

Magnescale

Software

USB Gauge LabVIEW Driver

Read all the instructions in the manual carefully before use and strictly follow them.

Keep the manual for future references.

This instruction manual corresponds to the special software Ver. 1.0.

Instruction Manual

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Note

The text and display screens of this instruction manual, with some exceptions, assume the use of a computer running Windows7 and LabVIEW 2015. For order operating systems, there might be cases such as restricted functionalities and or different displays.

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1. Outline

This LabVIEW driver provides the VI used to control USB gauges using LabVIEW. The USB gauges are controlled by accessing the ActiveX control available on the Magescale website.

1-1. Prerequisites

The following driver and programs are required in order to use this library:

- UsbSerial4MgsGauge.ocx
- Microsoft Visual C++2017 Runtime
- STMicroelectronics Virtual COM Port driver V1.4.0

These can be introduced by installing the MGS USB Gauge Monitor software available on the Magescale website.

This LabVIEW driver can be used with LabVIEW 8.6 or later.

This LabVIEW driver assumes the output format set by Default Instrument Setup.vi (refer to 3-8-1). For example, when changing the output format from the USB gauge, such as changing the output delimiter from comma to tab, it is necessary to change the VI included in Magescale DS8xx.lvlib.

2. Folder Configuration

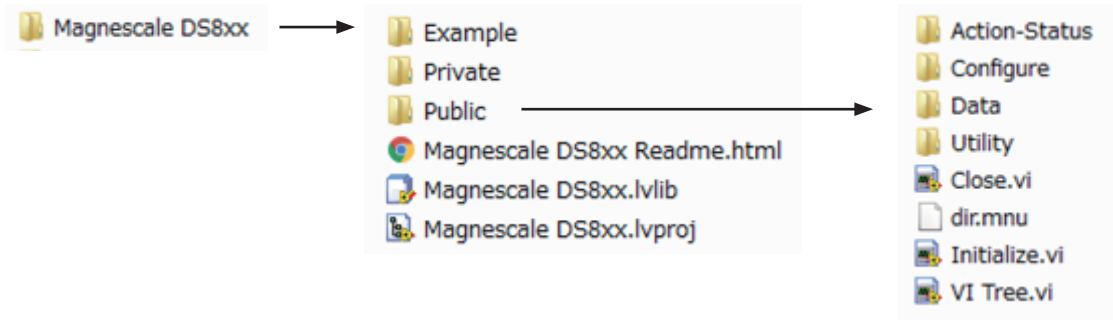
The distributed zip file contains a Magnescale DS8xx folder with the following internal configuration. When incorporating USB gauge functionality into the user VI, normally use the VI in the Public folder.

Folder Configuration

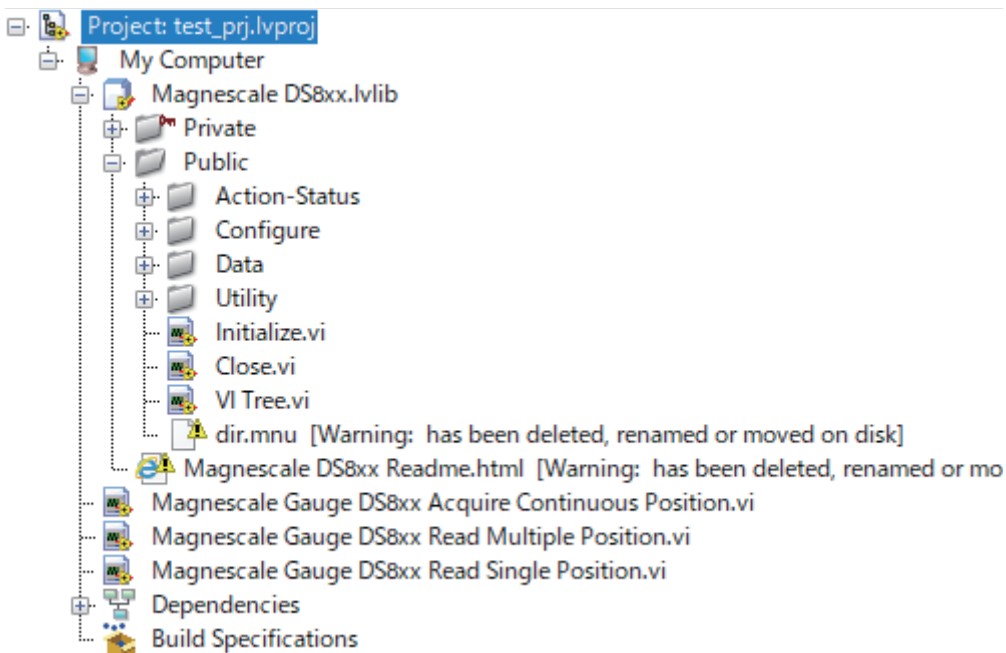
Inside the ZIP file

Inside the Magnescale DS8xx

Inside the Public folder



Magnescale DS8xx.lvproj virtual folder configuration



Magnescale DS8xx folder

File, Folder name	Description
Public	This folder contains VI with the access scope set to "Public" by Magnescale DS8xx.lvlib. Normally use the VI in this folder.
Private	This folder contains VI with the access scope set to "Private" by Magnescale DS8xx.lvlib. These VI cannot be called directly from VI not included in Magnescale DS8xx.lvlib.
Example	This folder contains simple examples of using this LabVIEW driver.
Magnescale DS8xx Readme.html	Readme file
Magnescale DS8xx.lvlib	Project library that includes the USB gauge control VI
Magnescale DS8xx.lvproj	Project file that includes libraries, examples of use, and Readme

Public folder

Folder name	Description
Action-Status	This folder contains the VI used to get the current configuration and operate a USB gauge based on that current configuration.
Configure	This folder contains the VI used to set the USB gauge configuration.
Data	This folder contains the VI used to get measurement data from a USB gauge.
Utility	This folder contains the utility VI.

3. VI

3-1. VI List

Directly under the Public folder

VI name	Description
Initialize.vi	This VI must be called first when controlling a USB gauge.
Close.vi	This VI must be called when ending control of a USB gauge.
VI Tree.vi	This VI shows all the VI contained in the Public folder, arranged in a block diagram.

Action-Status folder

VI name	Description
Clear Data.vi	This clears the maximum, minimum, and P-P values.
Search Reference Position.vi	This starts a reference point search.
Query Gauge Name.vi	This queries the USB gauge name.
Query Reference Position Mode.vi	This queries the current reference position mode.
Query Measurement Status.vi	This queries the reference point status, reference position mode, measurement value mode, pause status, latch status, and repeat output mode.
Query Setup Status.vi	This queries the compatible mode, flag output mode, response character string output format, line number output status, time stamp output status, and response identifier output status.
Query Timeout.vi	This queries the time set as the timeout.
Query Reference Position.vi	This queries the reference point position.
Query Preset Position.vi	This queries the preset positions.
Query Time Stamp.vi	This queries the current time stamp.
Align All Time Stamp.vi	This aligns the time stamps of all the connected USB gauges.
Query Difference Time List.vi	This measures the difference between the time stamps of all the connected USB gauges and the time stamp of the PC and returns the results.
Disable Preset Position.vi	This disables the presets.

Configure folder

VI name	Description
Configure Gauge Name.vi	This sets the gauge name.
Configure Measurement Mode.vi	This sets the measurement mode.
Configure Preset Position.vi	This sets the preset positions.
Configure Reference Position Mode.vi	This sets the reference position mode.
Configure Pause.vi	This switches the pause status.
Configure Latch.vi	This switches the latch status.
Configure Timeout.vi	This sets the timeout.

Data folder

VI name	Description
Read Data(Single).vi	This gets the measurement value for one point in the set measurement mode and reference position mode.
Read Peak-to-Peak.vi	This gets the P-P and current values for one point.
Read Max and Min.vi	This gets the maximum, minimum, and current values for one point.
Read Data(Multiple).vi	Polymorphic VI Select Read Data(Multiple)(Array).vi or Read Data(Multiple)(XYgraph).vi. This gets the set number of measurement values at the set time interval. The obtained measurement values are the values for the set measurement mode and reference position mode.
Read Data(Multiple)(Array).vi	This outputs the measurement value data as an array.
Read Data(Multiple)(XYgraph).vi	This outputs the measurement value array and time stamp array as a cluster.

Utility folder

VI name	Description
Error Confirm.vi	This confirms whether the command acquired by the query contains an error, and outputs the error information.
Reset.vi	This performs resets the USB gauge.
Version Query.vi	This queries the ActiveX control version.
Save Setup.vi	This saves the gauge name, preset position ABS values, and preset setting values in the USB gauge.
Alarm Query.vi	This confirms whether the command acquired by the query contains an alarm, and outputs the alarm.

Private folder

VI name	Description
Default Instrument Setup.vi	This sets the output format to comma delimiter and makes the settings add the line number and the time stamp to the output character string. The access scope is "private" and access is possible only from the VI included in Magnescale DS8xx.lvlib.

Example folder

VI name	Description
Magnescale Gauge DS8xx Read Single Position.vi	Sample VI that gets a measurement value from a USB gauge.
Magnescale Gauge DS8xx Read Multiple Position.vi	Sample VI that gets multiple data from a USB gauge and displays the results as a graph of the measurement results and times.
Magnescale Gauge DS8xx Acquire Continuous Position.vi	Sample VI that gets the measurement values of a USB gauge at the set interval.

3-2. VI Common Items

The connector panes of the VI included in Magnescale DS8xx.lvlib all have a 4×2×2×4 configuration with the following common input and output connectors:

Input connectors

Connector	Format	Description
UsbSerial4MgsGaugeLib.UsbSerial4MgsGauge	Automation refnum	ActiveX control UsbSerial4MgsGauge.ocx reference input.
Handle In	I32	Input connector of VI that performs command transmission. Specify the USB gauge that is the processing target by the handle.
error in	Error cluster	This connects errors.

Output connectors

Connector	Format	Description
UsbSerial4MgsGaugeLib.UsbSerial4MgsGaugeOut	Automation refnum	ActiveX control UsbSerial4MgsGauge.ocx reference output. This returns the same value as the input refnum. However, it returns non-refnum when the USB gauge has not been connected by Initialize.vi or when an error has occurred.
Handle Out	I32	Output connector of VI that performs command transmission. This returns the same value as Handle In.
error out	Error cluster	This outputs errors.

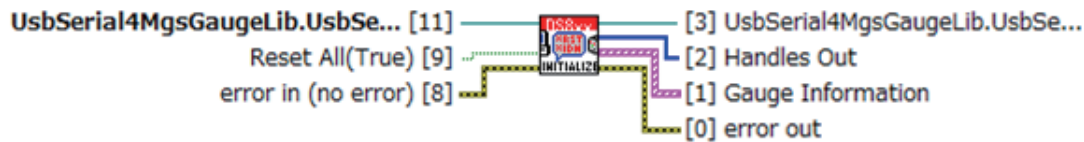
3-3. VI Directly below the Public Folder

This section describes the VI that must be called first or last when controlling a USB gauge, and the VI Tree.

3-3-1. Initialize.vi

This opens ActiveX control, opens all the connected USB gauges, and makes the default settings (refer to 3-8-1). It outputs the handle number and information of each USB gauge.

Initialize.vi (4815)



Initialize all connected gauges.

Open ActiveX control, query gauge information, set default setup and reset all handles (if required).

Default:HOFF,HCSV,HNO,HTS

Input connectors (excluding common parts)

Connector	Format	Description
Reset All	Boolean	When True is input, the connected USB gauges are reset.

Output connectors (excluding common parts)

Connector	Format	Description
Handles Out	I32 array	Array of the handle numbers of multiple opened USB gauges
Gauge Information	Cluster array	Array of the information of multiple connected USB gauges

Details of Gauge Information array cluster

Connector	Format	Description
COM	I32	USB gauge COM number
Gauge Name	Character string	User-set USB gauge name
Model	Character string	USB gauge model name
Serial Number	Character string	USB gauge serial number
Resolution[mm]	DBL	USB gauge resolution [mm]
Firmware	Character string	USB gauge firmware version
Handle	I32	Handle number acquired when the USB gauge is opened

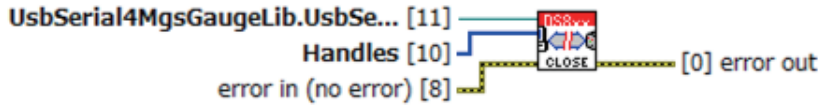
Related properties, methods, and commands (except within sub VI)

- Property GaugeInfList
- Method Open

3-3-2. Close.vi

This closes the handles of all the USB gauges and closes the reference of ActiveX control.

Close.vi (4815)



Close all handles, then close reference of ActiveX control.

Input connectors (excluding common parts)

Connector	Format	Description
Handles	I32 array	Array of handle numbers

Related properties, methods, and commands

- Method Close

3-3-3. VI Tree

This VI shows all the VI contained in the Public folder of the library arranged in a block diagram.

VI Tree.vi (4815)



This is the instrument driver for the USB Gauge; DS8xx series and MT30. The VI Tree displays all the user-callable VIs of the instrument driver in an organized table.

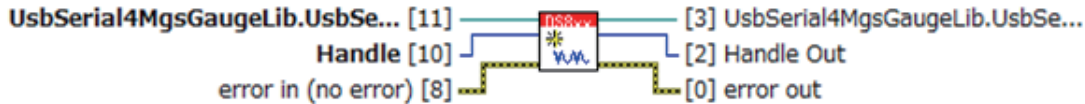
3-4. VI in the Action-Status Folder

The Action-Status folder contains the VI used to operate a USB gauge with the current configuration and to get the current configuration.

3-4-1. Clear Data.vi

This initializes the maximum, minimum and P-P values of the USB gauge corresponding to the input handle. As a result, maximum value = minimum value = current value and P-P value = 0.

Clear Data.vi (4815)



Reset Data to calculate Maximum, Minimum and Peak-to-peak value.
It results in Maximum=Minimum=Present Value and Peak-to-peak=0.

Related properties, methods, and commands

- Method DoCommand
- Command ASTART
- Command NOP

3-4-2. Search Reference Position.vi

This starts a reference point search for the USB gauge corresponding to the input handle. To detect the reference point, move the spindle so that it passes the reference point of the USB gauge during the reference point search. This function is available only with the DS series.

Search Reference Position.vi (4815)



Search Reference Point in a gauge for a handle. The reference position status of the gauge becomes "Finding". When it go through its reference position during "Finding", the status becomes "Found".

This function is available at DS Series only.

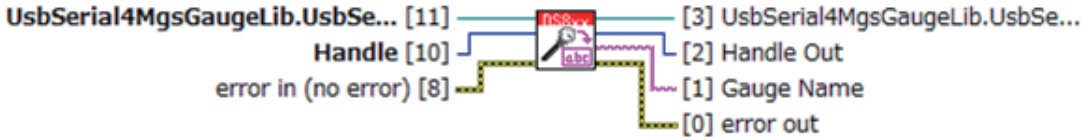
Related properties, methods, and commands

- Method DoCommand
- Command AL
- Command NOP

3-4-3. Query Gauge Name.vi

This queries the unique name set for the USB gauge corresponding to the input handle.

Query Gauge Name.vi (4815)



Query gauge name.

Output connectors (excluding common parts)

Connector	Format	Description
Gauge Name	Character string	Unique gauge name that has been set

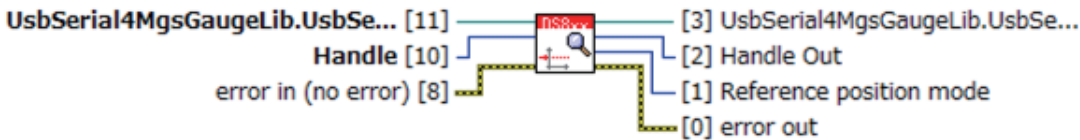
Related properties, methods, and commands

- Method DoCommand
- Command ARPOS

3-4-4. Query Reference Position Mode.vi

This queries the current reference position mode of the USB gauge corresponding to the input handle.

Query Reference Position Mode.vi (4815)



Query reference position mode for a handle.
Mode:INC, Pn(n=1,2,3), ABS

Output connectors (excluding common parts)

Connector	Format	Description
Reference Position Mode	I32 text ring	Reference position mode 0 : Invalid : Invalid mode 1 : INC : Incremental 2 : P1 : Preset 1 3 : P2 : Preset 2 4 : P3 : Preset 3 5 : ABS : Absolute

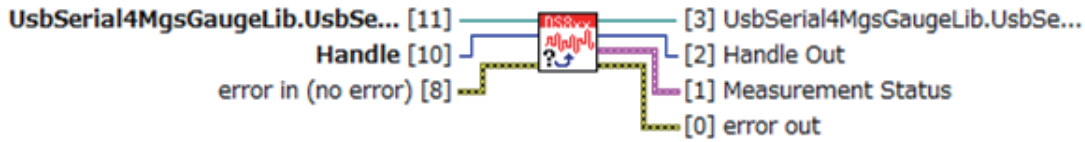
Related properties, methods, and commands

- Method DoCommand
- Command ARPOS

3-4-5. Query Measurement Status.vi

This queries the current settings of the USB gauge corresponding to the input handle. As a result, the current reference point status, reference position mode, measurement mode, pause status, latch status, and repeat output mode are acquired.

Query Measurement Status.vi (4815)



Query status of a gauge; Reference Point search status, reference position mode, measurement mode, pause status, latch status and repeat mode.

Output connectors (excluding common parts)

Connector	Format	Description
Measurement Status	Cluster	Settings related to measurement by the USB gauge corresponding to the specified handle

Details of Measurement Status cluster

Connector	Format	Description
Reference Position	I32 text ring	Reference point status 0: Invalid : Invalid status 1: Unknown : Reference point position unknown 2: Finding : Reference point search in progress 3: Found :
Reference Position Mode	I32 text ring	Reference position mode 0: Invalid : Invalid mode 1: INC : Incremental 2: P1 : Preset 1 3: P2 : Preset 2 4: P3 : Preset 3 5: ABS : Absolute
Measurement Mode	I32 text ring	Measurement mode 0: Invalid : Invalid mode 1: MAX : Maximum value 2: MIN : Minimum value 3: Pp : P-P value 4: REAL : Current value
Pause	Boolean	Pause status. Pause enabled when True.
Latch	Boolean	Latch status. Latch enabled when True.
Repeat Mode	I32 text ring	Repeat output mode 0: No Repeat : Repeat measurement not in progress 1: R : Repeat measurement started by R command in progress 2: RMM : Repeat measurement started by RMM command in progress 3: RPP : Repeat measurement started by RPP command in progress 4: r : Repeat measurement started by Ar command in progress 5: rmm : Repeat measurement started by Armm command in progress 6: rpp : Repeat measurement started by Arpp command in progress

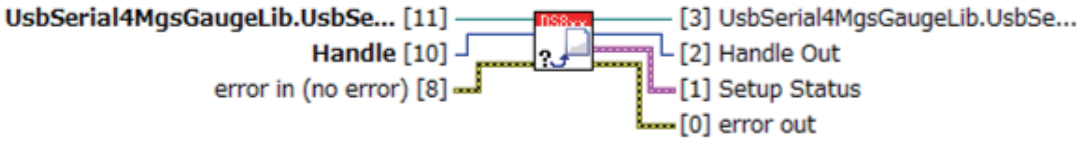
Related properties, methods, and commands

- Method DoCommand
- Command ASTATUS

3-4-6. Query Setup Status.vi

This queries the axis-independent settings. As a result, the current compatible mode, flag output mode, response character string output format, line number output status, time stamp output status, and response identifier output status are acquired.

Query Setup Status.vi (4815)



Query status independent from each handle; compatible mode, flag mode, output form, line number output, time stamp output and HRESID.

Output connectors (excluding common parts)

Connector	Format	Description
Setup Status	Cluster	Axis-independent settings

Details of Setup Status cluster

Connector	Format	Description
Compatible mode	I32 text ring	Compatible mode 0 : LY : LY compatible mode 1 : LT : LT compatible mode
Flag Mode	I32 text ring	Flag output mode 0 : OFF : No flag 1 : ON : Axis name (fixed to "A") only 2 : ON1 : Axis name and flag 3 : ON2 : Axis name and two flag
Output form	I32 text ring	Response character string output mode 0 : Fixed digit : Digit position fixed 1 : CSV : Comma delimiter 2 : TSV : Tab delimiter
Line number	Boolean	Line number output status. Line number output when True.
Time stamp	Boolean	Time stamp output status. Time stamp output when True.
RESID?	Boolean	Response identifier output status. Response identifier output when True.

Related properties, methods, and commands

- Method DoCommand
- Command HSTATUS

3-4-7. Query Timeout.vi

This queries the timeout.

Query Timeout.vi (4815)



Query timeout[ms].

Output connectors (excluding common parts)

Connector	Format	Description
Timeout[ms]	I32	Timeout (ms)

Related properties, methods, and commands

- Property Timeout

3-4-8. Query Reference Position.vi

This queries the reference point position of the USB gauge corresponding to the input handle.

Query Reference Position.vi (4815)



Query reference position value[mm].

This function is available at DS Series.

Output connectors (excluding common parts)

Connector	Format	Description
Reference Position[mm]	DBL	Reference point position (mm)

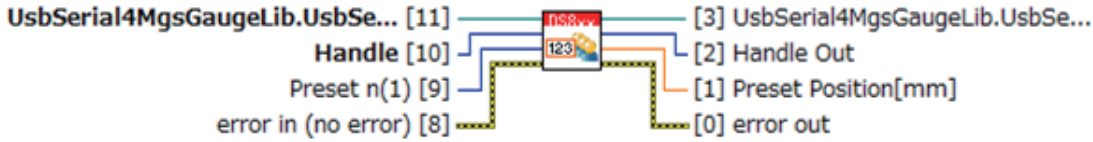
Related properties, methods, and commands

- Method DoCommand
- Command ALO

3-4-9. Query Preset Position.vi

This queries the preset positions of the input presets of the USB gauge corresponding to the input handle.

Query Preset Position.vi (4815)



Query Preset n position[mm] (n=1,2,3) for a handle.

Input connectors (excluding common parts)

Connector	Format	Description
Preset n	I8 text ring	Preset number to be confirmed. Select 1, 2, or 3.

Output connectors (excluding common parts)

Connector	Format	Description
Preset Position[mm]	DBL	Preset position (mm) of the set preset number

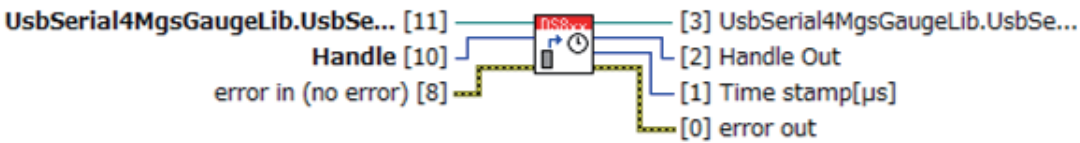
Related properties, methods, and commands

- Method DoCommand
- Command APn(n=1,2,3)

3-4-10. Query Time Stamp.vi

This queries the time stamp of the USB gauge corresponding to the input handle.

Query Time Stamp.vi (4815)



Query time stamp[μs] in a gauge.

Output connectors (excluding common parts)

Connector	Format	Description
Time stamp[μs]	DBL	Time stamp of the USB gauge (μs)

Related properties, methods, and commands

- Method DoCommand
- Command TS

3-4-11. Align All Time Stamp.vi

This aligns the time stamps of all the connected USB gauges.

Align All Time Stamp.vi (4815)



Align time stame to 0 in all gauges.

Flow

Close all handles→Align all time stamps by the command "GaugeInfList"→Open each com port.

Input connectors (excluding common parts)

Connector	Format	Description
Gauge Information	Cluster array	Array of gauge information. Refer to 3-3-1 for the cluster elements.

Output connectors (excluding common parts)

Connector	Format	Description
Gauge Information Out	Cluster array	Array of gauge information. Refer to 3-3-1 for the cluster elements.

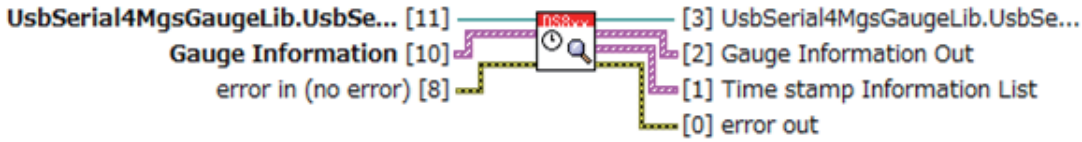
Related properties, methods, and commands

- Method Close
- Property GaugeInfList
- Method Open

3-4-12. Query Difference Time List.vi

This measures the difference between the time stamp of each USB gauge and the time stamp of the PC ten times for all the connected USB gauges and outputs the results.

Query Difference Time List.vi (4815)



Query time stamp information list.

Input connectors (excluding common parts)

Connector	Format	Description
Gauge Information	Cluster array	Array of gauge information. Refer to 3-3-1 for the cluster elements.

Output connectors (excluding common parts)

Connector	Format	Description
Gauge Information Out	Cluster array	Array of gauge information. Refer to 3-3-1 for the cluster elements.
Time stamp Information List	Cluster array	Results of comparing the time stamp of each USB gauge and the time stamp of the PC.

Details of Time stamp Information List array cluster

Connector	Format	Description
COM	I32	COM number of USB gauge
Gauge Name	Character string	User-set USB gauge name
Minimum Difference[μs]	U32	Minimum value of time stamp difference (μs)
Difference Average[μs]	DBL	Average value of time stamp difference (μs)
Maximum Difference[μs]	U32	Maximum value of time stamp difference (μs)
Reaction Time Average[μs]	DBL	Average value of reaction time (μs)
Reference time stamp[μs]	U32	Reference time stamp (μs)

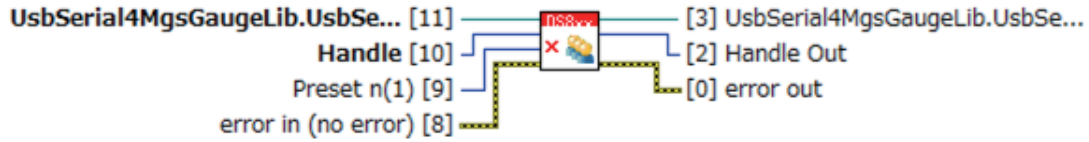
Related properties, methods, and commands

- Method Close
- Property DiffTimestampList
- Method Open

3-4-13. Disable Preset Position.vi

This disables an input preset of the USB gauge corresponding to the input handle.

Disable Preset Position.vi (4815)



Disable Preset Position n for a handle.

n=1,2,3

Input connectors (excluding common parts)

Connector	Format	Description
Preset n	I8 text ring	Preset number to be disabled. Select from 1, 2, or 3.

Related properties, methods, and commands

- Method DoCommand
- Command APn=NONE (n=1,2,3)

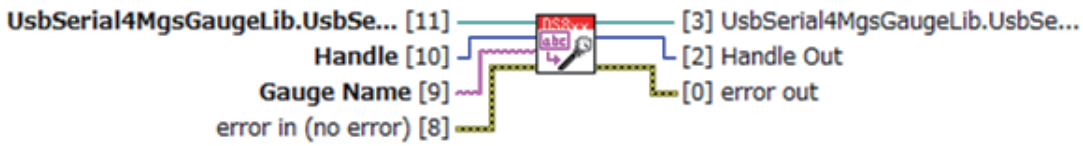
3-5. VI in the Configure Folder

The Configure folder contains the VI used to set the USB gauge configuration.

3-5-1. Configure Gauge Name.vi

This sets the unique name of the USB gauge corresponding to the input handle. The maximum length of the name is 32 characters, and the available characters are one-byte alphanumeric characters, '_', '-', and '/'. The initial character must be an alphabet character or '_'.

Configure Gauge Name.vi (4815)



Configure user defined gauge name.

Usable character as gauge name: Alphanumeric character, '_', '-' and '/'

First letter must be alphabet character or '_'.

Maximum length of gauge name:32

Input connectors (excluding common parts)

Connector	Format	Description
Gauge Name	Character string	Character string set as the unique USB gauge name

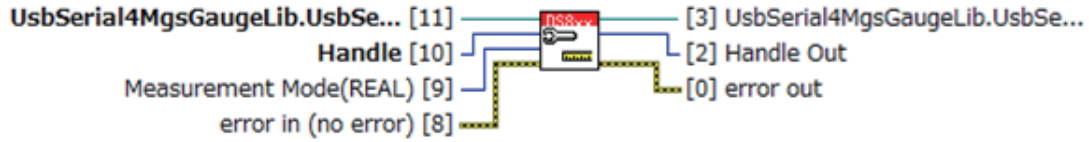
Related properties, methods, and commands

- Method DoCommand
- Command ARPOS

3-5-2. Configure Measurement Mode.vi

This sets the measurement mode of the USB gauge corresponding to the input handle.

Configure Measurement Mode.vi (4815)



Configure measurement mode when using the command "Ar" to get a measurement value.

Input connectors (excluding common parts)

Connector	Format	Description
Measurement Mode	I32 text ring	Measurement mode 0 : MAX : Maximum value 1 : MIN : Minimum value 2 : PP : PP value 3 : REAL : Current value

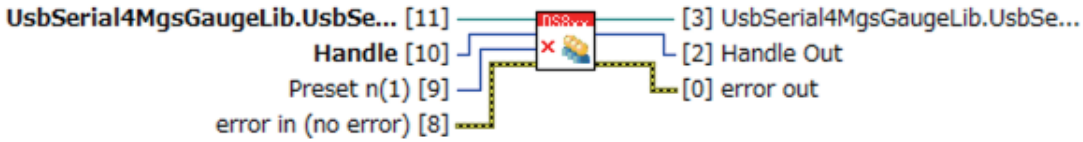
Related properties, methods, and commands

- Method DoCommand
- Command AMAX
- Command AMIN
- Command APP
- Command AREAL
- Command NOP

3-5-3. Configure Preset Position.vi

This sets the preset position corresponding to the set preset number of the USB gauge corresponding to the input handle.

Disable Preset Position.vi (4815)



Disable Preset Position n for a handle.
n=1,2,3

Input connectors (excluding common parts)

Connector	Format	Description
Preset Position[mm]	DBL	Preset position to be set (mm)
Preset n	I8 text ring	Preset number to be set. Select 1, 2, or 3.

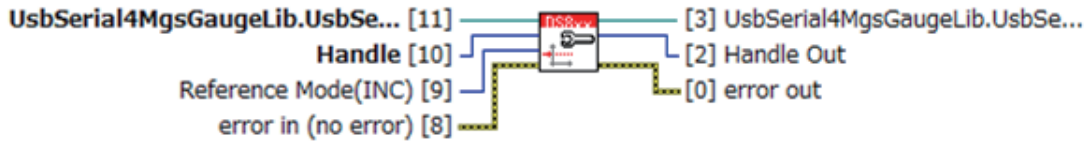
Related properties, methods, and commands

- Method DoCommand
- Command APn=x(n=1,2,or 3, preset number, x=preset position [mm])
- Command NOP

3-5-4. Configure Reference Position Mode.vi

This sets the reference position mode of the USB gauge corresponding to the input handle.

Configure Reference Position Mode.vi (4815)



Configure reference position mode for a handle.

Mode: INC, Pn(n=1,2,3), ABS

Pn: necessary to Set preset position n

ABS: necessary to detect gauge origin

Input connectors (excluding common parts)

Connector	Format	Description
Reference Mode	I32 text ring	Reference position mode 0: Invalid : Invalid mode 1: INC : Incremental 2: P1 : Preset 1 3: P2 : Preset 2 4: P3 : Preset 3 5: ABS : Absolute

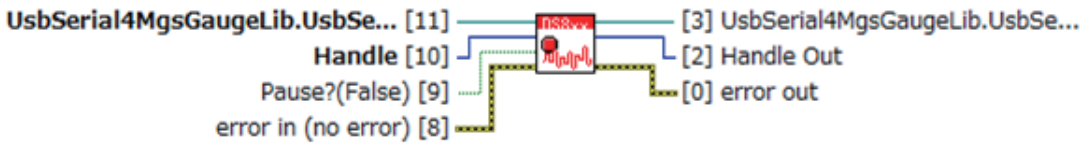
Related properties, methods, and commands

- Method DoCommand
- Command ARPOS=INC
- Command ARPOS=P1
- Command ARPOS=P2
- Command ARPOS=P3
- Command ARPOS=ABS
- Command NOP

3-5-5. Configure Pause.vi

This switches the pause status of the USB gauge corresponding to the input handle. Maximum, minimum, and P-P value updating stops while paused, but current value updating continues.

Configure Pause.vi (4815)



Configure pause. During pause on, maximum, minimum and peak-to-peak value are not updated. Present position keeps being updated.

Input connectors (excluding common parts)

Connector	Format	Description
Pause?	Boolean	Sets the pause status. Pause enabled when True.

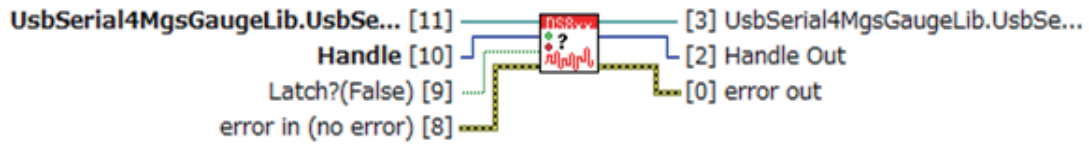
Related properties, methods, and commands

- Method DoCommand
- Command APAUON
- Command APAUOFF
- Command NOP

3-5-6. Configure Latch.vi

This switches the latch status of the USB gauge corresponding to the input handle. Output value updating stops while latched, but maximum, minimum, and P-P value updating continues.

Configure Latch.vi (4815)



Configure Latch. If on, output data is not updated. Maximum, minimum and peak-to-peak value are updated internally.

Input connectors (excluding common parts)

Connector	Format	Description
Latch?	Boolean	Sets the latch status. Latch enabled when True.

Related properties, methods, and commands

- Method DoCommand
- Command ALCHON
- Command ALCHOFF
- Command NOP

3-5-7. Configure Timeout.vi

This sets the timeout (ms) for the USB gauge corresponding to the input handle. The timeout that can be set by this VI has a lower limit of 1 [ms] and an upper limit of 1,000,000 [ms] (= 1,000 [s]). When a value outside the range of 1 [ms] to 1,000,000 [ms] is input, the closest value within that range is set.

Configure Timeout.vi (4815)



Configure timeout[ms] to coerced value within the range.

Timeout Range: 1 [ms] - 1000000 [ms](1000 [s])

It is possible to set timeout to the value larger than 1000 [s] by changing upper limit in this VI.

Input connectors (excluding common parts)

Connector	Format	Description
Timeout[ms]	I32	Timeout to be set (ms)

Output connectors (excluding common parts)

Connector	Format	Description
In Range?	Boolean	Returns True if the input timeout is within the range.

Related properties, methods, and commands

- Property Timeout

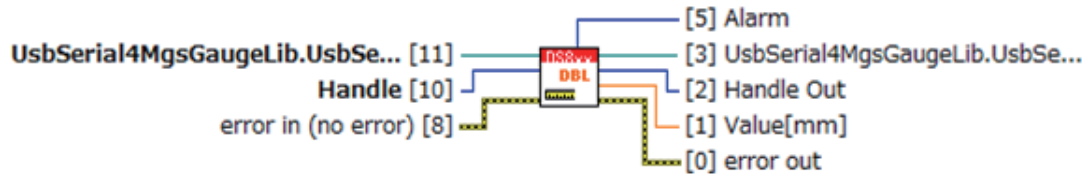
3-6. VI in the Data Folder

The Data folder contains the VI used to get measurement values from a USB gauge.

3-6-1. Read Data(Single).vi

This outputs one data of the USB gauge corresponding to the input handle in the set reference position mode and measurement mode.

Read Data(Single).vi (4815)



Get a data[mm] of the current mode. Data type depends on its measurement mode; INC, Pn(n=1, 2,3) and ABS.

Output connectors (excluding common parts)

Connector	Format	Description
Value[mm]	DBL	USB gauge output value [mm]
Alarm	U16 text ring	Alarm output by the USB gauge 0 : No Alarm 1 : Speed 2 : Level 3 : Speed + Level 4 : Reference Position 5 : Speed + Reference Position 6 : Level + Reference Position 7 : Speed + Level + Reference Position

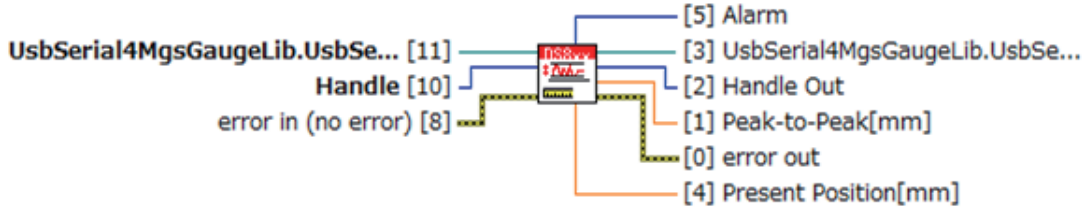
Related properties, methods, and commands

- Method DoCommand
- Command Ar

3-6-2. Read Peak-to-Peak.vi

This outputs the P-P and current values of the USB gauge corresponding to the input handle.

Read Peak-to-Peak.vi (4815)



Read peak-to-peak value[mm]. It also returns present position[mm].

Output connectors (excluding common parts)

Connector	Format	Description
Peak-to-Peak[mm]	DBL	USB gauge P-P value [mm]
Present Position[mm]	DBL	USB gauge current value [mm] Position[mm]
Alarm	U16 text ring	Alarm output by the USB gauge 0 : No Alarm 1 : Speed 2 : Level 3 : Speed + Level 4 : Reference Position 5 : Speed + Reference Position 6 : Level + Reference Position 7 : Speed + Level + Reference Position

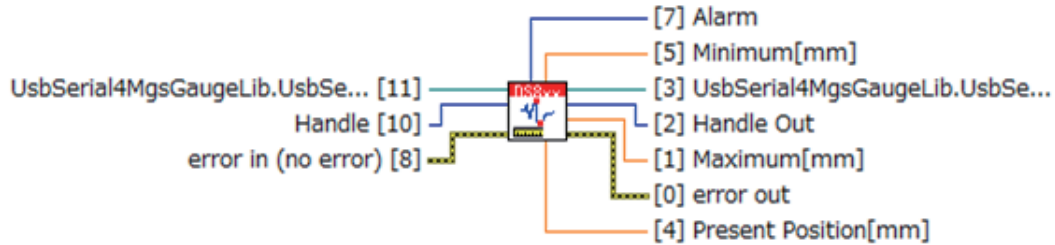
Related properties, methods, and commands

- Method DoCommand
- Command Arpp

3-6-3. Read Max and Min.vi

This outputs the maximum, minimum, and current values of the USB gauge corresponding to the input handle.

Read Max and Min.vi (4815)



Read maximum and minimum values[mm].

Output connectors (excluding common parts)

Connector	Format	Description
Maximum[mm]	DBL	USB gauge maximum value [mm]
Minimum[mm]	DBL	USB gauge minimum value [mm]
Present Position[mm]	DBL	USB gauge current value [mm]
Alarm	U16 text ring	Alarm output by the USB gauge 0 : No Alarm 1 : Speed 2 : Level 3 : Speed + Level 4 : Reference Position 5 : Speed + Reference Position 6 : Level + Reference Position 7 : Speed + Level + Reference Position

Related properties, methods, and commands

- Method DoCommand
- Command Arm

3-6-4. Read Data(Multiple).vi

This is a polymorphic VI. Select Read Data(Multiple)(Array).vi or Read Data(Multiple)(XYgraph).vi.



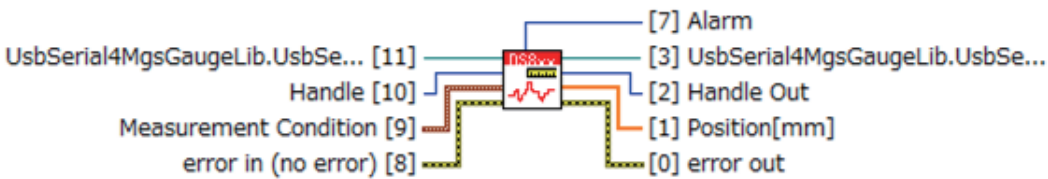
Output connectors (excluding common parts)

Polymorphic VI selector	Supported VI
Array	Read Data(Multiple)(Array).vi
XYgraph	Read Data(Multiple)(XYgraph).vi

3-6-4-1. Read Data(Multiple)(Array).vi

This performs repeat measurement at the set conditions for the USB gauge corresponding to the input handle and outputs the measurement results as an array. The values to be measured are the values for the set reference position mode and measurement mode.

Read Data(Multiple)(Array).vi (4815)



Read values[mm] as an array.

Data number in Measurement Mode must be positive number. Interval[s] in Measurement Mode must be greater than 0 and lower than 300. When Start Time stamp=0, it gets data immediately.

Input connectors (excluding common parts)

Connector	Format	Description
Measurement Condition	Cluster	Cluster that sets the number of measurement points, measurement interval, and measurement start time stamp

Details of Measurement Condition Cluster

Connector	Format	Description
Data Number	I32	Number of points at which to perform repeat measurement
Interval[s]	DBL	Repeat measurement interval (s)
Start Time Stamp[μs]	U32	USB gauge time stamp (μs) at which to start repeat measurement. When "0," repeat measurement starts immediately.

Output connectors (excluding common parts)

Connector	Format	Description
Position[mm]	DBL array	Repeat measurement results [mm]
Alarm	U16 text ring	Alarm output by the USB gauge 0 : No Alarm 1 : Speed 2 : Level 3 : Speed + Level 4 : Reference Position 5 : Speed + Reference Position 6 : Level + Reference Position 7 : Speed + Level + Reference Position

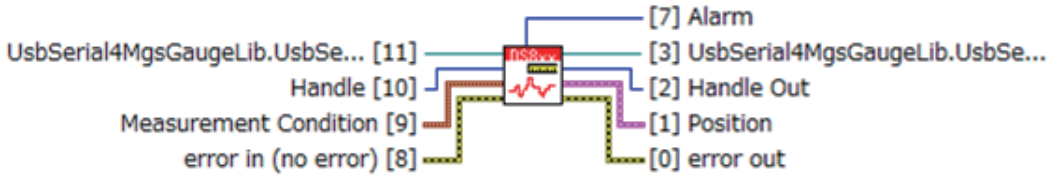
Related properties, methods, and commands

- Method DoCommand
- Command Ar=n, Δt.t0 (n : repeat times, Δt : measurement interval (s), t0 : measurement start time stamp (μs))

3-6-4-2. Read Data(Multiple)(XYgraph).vi

This performs repeat measurement at the set conditions for the USB gauge corresponding to the input handle and outputs the time stamp array and measurement results array as a cluster. The values to be measured are the values for the set reference position mode and measurement mode.

Read Data(Multiple)(XYgraph).vi (4815)



Read data[mm] as an XYgraphs.

Data number in Measurement Mode must be positive number. Interval[s] in Measurement Mode must be greater than 0 and lower than 300. When Start Time stamp=0, it gets data immediately.

Input connectors (excluding common parts)

Connector	Format	Description
Measurement Condition	Cluster	Cluster that sets the number of measurement points, measurement interval, and measurement start time stamp

Details of Measurement Condition Cluster

Connector	Format	Description
Data Number	I32	Number of points at which to perform repeat measurement
Interval[s]	DBL	Repeat measurement interval (s)
Start Time Stamp[μs]	U32	USB gauge time stamp (μs) at which to start repeat measurement. When "0," repeat measurement starts immediately.

Output connectors (excluding common parts)

Connector	Format	Description
Position	Cluster	Repeat measurement results
Alarm	U16 text ring	Alarm output by the USB gauge 0 : No Alarm 1 : Speed 2 : Level 3 : Speed + Level 4 : Reference Position 5 : Speed + Reference Position 6 : Level + Reference Position 7 : Speed + Level + Reference Position

Details of Position Array Cluster

Connector	Format	Description
Timestamp[μs]	DBL array	Time stamp array (μs)
Position[mm]	DBL array	Repeat measurement results [mm]

Related properties, methods, and commands

- Method DoCommand
- Command Ar=n, Δt, t0 (n : repeat times, Δt : measurement interval (s), t0 : measurement start time stamp (μs))

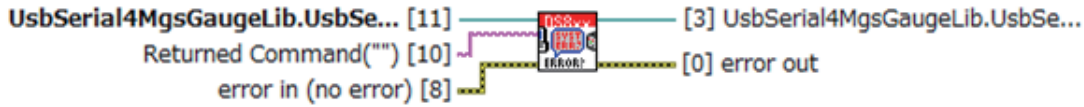
3-7. VI in the Utility Folder

The Utility folder contains the utility VI.

3-7-1. Error Confirm.vi

This inputs the USB gauge response and outputs the error information.

Error Confirm.vi (4815)



Query gauge error.

Error code by USB Gauge : 5000(custom error)

Input connectors (excluding common parts)

Connector	Format	Description
Returned Command	Character string	Character string queried by the DoCommand method

Related properties, methods, and commands

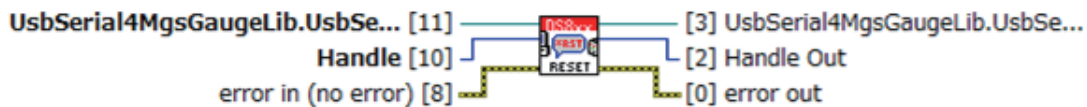
- None

3-7-2. Reset.vi

This resets the USB gauge corresponding to the input handle to the default settings (refer to 3-8-1). Reset (ARES command) performs the following processes:

- If an alarm has occurred, the alarm is cleared and the gauge is set to the reference point undetected status. If an alarm has not occurred, the detected reference point is held as is.
- If a reference point search is in progress, the reference point search ends in the reference point undetected status.
- The present position is set to "0" and the reference position is set to incremental (INC)
- Maximum value = minimum value = current value and P-P value = 0 are set.
- Pause and latch are set to the OFF status.
- If repeat measurement is in progress, the repeat measurement is ended.

Reset.vi (4815)



Resets the instrument and then sends a set of default setup commands to the instrument.

Related properties, methods, and commands

- Method DoCommand
- Command ARES

3-7-3. Version Query.vi

This queries the ActiveX control version.

Version Query.vi (4815)



Query ActiveX control version.

Output connectors (excluding common parts)

Connector	Format	Description
ActiveX Version	Character string	ActiveX control version

Related properties, methods, and commands

- Property Version

3-7-4. Save Setup.vi

This saves the current settings (gauge name, preset n position ABS values, preset n setting values) in the USB gauge*.

Save Setup.vi (4815)



Save gauge setup in gauge memory. Gage name, abusolute position preset n position(DS series) and preset n position are saved.

Related properties, methods, and commands

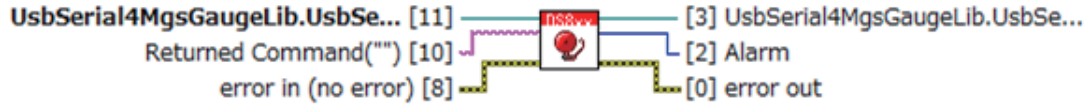
- Method DoCommand
- Command ASAVE
- Command NOP

* This LabVIEW driver does not include the VI used to get the preset positions saved in a USB gauge. Use the "ARCLn (n=1,2,3)" command to get saved preset positions. However, note that when preset positions have been set using Configure Preset Position.vi (refer to 3-5-3) or other means, the "ARCLn(n=1,2,3)" command sets the preset positions to the last set values. When the USB gauge is disconnected and then reconnected, the "ARCLn (n=1,2,3)" command sets the preset positions to the last saved values instead of the last set values.

3-7-5. Alarm Confirm.vi

This inputs the USB gauge response and, if the response contains an alarm, outputs the corresponding alarm.

Alarm Confirm.vi (4815)



Query alarm from gauges.

Alarm: Speed alarm, Level alarm, Reference Position alarm

Input connectors (excluding common parts)

Connector	Format	Description
Returned Command	Character string	Character string queried by the DoCommand method

Output connectors (excluding common parts)

Connector	Format	Description
Alarm	U16 text ring	Alarm output by the USB gauge 0 : No Alarm 1 : Speed 2 : Level 3 : Speed + Level 4 : Reference Position 5 : Speed + Reference Position 6 : Level + Reference Position 7 : Speed + Level + Reference Position

Related properties, methods, and commands

- None

3-8. VI in the Private Folder

The Private folder contains the VI used only within Magnescale DS8xx.lvlib. The access scope is set to "private," so these VI cannot be called directly from VI not included in Magnescale DS8xx.lvlib.

3-8-1. Default Instrument Setup.vi

This makes the following settings for the USB gauge corresponding to the input handle:

- HOFF : Cancels settings related to the output format.
- HCSV : Sets the delimiter in the output format to comma.
- HNO : Adds the line number to the output.
- HTS : Adds the time stamp to the output.

Default Instrument Setup.vi (4815)



Default setup

HOFF:no frag, HCSV:putput form=CSV, HNO:add data index, HTS:add timestamp

Related properties, methods, and commands

- Method DoCommand
- Command HOFF
- Command HCSV
- Command HNO
- Command HTS
- Command HSTATUS

3-9. VI in the Example Folder

The Example folder contains simple VI created using the VI of Magnescale DS8xx.lvlib.

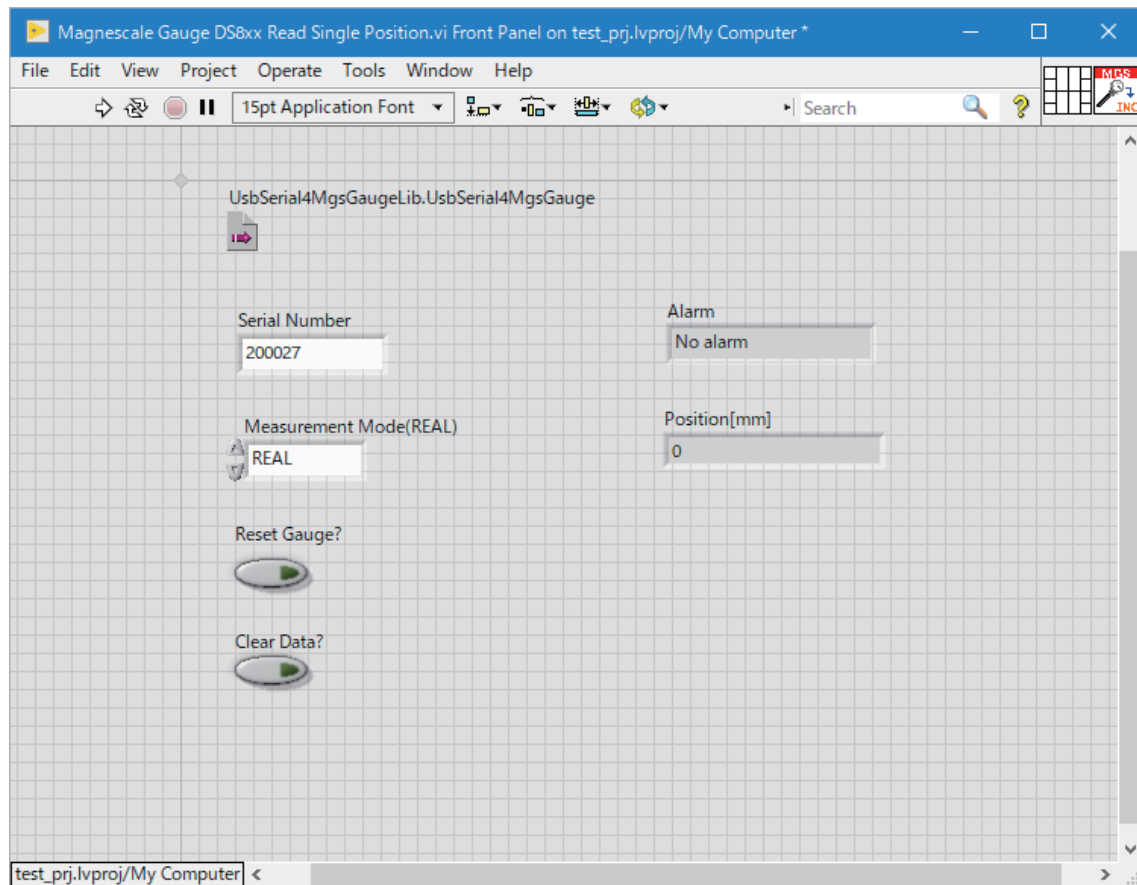
3-9-1. Magnescale Gauge DS8xx Read Single Position.vi

When the serial number and measurement mode of the USB gauge are input and this VI is executed, one value is acquired with reference position mode = Incremental. When Reset Gauge? is set to True, the gauge is reset before getting the data. When Clear Data? is set to True, the gauge maximum, minimum, and P-P values are initialized before getting the data.

Magnescale Gauge DS8xx Read Single Position.vi (4815)



Set measurement mode and obtain a value of the gauge specified by serial number.



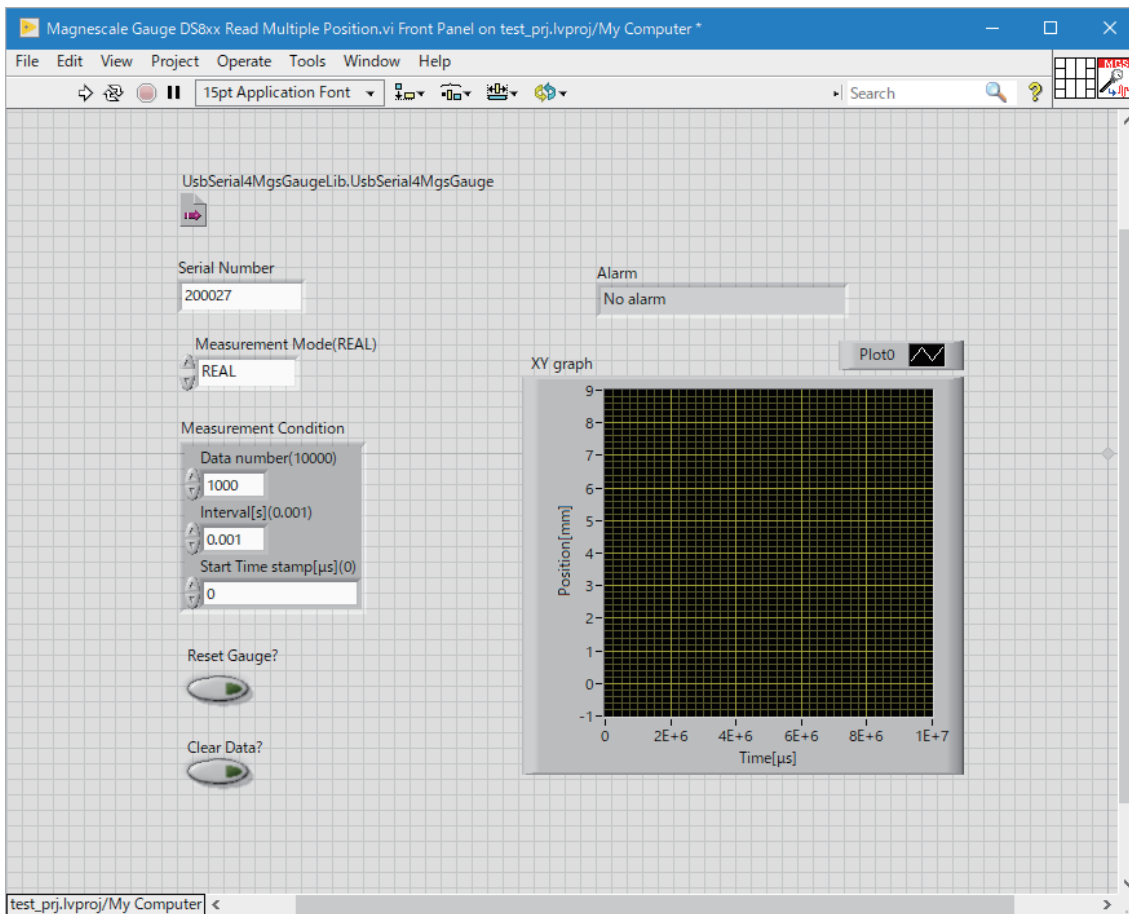
3-9-2. Magnescale Gauge DS8xx Read Multiple Position.vi

When the serial number, measurement mode, and measurement conditions (number of data, measurement interval, start time stamp) of the USB gauge are input and this VI is executed, the values are acquired with reference position mode = Incremental. When Reset Gauge? is set to True, the gauge is reset before getting the data. When Clear Data? is set to True, the gauge maximum, minimum, and P-P values are initialized before getting the data.

Magnescale Gauge DS8xx Read Multiple Position.vi (4815)



Set measurement mode and obtain multiple values and time stamp of the gauge specified by serial number.



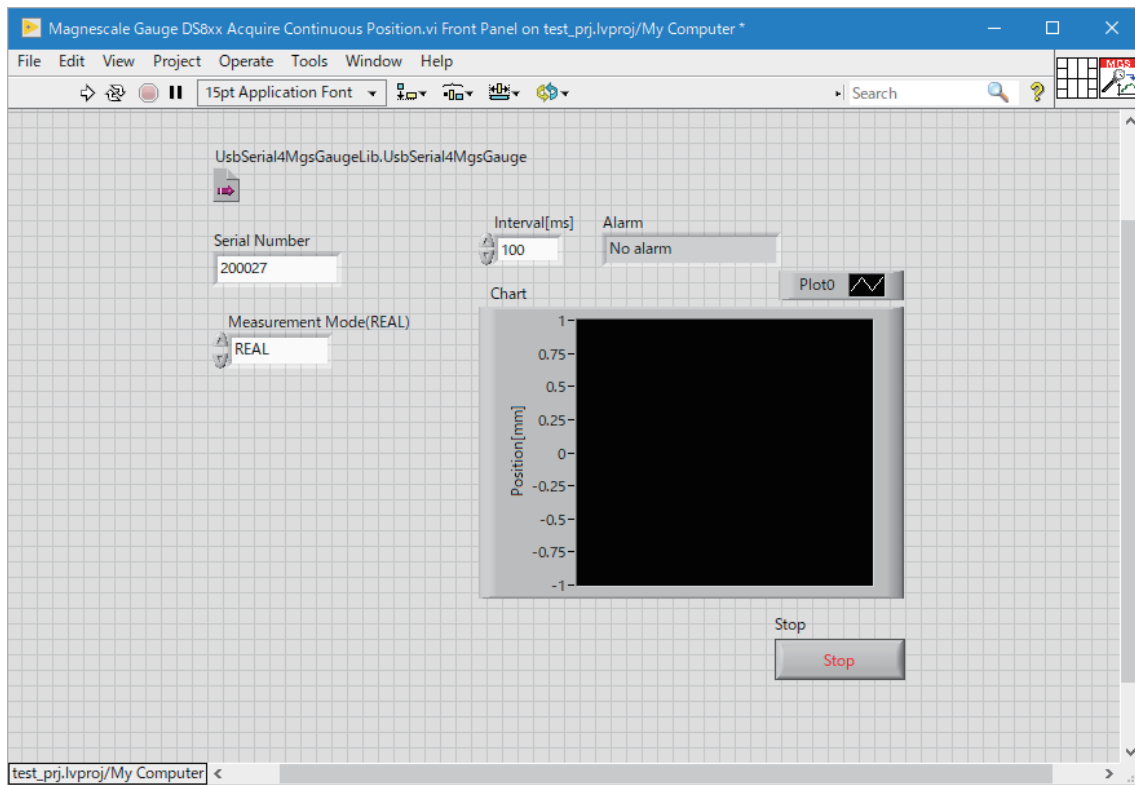
3-9-3. Magnescale Gauge DS8xx Acquire Continuous Position.vi

When the serial number and measurement mode of the USB gauge are input and this VI is executed, the gauge is reset and then values are repeatedly acquired at the input time interval with reference position mode = Incremental. When the Stop button is clicked, repeat acquisition stops and the gauge is closed*.

Magnescale Gauge DS8xx Acquire Continuous Position.vi (4815)



Set measurement mode and repeat obtaining a values of the gauge specified by serial number.



* Click the Stop button below the waveform chart to end VI execution. If execution is ended using the "Suspend" button in the tool bar, an error will occur when the VI is executed again.

4. Precautions

When a USB gauge has been opened by Initialize.vi or another method, always close the USB gauge before ending VI. If VI execution is ended without closing the USB gauge, an error will occur when VI is executed again.

Errors that occur when a gauge is not closed

#	Error	Occurrence condition	Remedial action
1	USB Gauge Access Denied.	Execution ended without closing the gauge.	Close LabVIEW without disconnecting the connected USB gauges. (Close all opened VI, etc. and close the start-up window.) After that, reopen LabVIEW.
2	“No Gauge Detected” occurs even when a USB gauge is connected.	USB gauge disconnected without closing LabVIEW in the above error status.	Close LabVIEW and then disconnect and reconnect the USB gauges.

- When MGS USB Gauge Monitor is used after using this LabVIEW driver, the position may not be displayed in MGS USB Gauge Monitor. In that case, disconnect the connected USB gauge and then reconnect it.

Appendix-1 Handling of ActiveX Control

USB gauges are controlled using the ActiveX control distributed by Magnescale Co., Ltd.. Therefore, this LabVIEW driver is wired using automation reference wires. This section describes how to register the ActiveX control used by this LabVIEW driver and how to use ActiveX control with LabVIEW.

A-1-1. Class registration

When installing MGS USB Gauge Monitor from the our website, class registration is performed in the process of installation, so there is no need for registration by the user. However, registration by the user is required in the following cases:

- When using ActiveX control without installing MGS USB Gauge Monitor (The STMicroelectronics Virtual COM Port driver settings must be made manually.)
- When changing the ActiveX control version.
- When using ActiveX control with 64-bit LabVIEW (64-bit software).
Even when using a 64-bit OS, if the LabVIEW to be used is 32-bit, the class redistered by MGS USB Gauge Monitor installation can be used.)

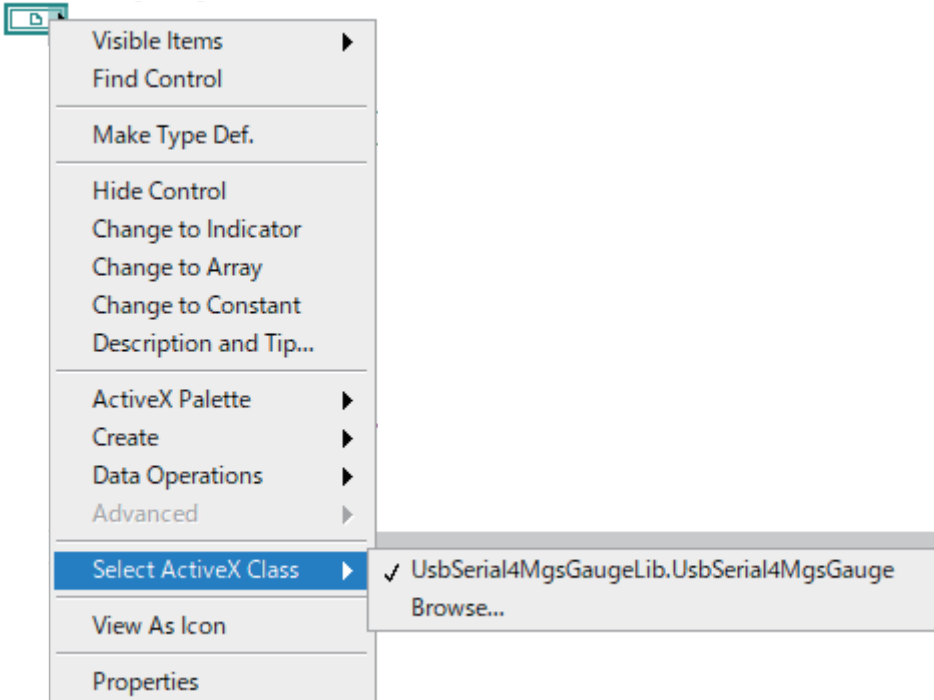
Class registration procedure

1. Execute the command prompt with administrator rights.
2. Input and execute the command `regsvr32 "UsbSerial4MgsGauge.ocx path"`.
(In case of a 64-bit OS, specify the 32-bit `UsbSerial4MgsGauge.ocx` path when using with 32-bit LabVIEW, or the 64-bit `UsbSerial4MgsGauge.ocx` path when using with 64-bit LabVIEW.)

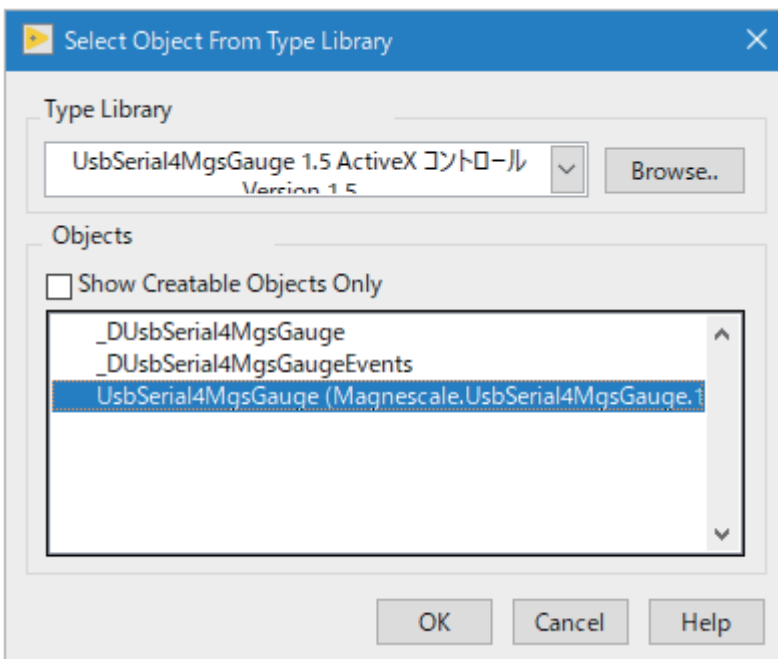
A-1-2. Handling of Automation refnum

All VI have the input and output connectors of the Automation refnum of UsbSerial4MgsGauge.ocx. Make the Automation refnum settings as follows:

1. Locate the sub VI included in Magnescale DS8xx.lvlib in the block diagram, right-click the Out connector of either UsbSerial4MgsGaugeLib.UsbSerial4MgsGauge or UsbSerial4MgsGaugeLib.UsbSerial4MgsGauge, and select Create → Constant (or Controller). Or, locate the Automation refnum controller on the front panel.
2. Right-click the Automation refnum constant (controller) and open Select ActiveX Class. Select "Select ActiveX Class," then select "UsbSerial4MgsGaugeLib.UsbSerial4MgsGauge." If there is no UsbSerial4MgsGaugeLib.UsbSerial4MgsGauge item in Select ActiveX Class, select "Browse" and proceed to Step 3.



3. If "Browse" was selected in Step 2, select UsbSerial4MgsGauge x.x ActiveX control Version x.x (x.x is the version number) from the Type Library list and select UsbSerial4MgsGauge (Magnescale.UsbSerial4MgsGauge.1) from the Object list



If UsbSerial4MgsGauge x.x ActiveX control Version x.x is not present in the Type Library list in "Select Object From Type Library" window, UsbSerial4MgsGauge.ocx may not be registered. UsbSerial4MgsGauge.ocx can be introduced by installing the MGS USB Gauge Monitor software available on our website.

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