



# **3390 Power Analyzer Driver Function User's Manual**

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## Revision History

Edition	Contents	Reviser	Date
1.00	First Edition	HIOKI	2009/07/27

## Contents

<b>1. Overview .....</b>	<b>5</b>
<b>2. Precondition.....</b>	<b>5</b>
<b>3. Driver Explanation.....</b>	<b>6</b>
3.1 Driver Common Input & Output .....	6
3.1.1 Input Items .....	6
3.1.2 Output Items .....	6
3.2 Common Commands .....	7
3.2.1 HIOKI3390 Initialize.vi .....	7
3.2.2 HIOKI3390 Close.vi .....	8
3.2.3 HIOKI3390 CLS.vi .....	9
3.2.4 HIOKI3390 ESR.vi .....	10
3.2.5 HIOKI3390 IDN.vi .....	11
3.2.6 HIOKI3390 OPC.vi .....	12
3.2.7 HIOKI3390 OPT.vi .....	13
3.2.8 HIOKI3390 RST.vi .....	14
3.2.9 HIOKI3390 TRG.vi .....	15
3.2.10 HIOKI3390 WAI.vi .....	16
3.3 Device Specific Command .....	17
3.3.1 HIOKI3390 Conf Aout.vi .....	17
3.3.2 HIOKI3390 Conf AutoRange.vi .....	19
3.3.3 HIOKI3390 Conf Averaging.vi .....	20
3.3.4 HIOKI3390 Conf Calculate.vi .....	21
3.3.5 HIOKI3390 Conf Current.vi .....	22
3.3.6 HIOKI3390 Conf Deltay.vi .....	23
3.3.7 HIOKI3390 Demag.vi .....	24
3.3.8 HIOKI3390 Conf External A.vi .....	25
3.3.9 HIOKI3390 Conf External A DC.vi .....	26
3.3.10 HIOKI3390 Conf External A Freq.vi .....	27
3.3.11 HIOKI3390 Conf External B.vi .....	29
3.3.12 HIOKI3390 Conf External B DC.vi .....	30
3.3.13 HIOKI3390 Conf External B Pulse.vi .....	31
3.3.14 HIOKI3390 External Phase ZeroAdjust.vi .....	32
3.3.15 HIOKI3390 External ZeroAdjust.vi .....	33
3.3.16 HIOKI3390 Conf FFT.vi .....	34
3.3.17 HIOKI3390 Conf Filter.vi .....	35
3.3.18 HIOKI3390 Conf Frequency.vi .....	36
3.3.19 HIOKI3390 Conf Harmonic.vi .....	37
3.3.20 HIOKI3390 Hold.vi .....	38
3.3.21 HIOKI3390 Integrate Status.vi .....	39
3.3.22 HIOKI3390 Conf Integrate.vi .....	40
3.3.23 HIOKI3390 Integrate_Reset.vi .....	41
3.3.24 HIOKI3390 Integrate_Start.vi .....	42
3.3.25 HIOKI3390 Integrate_Stop.vi .....	43
3.3.26 HIOKI3390 Conf Interval.vi .....	44

3.3.27	HIOKI3390 Conf KeyLook.vi .....	45
3.3.28	HIOKI3390 Conf LPF.vi .....	46
3.3.29	HIOKI3390 Conf Measure.vi .....	47
3.3.30	HIOKI3390 Conf Measure Harmonic.vi .....	48
3.3.31	HIOKI3390 Measure.vi .....	49
3.3.32	HIOKI3390 Measure Harmonic.vi .....	50
3.3.33	HIOKI3390 Measure NoisePeak.vi .....	51
3.3.34	HIOKI3390 Conf Mode.vi .....	52
3.3.35	HIOKI3390 Conf Scale.vi .....	53
3.3.36	HIOKI3390 Conf Source.vi .....	54
3.3.37	HIOKI3390 Conf Sync.vi .....	55
3.3.38	HIOKI3390 Conf Timer.vi .....	56
3.3.39	HIOKI3390 Conf Voltage.vi .....	57
3.3.40	HIOKI3390 Conf ZeroSp.vi .....	58
<b>4.</b>	<b>DATA Structure .....</b>	<b>59</b>
4.1	Output Items of HIOKI3390 Conf Measure.vi and its sequential order .....	59
4.2	Output Items of HIOKI3390 Conf Measure Harmonic.vi and its sequential order .....	60
4.3	Status Data .....	61

## 1. Overview

This program can change the settings and query the power analyzer (hereinafter, measurement device) from the computer using the TCP/IP.

The program is divided into multiple Vi according to the functions.

## 2. Precondition





The following requirement needs to be met when using this program.

- Experience in program development using LabVIEW



## 3. Driver Explanation

### 3.1 Driver Common Input & Output

#### 3.1.1 Input Items

Name	Data Type	Explanation
connection ID		TCP/IP Connection ID
Set/Query		Specify whether to set the program operating mode to the set mode for the device, or to query the settings of the device. Input Range: False (Set: Default), True (Query)
Error Out		After sending the driver command, send the *ESR Command automatically and acquires error information. When an error occurs, input to error out. Input Range: False (Off: Default), True (On)
error in		Please refer the LabVIEW online reference's section on error report for a detailed explanation on error input. Default Value: no error

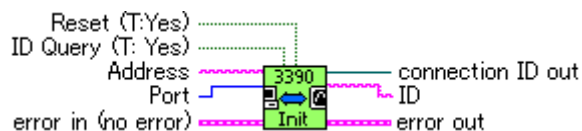
#### 3.1.2 Output Items

Name	Data Type	Explanation
connection ID out		Copied TCP/IP Connection ID
error out		Please refer the LabVIEW online reference's section on error report for a detailed explanation on error output.  When 3390 cannot be set properly, output error code (1300). Errors may be caused by <ul style="list-style-type: none"> <li>Integration or HOLD/PEAK HOLD mode</li> <li>Restrictions imposed by wiring mode</li> <li>Restrictions imposed by the availability of options</li> <li>affected by other settings for others</li> </ul> Please confirm with the 3390 instruction manual.






## 3.2 Common Commands

### 3.2.1 HIOKI3390 Initialize.vi

Starts the communication with the 3390 device.

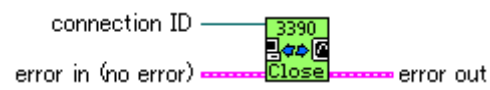


#### Input Output

Name	Data Type	Explanation
Address		Specify the 3390 IP Address. The default setting is 192.168.0.1.
Port		Specify the Port number. The default setting is 3390.
ID Query		Output the connection device's ID.
Reset		Send the RST command to the connection device and reset the settings.
ID		Return the device's ID. Valid when the ID Query is True.

### 3.2.2 HIOKI3390 Close.vi

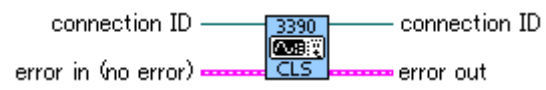
Disconnects the communication with the 3390 device.





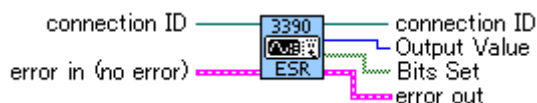
### 3.2.3 HIOKI3390 CLS.vi

Clears the event register.



### 3.2.4 HIOKI3390 ESR.vi

Returns and clears the contents of the event register.

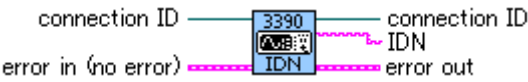


#### Input Output

Name	Data Type	Explanation
Frequency		Outputs the query results of the event register as numerical values.
Integrate		<p>Outputs the query results of the event register in Boolean Array.</p> <p>bit7(PON): Power On Flag Turns to 1 when power is switched on or when power is returned after a blackout.</p> <p>bit6(URQ): User Request Not available in the 3390.</p> <p>bit5(CME): Command Error (Ignores commands up to the message terminator) Turns to 1 when there are syntactical and command errors in the commands received.</p> <ul style="list-style-type: none"> <li>• When there is an error in the program header</li> <li>• When the data value is different from the specified value</li> <li>• When the data type is different from the specified type</li> </ul> <p>bit4(EXE): Execution error Turns to 1 when the command cannot be executed for whatever reason.</p> <ul style="list-style-type: none"> <li>• When the specified data is outside the set range</li> <li>• When the specified data cannot be set</li> <li>• When another function is in operation and the command cannot be executed (holding, integrating, etc.)</li> </ul> <p>bit3(DDE): Device-dependent error Turns to 1 when the command cannot be executed due to causes other than a command error, query error or execution error.</p> <ul style="list-style-type: none"> <li>• When there is an internal problem and the command could not be executed</li> </ul> <p>bit2(QYE): Query error Turns to 1 when the error is detected by the output cue control part.</p> <ul style="list-style-type: none"> <li>• When the data inundated the output cue</li> </ul> <p>bit1(RQC): Request for controller right Not available in the 3390.</p> <p>bit0(OPC): Operation completed Not available in the 3390.</p>

3.2.5 HIOKI3390 IDN.vi

Queries the Device ID.

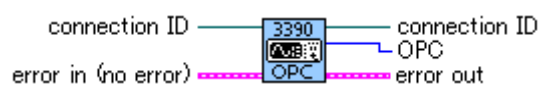


Input Output

Name	Data Type	Explanation
IDN		Outputs the query results. Output Items: <Maker>, <Model>, <Serial Number>, <Software Version>

### 3.2.6 HIOKI3390 OPC.vi

Outputs 1 when out of the commands sent, the commands before HIOKI3390 OPC.vi has finished processing.

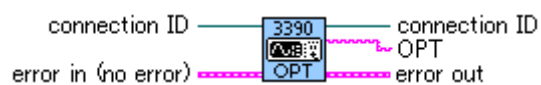


#### Input Output


Name	Data Type	Explanation
OPC	I32	Returns 1.

### 3.2.7 HIOKI3390 OPT.vi

Queries the option types attached to the 3390.

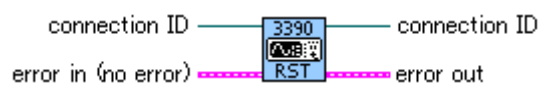


#### Input Output

Name	Data Type	Explanation
OPT		Outputs the query results of the options. Output Items: <CH1 Sensor>, <CH2 Sensor>, <CH3 Sensor>, <CH4 Sensor>, <Option>, <Option Serial Number>

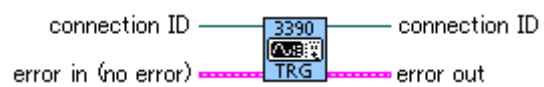
### 3.2.8 HIOKI3390 RST.vi

Sets the various device settings, except for language and command settings, to factory defaults.



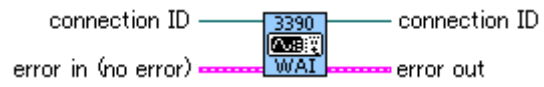
### 3.2.9 HIOKI3390 TRG.vi

Measures once in Hold and Peak Hold status.



### 3.2.10 HIOKI3390 WAI.vi

Waits until the next refresh is completed.



#### Note

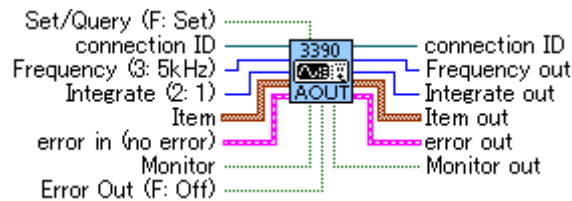
In Hold status, the display data will not change even when this command is executed.



### 3.3 Device Specific Command

#### 3.3.1 HIOKI3390 Conf Aout.vi



Sets and reads the functions related to D/A Output.



#### Input Output

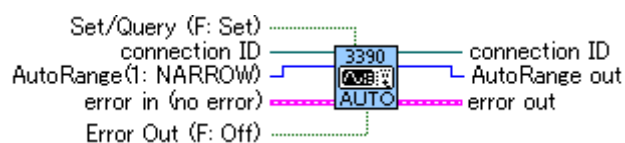
Name	Data Type	Explanation
Frequency		Sets the frequency full scale and the motor's maximum frequency. Input Range: 0 (100 Hz), 1 (500 Hz), 2 (1kHz), 3 (5kHz: Default)  Note The settings for the frequency full scale of D/A Output and the settings for the motor's measured maximum frequency are the same.
Integrate		Sets the Integration full scale coefficients. Input Range: 0(1/10), 1(1/2), 2(1: Default), 3(5), 4(10), 5(50), 6(100), 7(500), 8(1000), 9(5000), 10(10000)
Item		Sets the D/A Output Items (Item, CH). Specifies the output items between 1 and 16. Item Input Range: 0(OFF), 1(Urms: Default), 2(Umn), 3(Uac), 4(Udc), 5(Ufnd), 6(Upk+), 7(Upk-), 8(Uthd), 9(Urf), 10(Uunb), 11(Irms), 12(lmn), 13(lac), 14(ldc), 15(lfnd), 16(lpk+), 17(lpk-), 18(lthd), 19(lrf), 20(lunb), 21(P), 22(S), 23(Q), 24(PF), 25(DEG U), 26(DEG I), 27(DEG P), 28(f), 29(EFFI), 30(LOSS), 31(IH+), 32(IH-), 33(IH), 34(WP+), 35(WP-), 36(WP), 37(CH A), 38(CH B), 39(Pm), 40(Slip), 41(TEMP)  Ch Input Range: 0(1: Default), 1(2), 2(3), 3(4), 4(12), 5(34), 6(123)
Monitor		Sets the ON/OFF of the waveform output. Input Range: FALSE (OFF), True (ON: Default)
Frequency out		Outputs the query results of the frequency full scale and the maximum frequency. Output Value: 0(100Hz), 1(500Hz), 2(1kHz), 3(5kHz)
Integrate out		Outputs the query results of the integration full scale. Output Value: 0(1/10), 1(1/2), 2(1), 3(5), 4(10), 5(50), 6(100), 7(500), 8(1000), 9(5000), 10(10000)

## Input Output (Cont'd)

Name	Data Type	Explanation
Item out		<p>Outputs the query results of the D/A Output Items.</p> <p>Item</p> <p>Output Range: 0(OFF), 1(Urms), 2(Umn), 3(Uac), 4(Udc), 5(Ufnd), 6(Upk+), 7(Upk-), 8(Uthd), 9(Urf), 10(Uunb), 11(Irms), 12(lmn), 13(lac), 14(ldc), 15(lfnd), 16(lpk+), 17(lpk-), 18(lthd), 19(lrf), 20(lunb), 21(P), 22(S), 23(Q), 24(PF), 25(DEG U), 26(DEG I), 27(DEG P), 28(f), 29(EFFI), 30(LOSS), 31(IH+), 32(IH-), 33(IH), 34(WP+), 35(WP-), 36(WP), 37(CH A), 38(CH B), 39(Pm), 40(Slip), 41(TEMP)</p> <p>Ch</p> <p>Output Value: 0(1), 1(2), 2(3), 3(4), 4(12), 5(34), 6(123)</p>
Monitor out		<p>Outputs the query results of the waveform output.</p> <p>Output Value: False (OFF), True (ON)</p>

### 3.3.2 HIOKI3390 Conf AutoRange.vi

Sets and reads the AutoRange.

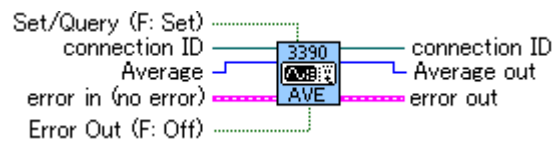


#### Input Output



Name	Data Type	Explanation
AutoRange		Sets the AutoRange. Input Range: 0 (WIDTH), 1 (NARROW: Default)
AutoRange out		Outputs the query results of the AutoRange.

### 3.3.3 HIOKI3390 Conf Averaging.vi

Sets and reads the average.

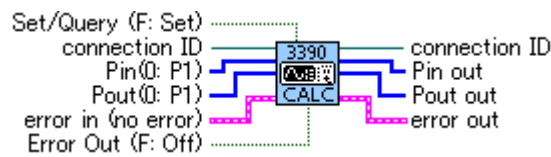


#### Input Output

Name	Data Type	Explanation
Average		<p>Sets the average. Input Range: 0 (OFF: Default), 1 (FAST), 2 (MID), 3 (SLOW)</p> <p>Note: The averaging process will start again when the average setting is changed.</p>
Average out		Outputs the query results of the average.

### 3.3.4 HIOKI3390 Conf Calculate.vi

Sets and reads the Efficiency/Loss Calculation Formula.

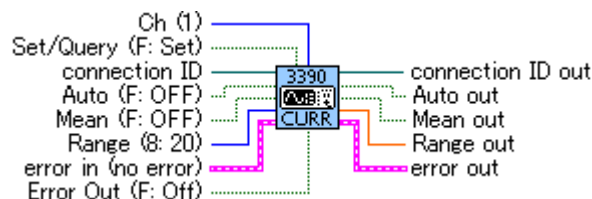


#### Input Output

Name	Data Type	Explanation
Pin		<p>Sets the Pin items of the Efficiency/Loss Calculation Formula for CH1 – CH3 in array.</p> <p>Input Range: 0 (P1: Default), 1 (P2), 2 (P3), 3 (P4), 4 (P12), 5 (P34), 6 (P123), 7 (Pm)</p> <p>Note: P12/P34/P123 cannot be specified when they cannot be selected because of the wiring setting. Pm can only be specified during the implementation of the Motor Analysis Option and when Pm is selectable.</p>
Pout		<p>Sets the Pout items of the Efficiency/Loss Calculation Formula for CH1 – CH3 in array.</p> <p>Input Range: 0 (P1: Default), 1 (P2), 2 (P3), 3 (P4), 4 (P12), 5 (P34), 6 (P123), 7 (Pm)</p> <p>Note: P12/P34/P123 cannot be specified when they cannot be selected because of the wiring setting. Pm can only be specified during the implementation of the Motor Analysis Option and when Pm is selectable.</p>
Pin out		Outputs the query results of the Efficiency/Loss Calculation Formula Pin Items for CH1 – CH3.
Pout out		Outputs the query results of the Efficiency/Loss Calculation Formula Pout Items for CH1 – CH3 in array.

### 3.3.5 HIOKI3390 Conf Current.vi

Sets and reads the functions related to current.

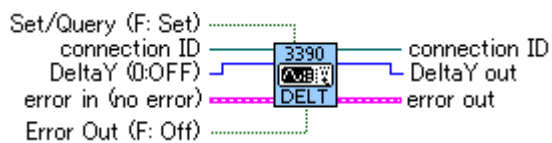


#### Input Output

Name	Data Type	Explanation
Ch		Sets the Input unit. Input Range: 1 (Default) – 4
Auto		Sets the electric current range to AutoRange. Input Range: False (OFF: Default), True (ON)  Note: Depending on the measurement line combination (for above 1P3W), the current AutoRange settings of other channels in the combination may be changed too.
Mean		Sets the Electric Current Rectification Method to MEAN. Input Range: False (OFF: Default), True (ON)
Range		Sets the current range. Valid when the AutoRange is OFF. Input Range: 0(0.4), 1(0.8), 2(1), 3(2), 4(4), 5(5), 6(8), 7(10), 8(20:Default), 9(40), 10(50), 11(80), 12(100), 13(200), 14(500)  Note: When the range is changed, please wait until the internal circuit is stabilized before reading the measured value. Depending on the measurement line combination (for above 1P3W), the current range settings of other channels in the combination may be changed too.
Auto out		Outputs the query results of AutoRange. Output Value: False (OFF), True (ON)
Mean out		Outputs the query results of the Rectification Method (MEAN). Output Value: False (OFF), True (ON)
Range out		Outputs the query results of the range. Output Value: 0.4 - 500

### 3.3.6 HIOKI3390 Conf Deltay.vi

Sets and reads the  $\Delta - Y$  formula.

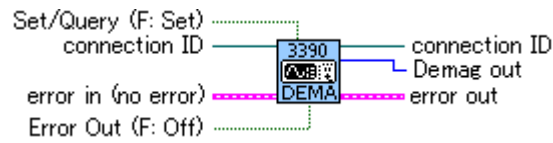


#### Input Output

Name	Data Type	Explanation
Deltay		Sets the $\Delta - Y$ formula. Input Range: 0 (Off: Default), 1 (On)
Deltay out		Outputs the query results of the $\Delta - Y$ formula.

### 3.3.7 HIOKI3390 Demag.vi

Executes the Zero Adjust.



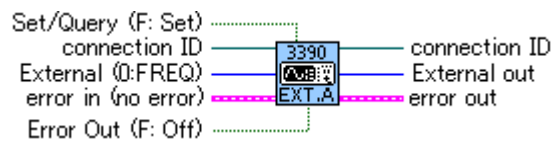
#### Input Output

Name	Data Type	Explanation
Demag out	I32	<p>Outputs the query results of the zero adjust. Output Value:  OK (0): Normal completion  BUSY (1): Executing Zero Adjust  ERROR (2): Zero Adjust Failed</p> <p>Note:  The zero adjust takes more than 30 seconds to execute and in that period, you may get an execution command. Please combine with the "HIOKI3390 OPC.vi" and wait for the OPC response before sending the next command. The OPC response indicates the completion of zero adjust.</p>



### 3.3.8 HIOKI3390 Conf External A.vi

Sets and reads the Motor Analysis Option's Channel A Input.

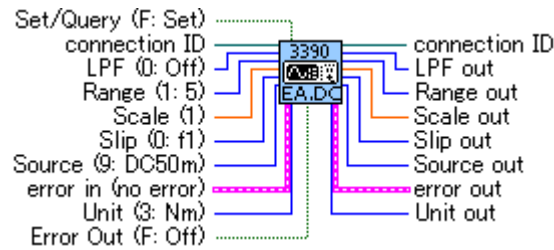


#### Input Output

Name	Data Type	Explanation
External		<p>Sets the Channel A Input of the Motor Analysis Option. Input Range: 0 (FREQ), 1 (DC: Default)</p> <p>Note: When the Channel A input is set to Analog DC, if Channel A's unit is "Hz", it will change to "V". When the Channel A input is set to frequency, if Channel A's unit is "V", it will change to "Hz".</p>
External out		Outputs the query results of the Channel A Input of the Motor Analysis Option.

### 3.3.9 HIOKI3390 Conf External A DC.vi

Sets and reads the function related to the Motor Analysis Option's Channel A voltage.



#### Input Output

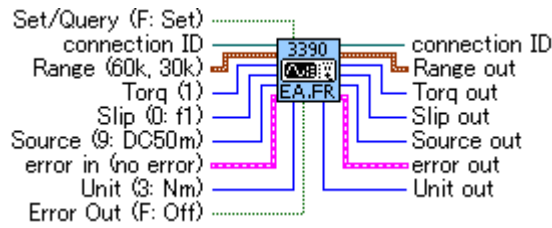
Name	Data Type	Explanation
LPF		Sets the low pass filter of the Motor Analysis Option. Input Range: 0 (Off: Default), 1 (On)
Range		Sets the voltage of Channel A. Input Range: 0 (1), 1 (5: Default), 2 (10)
Scale		Sets the scaling of Channel A. Input Range: 0.01 – 9999.99 (1.00: Default)
Slip		Sets the input frequency sources for the slip calculations. Input Range: 0 (f1: Default), 1 (f2), 2 (f3), 3 (f4)
Source		Sets the Motor Synchronized Source. Input Range: 0 (U1), 1 (U2), 2 (U3), 3 (U4), 4 (I1), 5 (I2), 6 (I3), 7 (I4), 8 (Ext), 9 (DC50ms: Default), 10 (DC100ms)  Note: Ext can only be set when ChB is set as pulse.
Unit		Sets the Channel A unit. Input Range: 0 (V), 1 (Hz), 2 (mNm), 3 (Nm: Default), 4 (kNm)  Note: When Channel A is in the Analog DC setting and “Hz” is set, the Channel A input setting changes to frequency, and when the Channel A is in the frequency setting and “V” is set, the Channel A input setting changes to Analog DC.
LPF out		Outputs the query results of the Low Pass Filter of the Motor Analysis Option. Output Range: 0 (Off), 1 (On)
Range out		Outputs the query results of the Channel A voltage range. Output Range: 0 (1), 1 (5), 2 (10)
Scale out		Outputs the query results of Channel A scaling.
Slip out		Outputs the query results of the input frequencies for the slip calculations. Output Range: 0 (f1), 1 (f2), 2 (f3), 3 (f4)
Source out		Outputs the query results of the Motor Synchronized Source. Output Range: 0 (U1), 1 (U2), 2 (U3), 3 (U4), 4 (I1), 5 (I2), 6 (I3), 7 (I4), 8 (Ext), 9 (DC50ms), 10 (DC100ms)
Unit out		Outputs the query results of Channel A units. Output Range: 0 (V), 1 (Hz), 2 (mNm), 3 (Nm), 4 (kNm)

#### Note

This command is only valid when External A is DC.

### 3.3.10 HIOKI3390 Conf External A Freq.vi






Sets and reads the functions related to the Motor Analysis Option's Channel A input frequency.



#### Input Output

Name	Data Type	Explanation
Range		<p>Sets the Channel A's frequency ranges fc and fd. Input Range fc: 3000 – 98000 (60000: Default) Input Range fd: 1000 – 48000 (30000: Default)</p> <p>Note: Cannot be set if <math>fc + fd &lt; 100\text{kHz}</math> and <math>fc - fd &gt;</math> is not 1kHz. Always set fc and fd in multiples of 1000. This command is only valid when <b>External A is FREQ.</b></p>
Torq		<p>Sets the torque value of Channel A. Input Range: 1 – 999 (1: Default)</p> <p>Note: The values set here will be used in combination with the units set in UNIT. This command is only valid when <b>External A is FREQ.</b></p>
Slip		<p>Sets the Input Frequency Source for the slip calculations. Input Range: 0 (f1: Default), 1 (f2), 2 (f3), 3 (f4)</p>
Source		<p>Sets the Motor Synchronized Source. Input Range: 0 (U1), 1 (U2), 2 (U3), 3 (U4), 4 (I1), 5 (I2), 6 (I3), 7 (I4), 8 (Ext), 9 (DC50ms: Default), 10 (DC100ms)</p> <p>Note: Ext can only be set when chB is set as pulse.</p>
Unit		<p>Sets the Channel A units. Input Range: 0 (V), 1 (Hz), 2 (mNm), 3 (Nm), 4 (kNm)</p> <p>Note: When Channel A is in the Analog DC setting and "Hz" is set, the Channel A input setting changes to frequency, and when the Channel A is in the frequency setting and "V" is set, the Channel A input setting changes to Analog DC.</p>

## Input Output (Cont'd)

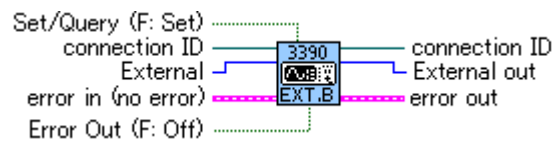
Name	Data Type	Explanation
Range out		Outputs the query results of the frequency ranges fc and fd of Channel A.
Torq out		Outputs the query results of the torque value of Channel A.
Slip out		Outputs the query results of the input frequency sources for the slip calculations. Output Range: 0 (f1), 1 (f2), 2 (f3), 3 (f4)
Source out		Outputs the query results of the Motor Synchronized Source. Output Range: 0 (U1), 1 (U2), 2 (U3), 3 (U4), 4 (I1), 5 (I2), 6 (I3), 7 (I4), 8 (Ext), 9 (DC50ms), 10 (DC100ms)
Unit out		Outputs the query results of the Channel A units. Output Range: 0 (V), 1 (Hz), 2 (mNm), 3 (Nm), 4 (kNm)

Note:

This command is only valid when **External A is FREQ**.

### 3.3.11 HIOKI3390 Conf External B.vi

Sets and reads the Motor Analysis Option's Channel B input.

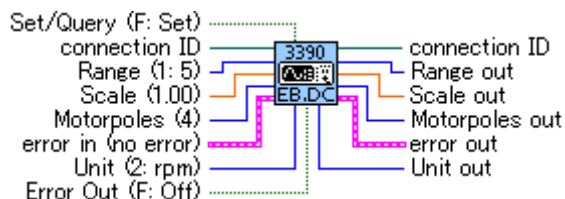


#### Input Output

Name	Data Type	Explanation
External		Sets the Pulse/Analog DC Input of Channel B. Input Range: 0 (PULSE: Default), 1 (DC)
External out		Outputs the query results of Channel B.

### 3.3.12 HIOKI3390 Conf External B DC.vi

Sets and reads the functions related to the Motor Analysis Option's Channel B voltage.



#### Input Output

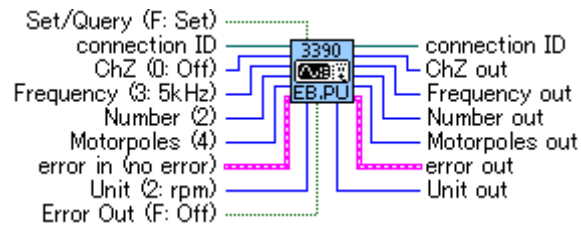
Name	Data Type	Explanation
Range		Sets the voltage range of Channel B. Input Range: 0 (1), 1 (5: Default), 2 (10)
Scale		Sets the Scaling of Channel B. Input Range: 0. 01 – 9999.99 (1.00: Default)
Motorpoles		Sets the Motor Poles. Input Range: even values of 2 – 98 (4: Default)  Note: When an odd number is set, an even number smaller than the set value will be set.
Unit		Sets the unit of Channel B. Input Range: 0 (V), 1 (Hz), 2 (rpm: Default)  Note: When Channel B is in the Pulse setting and “V” is set, Channel B’s input setting changes to Analog DC.
Range out		Outputs the query results of Channel B’s voltage range.
Scale out		Outputs the query results of Channel B’s scaling.
Motorpoles out		Outputs the query results of the Motor Poles.
Unit out		Outputs the query results of Channel B unit. Output Range: 0 (V), 1 (Hz), 2 (rpm)

Note:

This command is only valid when External B is DC.

### 3.3.13 HIOKI3390 Conf External B Pulse.vi

Sets and reads the functions related to the Motor Analysis Option's Channel B pulse.



#### Input Output

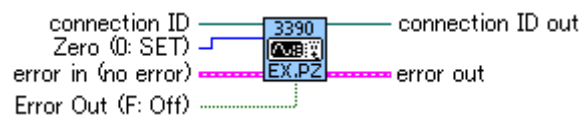
Name	Data Type	Explanation
ChZ		Sets the ON/OFF of Channel Z Input. (OFF: Default)
Frequency		Sets the measured maximum frequency of Channel B. Input Range: 100 Hz (0), 500 Hz (1), 1kHz (2), 5 kHz (3: Default)
Number		Sets the pulse value of Channel B. Input Range: 1 – 60000 (2: Default)  Note: Only half multiples of the motor poles that are set can be set.
Motorpoles		Sets the motor poles. Input Range: even values of 2 – 98 (4: Default)  Note: When an odd number is set, an even number smaller than the set value will be set.
Unit		Sets the unit of Channel B. Input Range: 0 (V), 1 (Hz), 2 (rpm: Default)  Note: When Channel B is in the Pulse setting and “V” is set, Channel B’s input setting changes to Analog DC.
Frequency out		Outputs the measured maximum frequency of Channel B.
Number out		Outputs the query results of the pulse value of Channel B.
Motorpoles out		Outputs query results of the motor poles.
Unit out		Outputs the query results of Channel B unit. Output Range: 0 (V), 1 (Hz), 2 (rpm)

Note:


This command is only valid when External B is PULSE.

### 3.3.14 HIOKI3390 External Phase ZeroAdjust.vi

Executes and clears the Motor Analysis Option Phase Zero Adjust.



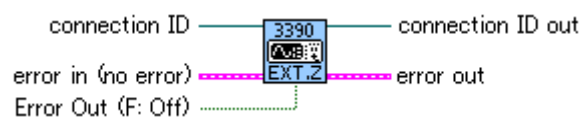
#### Input Output

Name	Data Type	Explanation
Zero		Executes the Phase Zero Adjust. Input Range: 0 (SET: Default), 1 (CLEAR)



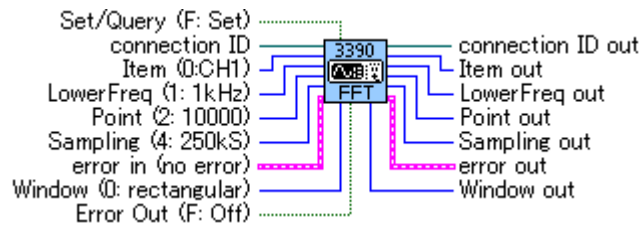
### 3.3.15 HIOKI3390 External ZeroAdjust.vi

Executes zero adjust of Motor Analysis Option.



### 3.3.16 HIOKI3390 Conf FFT.vi

Sets and reads functions related to Noise Analysis.

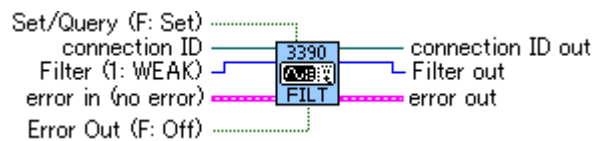


#### Input Output



Name	Data Type	Explanation
Item		Sets the measurement channels for Noise Analysis. Input Range: 0 (CH1: Default), 1 (CH2), 2 (CH3), 3 (CH4)
LowerFreq		Sets the noise lower frequency. Input Range: 0 (OFF), 1 (1kHz: Default), 2 (2kHz), 3 (3kHz), 4 (4kHz), 5 (5 kHz), 6 (6kHz), 7 (7kHz), 8 (8 kHz), 9 (9 kHz), 10 (10 kHz)
Point		Sets the point value for Noise Analysis. Input Range: 0 (1000), 1 (5000), 2 (10000: Default), 3 (50000)
Sampling		Sets the sampling speed for Noise Analysis. Input Range: 0 (10 kHz), 1 (25 kHz), 2 (50 kHz), 3 (100 kHz), 4 (250 kHz: Default), 5 (500 kHz)  Note: The lower frequency may be restricted depending on the setting for the noise lower frequency.
Window		Sets the Noise Analysis Window Function. Input Range: 0 (Rectangular: Default), 1 (Hanning), 2 (Flattop)
Item out		Outputs the query results of the measurement channels for Noise Analysis.
LowerFreq out		Outputs the query results of the Noise Lower Frequency.
Point out		Outputs the query results of the Noise Analysis Point Values.
Sampling out		Outputs the query results of the Noise Analysis Sampling Speed.
Window out		Outputs the query results of the Noise Analysis Window Function.

### 3.3.17 HIOKI3390 Conf Filter.vi

Sets and reads the zero cross filter.

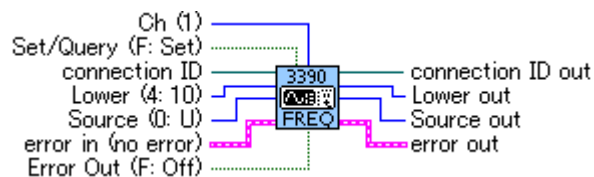


#### Input Output

Name	Data Type	Explanation
Filter		Sets the zero cross filter. Input Range: 0 (STRONG), 1 (WEAK: Default), 2 (OFF)
Filter out		Outputs the query results of the zero cross filter.

### 3.3.18 HIOKI3390 Conf Frequency.vi

Sets and reads the functions related to frequency measurement.

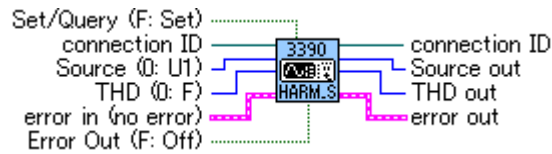


#### Input Output

Name	Data Type	Explanation
Ch		Specifies the input unit to set the Source. Input Range: 1 (Default) – 4
Lower		Sets the measurement lower frequency. Input Range: 0 (0.5 Hz), 1 (1 Hz), 2 (2 Hz), 3 (5 Hz), 4 (10 Hz: Default), 5 (20 Hz)
Source		Sets the frequency measurement source of the specified channel. Input Range: 0 (U: Default), 1 (I)
Lower out		Outputs the query results of the measurement lower frequency. Output Range: 0 (0.5 Hz), 1 (1 Hz), 2 (2 Hz), 3 (5 Hz), 4 (10 Hz), 5 (20 Hz)
Source out		Outputs the query results of the frequency measurement source of the specified channel. Output Range: 0 (U), 1 (I)

### 3.3.19 HIOKI3390 Conf Harmonic.vi

Sets and reads the functions related to the Harmonic Synchronization.

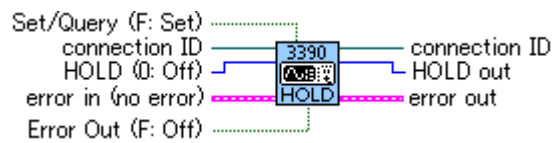


#### Input Output



Name	Data Type	Explanation
Source		Sets the Harmonic Synchronized Source. Input Range: 0 (U1: Default), 1 (U2), 2 (U3), 3(U4), 4 (I1), 5 (I2), 6 (I3), 7 (I4), 8 (Ext), 9 (DC50ms), 10 (DC 100ms)  Note: Ext can only be set when the Motor Analysis Option is implemented and when CH B is set to Pulse.
THD		Sets the THD Calculation Formula. Input Range: 0 (F: Default), 1 (R)
Source out		Outputs the query results of the Harmonic Synchronized Source. Output Range: 0 (U1), 1 (U2), 2 (U3), 3(U4), 4 (I1), 5 (I2), 6 (I3), 7 (I4), 8 (Ext), 9 (DC50ms), 10 (DC 100ms)
THD out		Outputs the query results of the THD Calculation Formula. Output Range: 0 (F), 1 (R)

### 3.3.20 HIOKI3390 Hold.vi

Sets and reads the Hold Status.

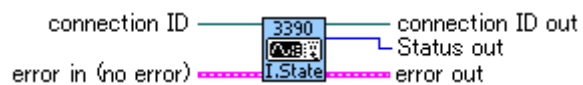


#### Input Output


Name	Data Type	Explanation
HOLD		<p>Sets the HOLD status. Input Range: 0 (OFF: Default), 1 (ON), 2 (PEAK)</p> <p>Note: Uses the "HIOKI3390 TRG.vi" to renew data during HOLD or PEAK HOLD status.</p>
HOLD out		Outputs the query results of the Hold Status.

### 3.3.21 HIOKI3390 Integrate Status.vi

Reads the integration (time control) status.

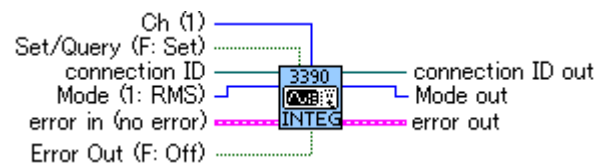


#### Input Output




Name	Data Type	Explanation
Status out		Outputs the query results of the device's integration status. Output Range: 0 (RESET), 1 (STOP), 2 (WAIT), 3 (RUN)

### 3.3.22 HIOKI3390 Conf Integrate.vi

Sets and reads the functions related to the Integration Mode.



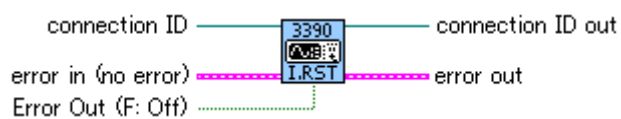
#### Input Output

Name	Data Type	Explanation
Ch		Sets the Input unit. Input Range: 1 (Default) – 4
Mode		Sets the Integration Mode. Input Range: 0 (DC), 1 (RMS: Default)
Mode out		Outputs the query results of the integration mode.



### 3.3.23 HIOKI3390 Integrate\_Reset.vi

Resets the Integration data. Same operation as the DATA RESET key on the main device.

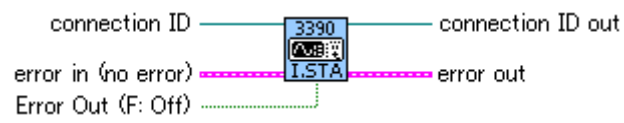


Note:

This command is only valid when Integration status is in STOP.

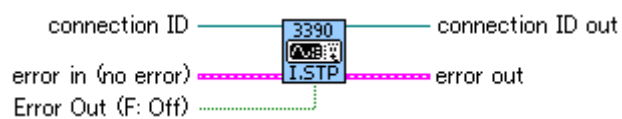
### 3.3.24 HIOKI3390 Integrate\_Start.vi

Starts Integration (time control).



### 3.3.25 HIOKI3390 Integrate\_Stop.vi

Stops Integration (time control).

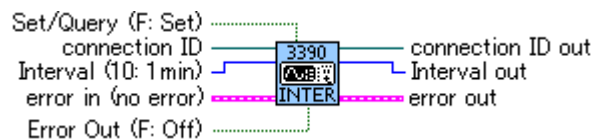


Note:

This command is only valid when Integration Status is in RUN/WAIT.

### 3.3.26 HIOKI3390 Conf Interval.vi

Sets and reads interval functions.

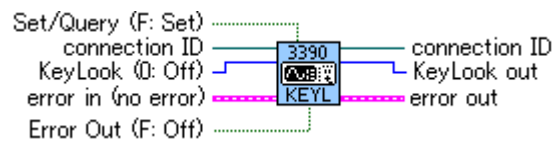


#### Input Output



Name	Data Type	Explanation
Interval		Sets the Interval Time. Input Range: 0 (OFF), 1 (50ms), 2 (100ms), 3 (200ms), 4 (500ms), 5 (1s), 6 (5s), 7 (10s), 8 (15s), 9 (30s), 10 (1min: Default), 11 (5 min), 12 (10min), 13 (15min), 14 (30min), 15 (60min)
Interval out		Outputs the query results of the integration mode. Output Range: 0 (OFF), 1 (50ms), 2 (100ms), 3 (200ms), 4 (500ms), 5 (1s), 6 (5s), 7 (10s), 8 (15s), 9 (30s), 10 (1min), 11 (5 min), 12 (10min), 13 (15min), 14 (30min), 15 (60min)

### 3.3.27 HIOKI3390 Conf KeyLook.vi

Sets and reads Key Lock.

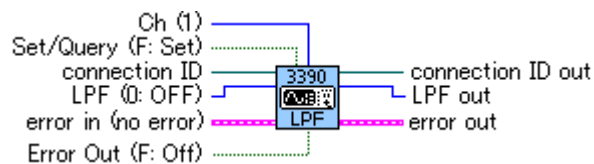


#### Input Output




Name	Data Type	Explanation
KeyLock		Sets the Key Lock ON/OFF. Input Range: 0 (Off: Default), 1 (On)
KeyLock out		Outputs the query results of Key Lock.

### 3.3.28 HIOKI3390 Conf LPF.vi

Sets and reads the Low Pulse Filter (LPF).

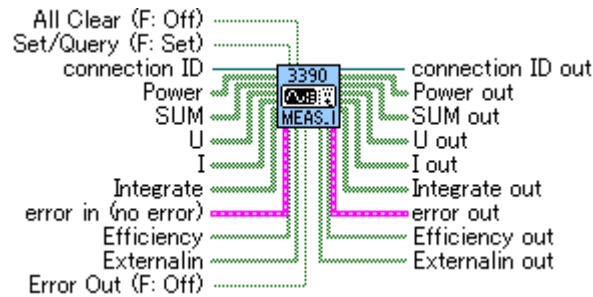


#### Input Output

Name	Data Type	Explanation
Ch		Sets the Input unit. Input Range: 1 (Default) – 4
LPF		Sets the cutoff frequency for the Low Pulse Filter (LPF). Input Range: 0 (OFF: Default), 1 (500 Hz), 2 (5kHz), 3 (100kHz)  Note: Depending on the measurement line combination (for above 1P3W), the LPF settings of other channels in the combination may be changed too.
LPF out		Outputs the query results of the cutoff frequency for the Low Pulse Filter (LPF).

### 3.3.29 HIOKI3390 Conf Measure.vi

Sets and reads the functions related to Measurement Data.



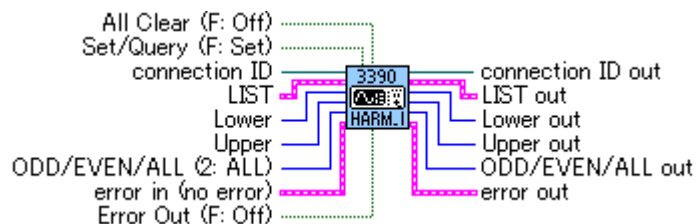
#### Input Output

Name	Data Type	Explanation
Power	[TF]	Sets the normal measurement communication output items of the various channels to Boolean's ON/OFF.
Sum	[TF]	Sets the normal measurement communication output items of SUM to Boolean's ON/OFF.
U	[TF]	Sets the voltage data communication output items to Boolean's ON/OFF.
I	[TF]	Sets the current data communication output items to Boolean's ON/OFF.
Integrate	[TF]	Sets the integration data communication output items to Boolean's ON/OFF.
Efficiency	[TF]	Sets the communication output items of the efficiency/loss calculation formula to Boolean's ON/OFF.
Externalin	[TF]	Sets the communication output items of Option ON/OFF to Boolean's ON/OFF.
All Clear	[TF]	Initializes the Output data items. All output data items become OFF.
Power out	[TF]	Outputs the query results of the normal measurement communication output items of the various channels.
Sum out	[TF]	Outputs the query results of the normal measurement communication output items of SUM.
U out	[TF]	Outputs the query results of the voltage data communication output items.
I out	[TF]	Outputs the query results of the current data communication output items.
Integrate out	[TF]	Outputs the query results of the integration data communication output items.
Efficiency out	[TF]	Outputs the query results of the communication output items of the efficiency/loss calculation.
Externalin out	[TF]	Outputs the query results of the communication output items of Option ON/OFF.

Note:  
All defaults are OFF.

### 3.3.30 HIOKI3390 Conf Measure Harmonic.vi

Sets and reads the functions related to the Harmonic Measurement Data.



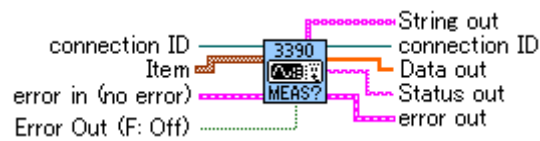
#### Input Output

Name	Data Type	Explanation
List		Sets the data responding as “HIOKI3390 Measure Harmonic.vi” to Boolean’s ON/OFF. Specify the Harmonic List (Level, Content, Phase Angle) here.
Lower		Sets the lower value. Input Range: 0 – 100 (0: Default)
Upper		Sets the upper value. Input Range: 0 – 100 (100: Default)
ODD/EVEN/ALL		Sets the Order: Input Range: 0 (ODD), 1 (EVEN), 2 (ALL: Default)
All Clear		Initializes the harmonic communication output data items. All harmonic communication output data items become OFF.
List out		Outputs the query results of the sent items.
Lower out		Outputs the query results of the lower value.
Upper out		Outputs the query results of the upper value.
ODD/EVEN/ALL out		Outputs the query results of the order. Output Range: 0 (ODD), 1 (EVEN), 2 (ALL)



### 3.3.31 HIOKI3390 Measure.vi

Reads the measurement data.

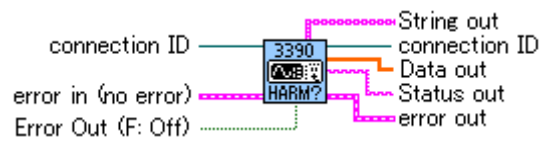


#### Input Output

Name	Data Type	Explanation
Item		<p>When the item number is more than 0 Creates measurement data specified by the item. Up to a maximum of 32 items. Items are arranged arbitrarily, and data is created in the order specified.</p> <p>When the item number is 0 Creates measurement data specified by "HIOKI3390 Conf Measure.vi". In this case, the measurement data's order is fixed. (Refer to output items and order) Status appears at the start of all data.</p>
Data out		Returns the measurement data.
Status out		Returns the Status data.
String out		Returns the measurement data as string.

### 3.3.32 HIOKI3390 Measure Harmonic.vi

Reads the Harmonic Measurement Data.

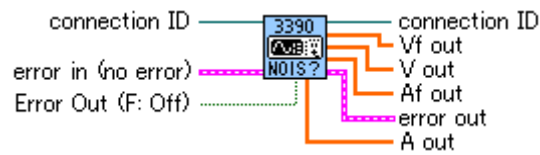


#### Input Output

Name	Data Type	Explanation
Data out		Returns the measurement data of items specified by "HIOKI3390 Conf Measure Harmonic.vi". In this case, the measurement data's order is fixed. (Refer to output items and order)
Status out		Returns the Status data.
String out		Returns the measurement data as string.

### 3.3.33 HIOKI3390 Measure NoisePeak.vi

Reads the Noise Measurement Data.

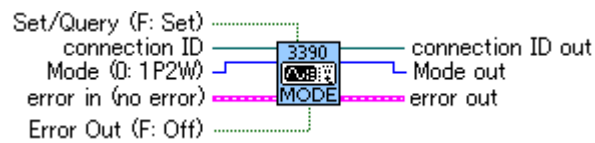


#### Input Output



Name	Data Type	Explanation
Vf out	[DBL]	Returns the frequencies of the ten maximum Noise Measurement voltage values.
V out	[DBL]	Returns the values of the ten maximum Noise Measurement voltage values.
Af out	[DBL]	Returns the frequencies of the ten maximum Noise Measurement current values.
A out	[DBL]	Returns the values of the ten maximum Noise Measurement current values.

### 3.3.34 HIOKI3390 Conf Mode.vi

Reads the wiring mode.

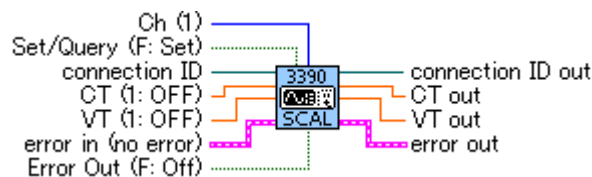


#### Input Output

Name	Data Type	Explanation
Mode		<p>Sets the wiring mode.</p> <p>Input Range: 0 (1P2W: Default), 1 (1P3W, 1P2W), 2 (3P3W2M, 1P2W), 3 (1P3W, 1P3W), 4 (3P3W2M, 1P3W), 5 (3P3W2M, 3P3W2M), 6 (3P3W3M, 1P2W), 7 (3P4W, 1P2W)</p> <p>Note: The setting for the wiring mode affects many other settings. Try to set this first before starting other settings. To set a combination mode for multiple channels, the current sensors for the combination channels must be the same.</p>
Mode out		<p>Outputs the query results of the wiring mode.</p> <p>Output Range: 0 (1P2W), 1 (1P3W, 1P2W), 2 (3P3W2M, 1P2W), 3 (1P3W, 1P3W), 4 (3P3W, 1P3W), 5 (3P3W2M, 3P3W2M), 6 (3P3W3M, 1P2W), 7 (3P4W, 1P2W)</p>

### 3.3.35 HIOKI3390 Conf Scale.vi

Sets and reads the CT, VT.

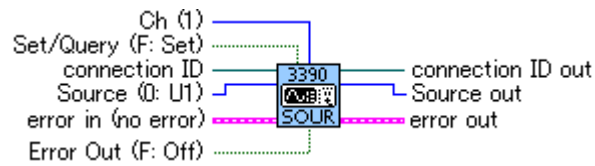


#### Input Output




Name	Data Type	Explanation
Ch		Sets the Input unit. Input Range: 1 (Default) - 4
CT		Sets the CT ratio of the specified channel. Input Range: 0. 01-9999.99 (1.00: Default)  Note: The setting for CT ratio OFF is 1. The query response for OFF is 1. The settings for other channels in the measurement line combination will be changed. Specify the starting channel in the channel combination.
VT		Sets the VT ratio for the specified channel. Input Range: 0. 01-9999.99 (1.00: Default)  Note: The setting for VT ratio OFF is 1. The query response for OFF is 1. The settings for other channels in the measurement line combination will be changed. Specify the starting channel in the channel combination.
CT out		Outputs the query results of the CT ratio of the specified channel.
VT out		Outputs the query results of the VT ratio of the specified channel.

### 3.3.36 HIOKI3390 Conf Source.vi

Sets and reads the Synchronized Source.

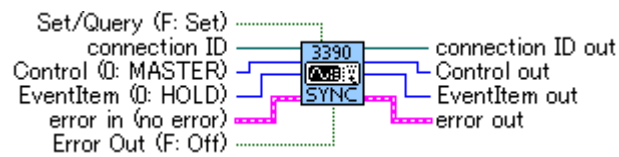


#### Input Output

Name	Data Type	Explanation
Ch		Sets the Input unit. Input Range: 1 (Default) - 4
Source		Sets the Synchronized Source of the specified channel. Input Range: 0 (U1: Default), 1 (U2), 2 (U3), 3(U4), 4 (I1), 5 (I2), 6 (I3), 7 (I4), 8 (Ext), 9 (DC50ms), 10 (DC 100ms)  Note: The settings for other channels in the measurement line combination will be changed. Ext can only be set when the Motor Analysis Option is implemented and when ch B is set to Pulse.
Source out		Outputs the query results of the Synchronized Source of the specified channel.

### 3.3.37 HIOKI3390 Conf Sync.vi

Sets and reads the functions related to the Synchronized Control.

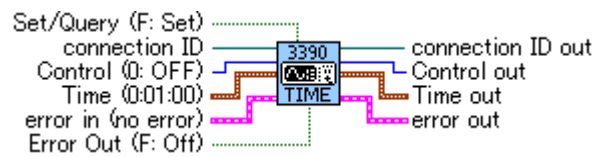


#### Input Output





Name	Data Type	Explanation
Control		Sets the Master/Slave of the Synchronized Control. Input Range: 0 (MASTER: Default), 1 (SLAVE)
EventItem		Sets the Synchronized Events of the Synchronized Control. Input Range: 0 (HOLD: Default), 1 (SAVE), 2 (COPY)
Control out		Outputs the query results of the Master/Slave of the Synchronized Control. Input Range: 0 (MASTER), 1 (SLAVE)
EventItem out		Outputs the query results Synchronized Events of the Synchronized Control. Input Range: 0 (HOLD), 1 (SAVE), 2 (COPY)

### 3.3.38 HIOKI3390 Conf Timer.vi

Sets and reads the functions related to the Timer Control.



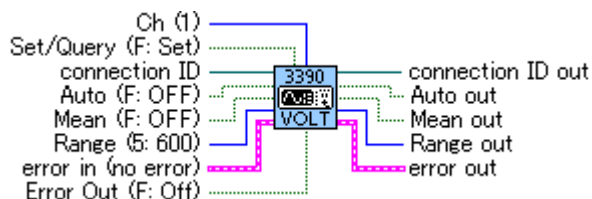
#### Input Output

Name	Data Type	Explanation
Control		Sets the ON/OFF of the Timer Control. Input Range: 0 (OFF: Default), 1 (ON)
Time		Sets the Timer Control in hours, minutes and seconds. (1min: Default)  Note: The timer range setting is from 10 seconds to 9999 hours 59 minutes 59 seconds.
Control out		Outputs the query results of the timer control as ON/OFF.
Time out		Outputs the query results of the timer control as hours, minutes and seconds.



### 3.3.39 HIOKI3390 Conf Voltage.vi

Sets and reads the functions related to voltage.

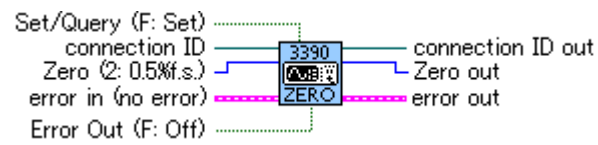


#### Input Output



Name	Data Type	Explanation
Ch		Sets the input unit. Input Range: 1 (Default) - 4
Auto		Sets the electric voltage range to AutoRange. Input Range: False (OFF: Default), True (ON)  Note: Depending on the measurement line combination (for above 1P3W), the voltage AutoRange settings of other channels in the combination may be changed too.
Mean		Sets the Voltage Rectification Method to MEAN. Input Range: False (OFF: Default), True (ON)
Range		Sets the voltage range. Valid when the AutoRange is OFF. Input Range: 0(15), 1(30), 2(60), 3(150), 4(300), 5(600: Default), 6(1500)  Note: When the range is changed, please wait until the internal circuit is stabilized before reading the measured value. Depending on the measurement line combination (for above 1P3W), the voltage range settings of other channels in the combination may be changed too.
Auto out		Outputs the query results of AutoRange. Output Value: False (OFF), True (ON)
Mean out		Outputs the query results of the Rectification Method (MEAN). Output Value: False (OFF), True (ON)
Range out		Outputs the query results of the range. Output Value: 15 - 1500

### 3.3.40 HIOKI3390 Conf ZeroSp.vi

Sets and reads Zero Suppress.



#### Input Output

Name	Data Type	Explanation
Zero		Sets the Zero Suppress. Input Range: 0 (OFF), 1 (0.1% f.s.), 2 (0.5% f.s.: Default)
Zero out		Outputs the query results of the Zero Suppress.

## 4. DATA Structure

### 4.1 Output Items of HIOKI3390 Conf Measure.vi and its sequential order

Output Items		Output Items and Order			
Status		Status			
Voltage	RMS	Urms1 to Urms4	Urms12	Urms34	Urms123
	Rectified Average(MEAN)	Umn1 to Umn4	Umn12	Umn34	Umn123
	AC Component	Uac1 to Uac4			
	Simple Average(DC)	Udc1 to Udc4			
	Fundamental Wave Component	Ufnd1 to Ufnd4			
	Waveform Peak +	Upk1+ to Upk4+			
	Waveform Peak -	Upk1- to Upk4-			
	THD/Ripple Rate	Uthd1 to Uthd4 / Urf1 to Urf4			
	Unbalanced factor	Uunb123			
Current	RMS	Irms1 to Irms4	Irms12	Irms34	Irms123
	Rectified Average(MEAN)	Imn1 to Imn4	Imn12	Imn34	Imn123
	AC Component	Iac1 to Iac4			
	Simple Average(DC)	Idc1 to Idc4			
	Fundamental Wave Component	Ifnd1 to Ifnd4			
	Waveform Peak +	Ipk1+ to Ipk4+			
	Waveform Peak -	Ipk1- to Ipk4-			
	THD/Ripple Rate	Ithd1 to Ithd4 / Irf1 to Irf4			
	Unbalanced factor	Iunb123			
Active Power		P1 to P4	P12	P34	P123
Apparent Power		S1 to S4	S12	S34	S123
Reactive Power		Q1 to Q4	Q12	Q34	Q123
Power Factor		PF1 to PF4	PF12	PF34	PF123
Phase Angle		DEG1 to DEG4	DEG12	DEG34	DEG123
Frequency		FREQ1 to FREQ4			
Integration	Positive Current	IH1+ to IH4+	IH12+	IH34+	IH123+
	Negative Current	IH1- to IH4-	IH12-	IH34-	IH123-
	Sum of Positive & Negative Current Flow	IH1 to IH4	IH12	IH34	IH123
	Positive Power Amount	WP1+ to WP4+	WP12+	WP34+	WP123+
	Negative Power Amount	WP1- to WP4-	WP12-	WP34-	WP123-
	Sum of Positive and Negative Power	WP1 to WP4	WP12	WP34	WP123
Efficiency		Effi1 to Effi3			
Loss		Loss1 to Loss3			
Temperature		Temp			
Motor		CH A	CH B	Pm	Slip

## 4.2 Output Items of HIOKI3390 Conf Measure Harmonic.vi and its sequential order

Harmonic Measurement Items					
Status		Status			
Frequency		HFREQ			
Level	Voltage 0th	HU1L000 to HU4L000	HU12L000	HU34L000	HU123L000
	Current 0th	HI1L000 to HI4L000	HI12L000	HI34L000	HI123L000
	Power 0th	HP1L000 to HP4L000	HP12L000	HP34L000	HP123L000
Content	Voltage 0th	HU1D000 to HU4D000	HU12D000	HU34D000	HU123D000
	Current 0th	HI1D000 to HI4D000	HI12D000	HI34D000	HI123D000
	Power 0th	HP1D000 to HP4D000	HP12D000	HP34D000	HP123D000
Phase Angle	Voltage 0th	HU1P000 to HU4P000	HU12P000	HU34P000	HU123P000
	Current 0th	HI1P000 to HI4P000	HI12P000	HI34P000	HI123P000
	Power 0th	HP1P000 to HP4P000	HP12P000	HP34P000	HP123P000
...	n th	Last 3 digits are n			
Level	Voltage 100th	HU1L100 to HU4L100	HU12L100	HU34L100	HU123L100
	Current 100th	HI1L100 to HI4L100	HI12L100	HI34L100	HI123L100
	Power 100th	HP1L100 to HP4L100	HP12L100	HP34L100	HP123L100
Content	Voltage 100th	HU1D100 to HU4D100	HU12D100	HU34D100	HU123D100
	Current 100th	HI1D100 to HI4D100	HI12D100	HI34D100	HI123D100
	Power 100th	HP1D100 to HP4D100	HP12D100	HP34D100	HP123D100
Phase Angle	Voltage 100th	HU1P100 to HU4P100	HU12P100	HU34P100	HU123P100
	Current 100th	HI1P100 to HI4P100	HI12P100	HI34P100	HI123P100
	Power 100th	HP1P100 to HP4P100	HP12P100	HP34P100	HP123P100

### 4.3 Status Data

Status information displays the measurement status during measurement data saving and is expressed as a hexadecimal value of 32bit.

bit 31	bit 30	bit 29	bit 28	bit 27	bit 26	bit 25	bit 24
HM4	HM3	HM2	HM1	MRB	MRA	MPB	MPA
bit 23	bit 22	bit 21	bit 20	bit 19	bit 18	bit 17	bit 16
ULM	----	UCU	HUL	UL4	UL3	UL2	UL1
bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
RI4	RI3	RI2	RI1	RU4	RU3	RU2	RU1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
PI4	PI3	PI2	PI1	PU4	PU3	PU2	PU1

HMx : Invalid harmonic parameter (when the harmonic synchronization is off, etc.)

MRx : Motor Analysis Option A, B Range Over

MPx : Motor Analysis Option A, B Peak Over

ULM : Motor Analysis Option A, B Synchronized Unlock

UCU : Incalculable (when measurement data becomes invalid immediately after a range has been changed, etc.)

HUL : Harmonic Synchronized Unlock

ULx : Respective Channel's Synchronized Unlock

Rlx : Respective Channel's Current Range Over

RUx : Respective Channel's Voltage Range Over

Plx : Respective Channel's Current Peak Over

PUx : Respective Channel's Voltage Peak Over

(x = channel number)