using cannot perform self- calibration.

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Restore Last External Cal Constants

Reverts the device to the calibration constants from the last complete external calibration. This VI recovers the hardware if a fatal system error occurs during an external or self-calibration procedure.



Note The NI 4050 and NI 4060 are not supported.

For the NI 4070/4071/4072 only, after calling this VI, you should use <u>niDMM Self Cal</u> before taking measurements with the device to readjust the device for temperature changes since the last external calibration.



instrument handle identifies a particular instrument session.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error

information. Otherwise, it describes the error status that this VI produces. Right-click the **error out** indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.

niDMM Set Cal Password

Changes the password required to enable external calibration functionality. The maximum password string length is eight characters, excluding the termination character. "NI" is the default password. A password is required for external calibration. Be sure to record the password in a secure location.

Note The NI 4050 and NI 4060 are not supported.



instrument handle identifies a particular instrument session.

- Old Password specifies the current password required to enable external calibration functionality. The maximum password string length is eight characters, excluding the termination character.
- **New Password** specifies the new password required to enable external calibration functionality. The maximum password string length is eight characters, excluding the termination character.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.

- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

Utility

Owning Palette: <u>NI-DMM</u>

Use the NI-DMM Utility functions for optional functionality in your application.

Palette Object	Description
<u>niDMM</u> <u>Reset</u>	Resets the instrument to a known state and sends initialization commands to the instrument. The initialization commands set instrument settings to the state necessary for the operation of the instrument driver.
<u>niDMM</u> <u>Self-</u> <u>Test</u>	Performs a self test on the DMM to ensure that the DMM is functioning properly. Self test does not calibrate the DMM.
niDMM Revision Query	Returns the revision numbers of the instrument driver and instrument firmware.
niDMM 4022 Control	Configures the NI 4022 Guard and Current Amplifier module. Supported Devices: NI PXI-4022

Subpalette	Description
	Use the NI-DMM IVI Utilities VIs to add IVI-inherent options to your application.

niDMM Reset

Resets the instrument to a known state and sends initialization commands to the instrument. The initialization commands set instrument settings to the state necessary for the operation of the instrument driver.



instrument handle identifies a particular instrument session.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information

about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Self-Test

Performs a self test on the DMM to ensure that the DMM is functioning properly. Self test does not calibrate the DMM.

This VI calls <u>niDMM Reset</u>, and any configurations previous to the call will be lost. All properties will be set to their default values after the call returns.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Self Test Result** contains the value returned from the instrument self test. Zero indicates success.

On the NI 4070/4072, the error code 1013 indicates that you should check the fuse and replace it, if necessary.

Note Self-test does not check the fuse on the NI 4065 and NI 4071. Hence, even if the fuse is blown on the NI 4065 or NI 4071, self-test does not return error code 1013.

Self Test Message contains the string returned from the instrument self-test. The array must contain at least 256 elements.

For the NI 4050 and NI 4060, the error codes returned for self-test failures include the following:

- NIDMM_ERROR_AC_TEST_FAILURE
- NIDMM_ERROR_DC_TEST_FAILURE
- NIDMM_ERROR_RESISTANCE_TEST_FAILURE

These error codes indicate that the DMM should be repaired.

For the NI 4065 and NI 4070/4071/4072, the error code returned for a self-test failure is NIDMM_ERROR_SELF_TEST_FAILURE. This error code indicates that the DMM should be repaired.

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Revision Query

Returns the revision numbers of the instrument driver and instrument firmware.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Instrument Driver Revision** returns a string containing the instrument driver software revision numbers.



Note The array must contain at least 256 elements ViChar[256].
Firmware Revision returns a string containing instrument firmware revision numbers.



Note The array must contain at least 256 elements ViChar[256].

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Disable

Places the instrument in a quiescent state where it has minimal or no impact on the system to which it is connected. If a measurement is in progress when this VI is called, the measurement is aborted.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.

status is TRUE (X) if an error occurred or FALSE

(checkmark) to indicate a warning or that no error occurred.

- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.

niDMM IVI Error Converter

Converts error codes from IVI instrument drivers to standard LabVIEW error codes. If an error is detected the VI builds the appropriate error cluster that is readable by one of the error handlers supplied with LabVIEW.



- instrument handle The instrument handle that you obtain from the niDMM Initialize or niDMM Initialize With Options VIs. The handle identifies a particular instrument session. Default Value: None
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **IVI error code (0)** is the error code returned from an IVI instrument driver operation.
- **Path to VI** is the path to the VI that caused an error.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error

information. Otherwise, it describes the error status that this VI produces. Right-click the **error out** indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

IVI Utilities

Owning Palette: Utility

Use the NI-DMM IVI Utilities VIs to add IVI-inherent options to your application.

Palette Object	Description
niDMM <u>Error</u> Message	Takes the error cluster returned by the NI-DMM VIs, interprets it, and returns it as a user-readable string.
<u>niDMM</u> <u>Reset with</u> <u>Defaults</u>	Resets the DMM to a known state and sends initialization commands to the DMM. The initialization commands set the DMM to the state necessary for the operation of NI- DMM. All user-defined default values associated with a logical name are applied after setting the DMM.
<u>niDMM</u> <u>Disable</u>	Places the instrument in a quiescent state where it has minimal or no impact on the system to which it is connected. If a measurement is in progress when this VI is called, the measurement is aborted.
niDMM Get Next Coercion Record	Returns the coercion information associated with the IVI session, and it retrieves and clears the oldest instance in which NI-DMM coerced a value you specified to another value.
Next	Returns the interchangeability warnings associated with the IVI session. It retrieves and clears the oldest instance in which the class driver recorded an interchangeability warning. Interchangeability warnings indicate that using your application with a different instrument might cause different behavior.
<u>niDMM</u> <u>Clear</u> Interchange <u>Warnings</u>	Clears the list of current interchange warnings.
niDMM <u>Reset</u> Interchange	When developing a complex test system that consists of multiple test modules, it is generally a good idea to design the test modules so that they can run in any order. To do so

<u>Check</u>	requires ensuring that each test module completely configures the state of each instrument it uses. If a particular test module does not completely configure the state of an instrument, the state of the instrument depends on the configuration from a previously executed test module.
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niDMM Error Message

Takes the error cluster returned by the NI-DMM VIs, interprets it, and returns it as a user-readable string.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- **Message Box** specifies whether to display error messages in a pop-up dialog.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Error Code** is the error code returned from the instrument. The default is 0, indicating a success.
- **Error Message** is the error information formatted into a string.

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Get Next Interchange Warning

Returns the interchangeability warnings associated with the IVI session. It retrieves and clears the oldest instance in which the class driver recorded an interchangeability warning. Interchangeability warnings indicate that using your application with a different instrument might cause different behavior.

NI-DMM performs interchangeability checking when the <u>Interchange</u> <u>Check</u> property is set to TRUE (1). This VI returns an empty string in the **interchange warning** parameter if no interchangeability warnings remain for the session. In general, NI-DMM generates interchangeability warnings when a property that affects the behavior of the instrument is in a state that you did not specify.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **INTERCHANGE WARNING** returns the next interchange warning for the IVI session. If there are no interchange warnings, the VI returns an empty string.

The buffer must contain at least as many elements as the value you specify with the <u>Buffer Size</u> property.

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Clear Interchange Warnings

Clears the list of current interchange warnings.

error in (no error)

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.

status is TRUE (X) if an error occurred or FALSE

(checkmark) to indicate a warning or that no error occurred.

- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Reset Interchange Check

When developing a complex test system that consists of multiple test modules, it is generally a good idea to design the test modules so that they can run in any order. To do so requires ensuring that each test module completely configures the state of each instrument it uses. If a particular test module does not completely configure the state of an instrument, the state of the instrument depends on the configuration from a previously executed test module.

Details



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

Details

If you execute the test modules in a different order, the behavior of the instrument and therefore the entire test module is likely to change. This change in behavior is generally instrument specific and represents an interchangeability problem. You can use this VI to test for such cases. After you use this VI, the interchangeability checking algorithms in NI-DMM ignore all previous configuration operations. By using this VI at the beginning of a test module, you can determine whether the test module has dependencies on the operation of previously executed test modules.

This VI does not clear the interchangeability warnings from the list of previously recorded interchangeability warnings. If you want to guarantee that <u>niDMM_GetNextInterchangeWarning</u> only returns those interchangeability warnings that are generated after calling this VI, you must clear the list of interchangeability warnings. You can clear the interchangeability warnings list by repeatedly calling <u>niDMM_GetNextInterchangeWarning</u> until no more interchangeability warnings are returned. If you are not interested in the content of those warnings, you can call <u>niDMM_ClearInterchangeWarnings</u>.

niDMM Get Next Coercion Record

Returns the coercion information associated with the IVI session, and it retrieves and clears the oldest instance in which NI-DMM coerced a value you specified to another value.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **coercion record** returns the next coercion record for the IVI session. If there are no coercion records, the VI returns an empty string.

The buffer must contain at least as many elements as the value you specify with the <u>Buffer Size</u> property.

- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

IVI Constant to niDMM Aperture Time Units

Translates the Aperture Time property from the IviDMM defined value into the appropriate LabVIEW enumeration.

IVI Constant is the IviDmm value for the Aperture Time property.

Aperture Time Units is the value for the Aperture Time property used in the NI-DMM LabVIEW VIs.

niDMM Auto Time Limit

Is an unsigned 32-bit integer indicator.

Auto Time Limit Constant

Auto Time Limit Constant is an unsigned 32-bit integer indicator.

niDMM Function To IVI Constant

Translates the Function property from the LabVIEW enumeration value into the appropriate IviDmm defined value.

Function -	Fune	IVI Constant

- **Function** is the value of the Function property used in NI-DMM LabVIEW VIs.
- **IVI Constant** is the correct IviDmm constant for the value specified for the Function property. The value of this constant can be used as the value for the NI-DMM property node or Call Library nodes.

niDMM Measurement Complete Destination To IVI Constant

Converts the Measurement Complete Destination enumeration control into an IVI constant.

Measurement Complete Destin... ------ IVI Constant

- Measurement Complete Destination specifies the destination of the Measurement Complete signal. This signal is issued by the DMM when the DMM completes a single measurement. NI-DMM sets the Measurement Complete Destination property to this value.
- **IVI Constant** is the correct IviDMM constant for the value specified for the Measurement Complete Destination property. The value of this constant can be used as the value for the NI-DMM property node or Call Library nodes.

niDMM Powerline Frequency To IVI Constant

Translates the value of the Powerline Frequency property from the LabVIEW enumeration value into the appropriate lviDmm defined value.

Powerline Frequency -----PLF IVI Constant

Powerline Frequency specifies the powerline frequency in hertz.

NI-DMM sets the <u>Powerline Frequency</u> property to this value.

50 HERTZ 50 Hz 60 HERTZ 60 Hz

M

Note You should set this control to the frequency of the AC power line (for 400 Hz power line use the 50 Hz setting).

IVI Constant is the correct IviDmm constant for the value specified for the Powerline Frequency property. The value of this constant value can be used as the value for the NI-DMM property node or Call Library nodes.

niDMM Configure Multi Point

Configures the properties for multipoint measurements.

These properties include the <u>Trigger Count</u>, <u>Sample Count</u>, <u>Sample</u> <u>Trigger</u>, and <u>Sample Interval</u>. For continuous acquisitions, set **Trigger Count** or **Sample Count** to zero.

Details



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Trigger Count sets the number of triggers you want the DMM to receive before returning to the Idle state.

NI-DMM sets the <u>Trigger Count</u> property to this value. The default is 1.

- Sample Count sets the number of measurements the DMM makes in each measurement sequence initiated by a trigger. NI-DMM sets the Sample Count property to this value. The default is 1.
- **Sample Trigger** specifies the sample trigger source to use. The default is Immediate.

NI-DMM sets the <u>Sample Trigger</u> property to this value.

Sample Interval (sec) sets the amount of time in seconds the DMM waits between measurements.

NI-DMM sets the <u>Sample Interval</u> property to this value. Specify a sample interval to add settling time between measurements or to decrease the measurement rate. **Sample Interval** only applies when the **Sample Trigger** is set to Interval. On the NI 4060, the **Sample Interval** value is used as the settling time. When sample interval is set to 0, the DMM does not settle between measurements. The NI 4065 and NI 4070/4071/4072 use the value specified in **Sample Interval** as additional delay. The default value

(-1) ensures that the DMM settles for a recommended time. This is the same as using an Immediate trigger.

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Note This parameter is not used on the NI 4050.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in

most cases, the name of the VI that produced the error or warning. The default is an empty string.

Details

Refer to <u>Multiple Point Acquisitions</u> for more information.

niDMM Read Multi Point

Acquires multiple measurements and returns an array of measured values.

The number of measurements the DMM makes is determined by the values you specify for the **Trigger Count** and **Sample Count** parameters of <u>niDMM Configure Multi Point</u>.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Number to Read specifies the number of measurements to acquire.

The maximum number of measurements for a finite acquisition is the (**Trigger Count** x **Sample Count**) parameters in <u>niDMM</u> <u>Configure Multi Point</u>. For continuous acquisitions, up to 100,000 points can be returned at once. The number of measurements can be a subset. The valid range is any positive ViInt32. The default value is 1.

Maximum Time (msec) specifies the maximum time allowed for this VI to complete in milliseconds. If the VI does not complete within this time interval, the VI returns the NIDMM_ERROR_MAX_TIME_EXCEEDED error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete. The valid range is 0–86400000. The default value is TIME LIMIT AUTO (-1). The DMM calculates the timeout automatically.

error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use niDMM Error Message to display the description of the error code. Use

error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- Measurements is an array of measurement values. The size of the array must be at least the size that you specify for the Number to Read parameter.
- **Actual Number** indicates the number of measured values actually retrieved from the DMM.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select **Explain Error** from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Fetch Multi Point

Returns an array of values from a previously initiated multipoint measurement.

The number of measurements the DMM makes is determined by the values you specify for the **Trigger Count** and **Sample Count** parameters of <u>niDMM Configure Multi Point</u>. You must call <u>niDMM Initiate</u> to initiate a measurement before calling this VI.



instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

Number to Fetch specifies the number of measurements to acquire.

The maximum number of measurements for a finite acquisition is the (**Trigger Count** x **Sample Count**) parameters in <u>niDMM</u> <u>Configure Multi Point</u>. For continuous acquisitions, up to 100,000 points can be returned at once. The number of measurements can be a subset. The valid range is any positive ViInt32. The default value is 1.

- Maximum Time (msec) specifies the maximum time allowed for this VI to complete in milliseconds. If the VI does not complete within this time interval, the VI returns the NIDMM_ERROR_MAX_TIME_EXCEEDED error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete. The valid range is 0–86400000. The default value is TIME LIMIT AUTO (-1). The DMM calculates the timeout automatically.
- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u>

Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.

- **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
- **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- **Measurements** is an array of measurement values.
 - Note The size of the Measurements Array must be at least the size that you specify for the Number to Fetch parameter.
- Actual Number indicates the number of measured values actually retrieved from the DMM.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM 4022 Control

Configures the NI 4022 Guard and Current Amplifier module.

Supported Devices: NI PXI-4022

Instrument Descriptor	
4022 Configuration	
error in (no error)	error out

Instrument Descriptor contains the resource name of the device to initialize.

The resource name is assigned in Measurement & Automation Explorer (MAX). Refer to <u>Related Documentation</u> for the *NI Digital Multimeters Getting Started Guide* for more information about configuring and testing the DMM in MAX. Valid Syntax:

- NI-DAQmx name
- DAQ::NI-DAQmx name[::INSTR]
- DAQ::Traditional NI-DAQ device number[::INSTR]
- IVI logical name

Caution All IVI names for the Instrument Descriptor, such as logical names or virtual names, are case-sensitive. If you use logical names, driver session names, or virtual names in your program, you must make sure that the name you use matches the name in the IVI Configuration Store file exactly, without any variations in the case of the characters in the name.

4022 Configuration specifies the operating mode of the Guard and Current Amplifier module. The driver by default sets the module to operate as a guard output.

Guard: Enables the internal amplifier to be a unity gain buffer for performing 6-wire guarded measurements.

Current Amp 100 nA: Enables the low current amplifier and applies a gain of 1E8 V/A.

Current Amp 10uA: Enables the low current amplifier and applies a gain of 1E6 V/A.

Current Amp 1mA: Enables the low current amplifier and applies a gain of 1E4 V/A.

Disconnect +IN from AGND: When one of the current amplification ranges is selected, the +INPUT of the amplifier is tied to analog ground. This is the default case. This default configuration can be overridden by selecting this option to disconnect the +INPUT, and allow the user to provide an external reference. Calling one of the current amplification ranges after calling this VI will reconnect the +INPUT to analog ground.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and select Explain Error from the shortcut menu for more information about the error.
 - **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
 - code is the error or warning code. The default is 0. If status is TRUE, code is a negative error code. If status is FALSE, code is 0 or a warning code.

source describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.

niDMM Reset with Defaults

Resets the DMM to a known state and sends initialization commands to the DMM. The initialization commands set the DMM to the state necessary for the operation of NI-DMM. All user-defined default values associated with a logical name are applied after setting the DMM.

instrument handle ************************************	nandle out
error in (no error)	

instrument handle identifies a particular instrument session.

You obtain the **instrument handle** parameter from <u>niDMM Initialize</u> or <u>niDMM Initialize With Options</u>. The default is None.

- error in (no error) describes error conditions that occur before this VI runs. If an error occurred before this VI runs, the VI passes the error in value to error out. This VI runs normally only if no error occurs before this VI runs. If an error occurs while this VI runs, it continues and sets its own error status in error out. Use <u>niDMM</u> Error Message to display the description of the error code. Use error in and error out to check errors and to specify execution order by wiring error out from one node to error in of the next node.
 - **Status** is TRUE (X) if an error occurred before this VI ran or FALSE (checkmark) to indicate a warning or that no error occurred before this VI ran. The default is FALSE.
 - **code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
 - **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.
- **instrument handle out** returns a handle that you use to identify the instrument in all subsequent instrument driver VI calls.
- error out contains error information. If error in indicates that an error occurred before this VI ran, error out contains the same error information. Otherwise, it describes the error status that this VI produces. Right-click the error out indicator on the front panel and

select **Explain Error** from the shortcut menu for more information about the error.

- **status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.
- **Code** is the error or warning code. The default is 0. If **status** is TRUE, **code** is a negative error code. If **status** is FALSE, **code** is 0 or a warning code.
- **source** describes the origin of the error or warning and is, in most cases, the name of the VI that produced the error or warning. The default is an empty string.