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**ISCO Sampler
67xx and 37xx Automatic Sampler
Sensor Interface Manual
Revision 08.02.20**

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About NexSens Technology, Inc.

NexSens software and real-time data logging systems are designed to simplify the setup and operation of environmental monitoring networks. NexSens products automate much of the tedious programming, data collection, and manual data processing common with other systems.

iChart is an easy-to-learn, easy-to-use Windows-based software program designed to interface with the industry's most popular environmental monitoring sensors and systems. A large multi-vendor instrument library makes setup quick and easy. iChart automates much of the tedious programming, data collection and manual data processing common with other environmental data collection systems.

The NexSens iSIC (Intelligent Sensor Interface and Control) is a state-of-the-art line of data loggers that simplify the collection of real-time data from environmental sensors and monitoring instruments. The iSIC data logger supports multi-vendor sensor connections and is designed for environmental data monitoring with NexSens communication equipment and software.

How to Use This Manual

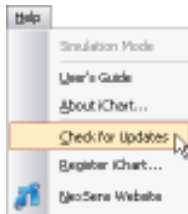
This manual is designed to provide you with detailed instructions for interfacing specific sensors to the NexSens iSIC data logger.

This manual provides you with all the information needed to interface your sensor with the iSIC data logger. For advanced system and sensor reference material:

- Review the material in the iSIC operations manual:
 - <http://www.nexsens.com/support/manuals.htm>
- Review the sensor manufacturer's operations manual. This information should have been provided with the purchase of the sensor. This material can also typically be found at the instrument manufacturer's website. If you are still having difficulty, email your technical support question to:
support@nexsens.com

Keeping iChart Up to Date

NexSens periodically releases new versions of iChart software and iSIC firmware to be downloaded free of charge. The updated versions typically add new features, improve existing features, and/or add more reliability to the system. It is important that iChart is updated to the latest version before connecting a new sensor to your iSIC data logger. Your computer will require internet access to update automatically.

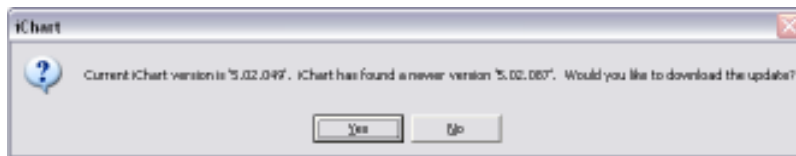


To obtain the latest version of iChart software, open the program on your computer. In the **Help** menu, select **Check for Updates**.

If your software is up to date, iChart will confirm that your computer is running the current software release.



If a newer version of iChart is available, a dialog box will appear asking if you would like to upgrade to download the update.



Click **Yes**. iChart will begin downloading the update.

Note: Depending on your connection speed, this update may take a few minutes. You can continue running other applications on your computer while the download is progressing.



When the update has finished the downloading process, click **OK** and close iChart.

Reopen iChart. When the program opens, iChart will automatically begin the installation process. Follow the step-by-step installation windows to complete the iChart software update.

Note: If an internet connection is unavailable on the computer, iChart can be downloaded onto another computer and then moved to the computer where it needs installed. The latest version of iChart can be downloaded here:

<http://www.nexsens.com/support/downloads.htm>

How triggering a sampler works

The NexSens iSIC allows for multiple methods for triggering an ISCO sampler based on parameters that are logged inside of the iSIC. The iSIC can:

Sample Time Based Continuous:

- Start a uniform time-based sampling continuously for as long as the reading is above an event threshold. In this scenario the iSIC data logger does not trigger the sampler to take samples, instead it simply powers the sampler and the sampler runs its on "Uniform Time Based" schedule:
 - To do this the ISCO only needs to be powered.

Sample Multiple on Event:

- Trigger an attached ISCO sampler to take a sample whenever a reading is above an event threshold:
 - For example, if a value of 50 NTU is programmed as the threshold value, every time the iSIC took a sample from the turbidity sensor that was above 50 NTU it would trigger the sampler.

Sample Once on Event:

- Trigger an attached ISCO sampler to take a sample only once when a reading goes above an event threshold. The sampler will not be triggered again until the reading goes back below the threshold reading:
 - For example, if a value of 50 NTU is programmed as the threshold value, the first time the iSIC took a sample from the turbidity sensor that was above 50 NTU it would trigger the sampler. It would not trigger again until turbidity went back down below 50 NTU.

Sample Time Based on Event:

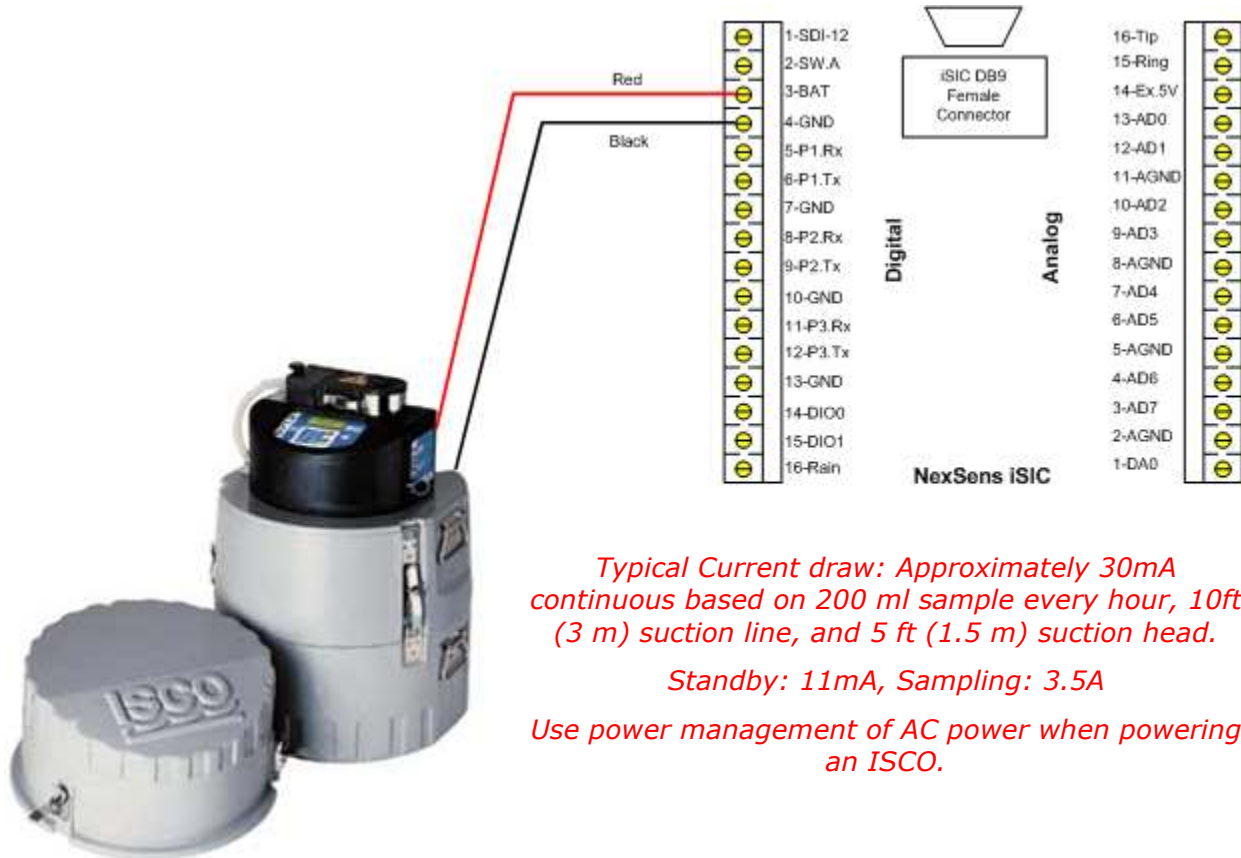
- Start a "Uniform Time Based" schedule on the sampler for as long as the reading is above an event threshold:
 - For example, if a value of 50 NTU is programmed as the threshold value, the first time the iSIC took a sample from the turbidity sensor that was above 50 NTU the sampler would start sampling at its pre-programmed time interval. It would do this until turbidity went back down below 50 NTU.

It is also possible for the sampler to continue to take samples at a scheduled interval until a certain time period has expired, even if the parameter drops below the event threshold. See page 5-25, section 5.13.1 of the ISCO manual. Using the *Once Enabled Stay Enabled* option to be set to *Yes* allows this to happen. It will start the sampling when the parameter threshold is breached and leave it sampling no matter what the IO inputs are until the scheduled time has expired.

Wiring

Powering the ISCO with an iSIC data logger:

The ISCO can be powered from an individual power source. Alternatively it can be powered from the NexSens iSIC data logger. This is usually recommended as the solar charging system is usually connected to the data logger MS2 connector.



The ISCO 67xx or 37xx can be powered by an iSIC data logger via the MS2 Power Source connector located on the ISCO sampler. The NexSens part number for this cable is:

- A19 – MS2 to flying lead external power cable

ISCO Connector:

2-PIN MALE, SEALED

A Ground

B +12 volts DC



Sample Once or Sample Multiple on Event:

To trigger an attached ISCO 67xx or 37xx sampler to take a sample either once or whenever a reading is above a certain threshold, it should connect to an iSIC data logger via the MS6 Flow Switch connector located on the ISCO sampler. The NexSens part number for this cable is:

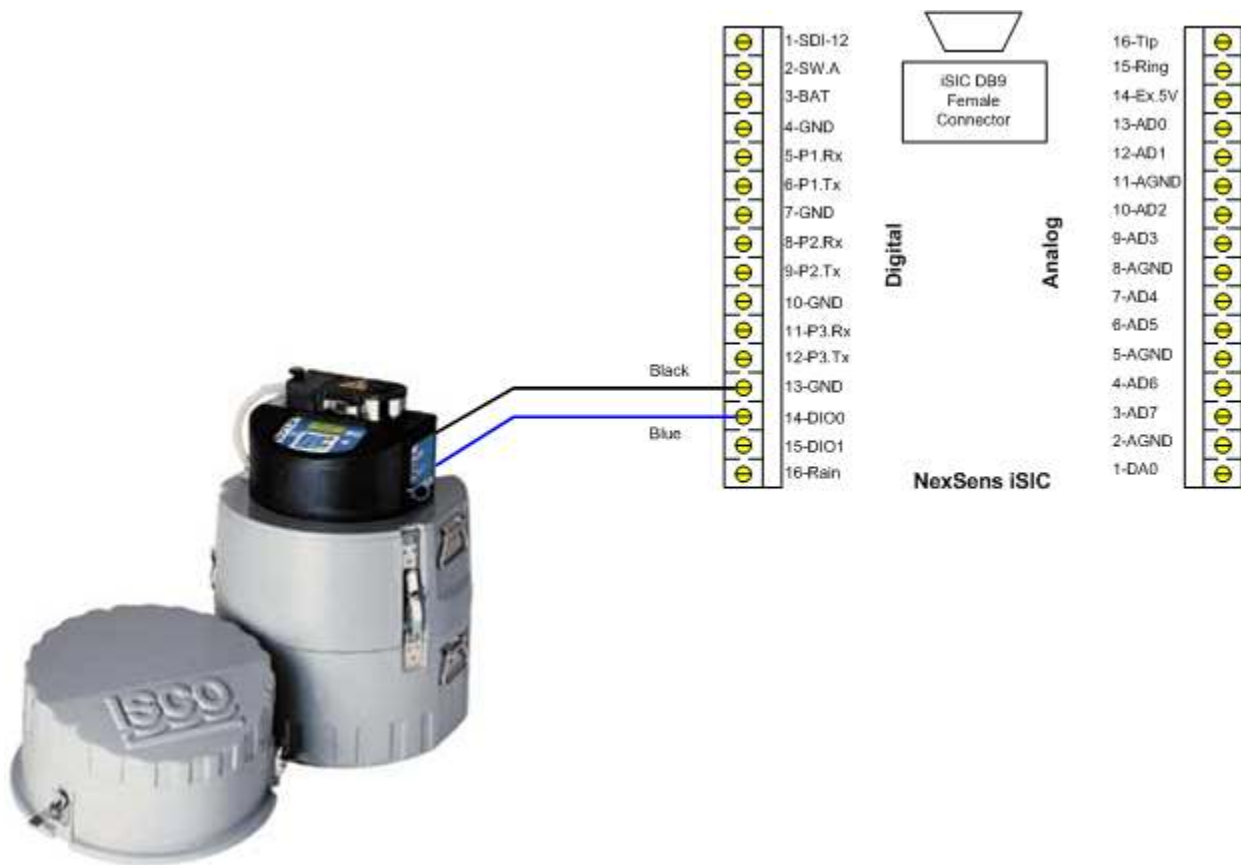
- A59 – ISCO Interface Cable, 20ft

ISCO Connector:

6-PIN MALE, SEALED

B Ground

C Flow Pulses In



For wiring to the iSIC data logger: connect the **Black** wire of the A59 – ISCO Interface cable to GND and the **Blue** wire to either DIO.0 or DIO.1.

Sample Time Based on Event:

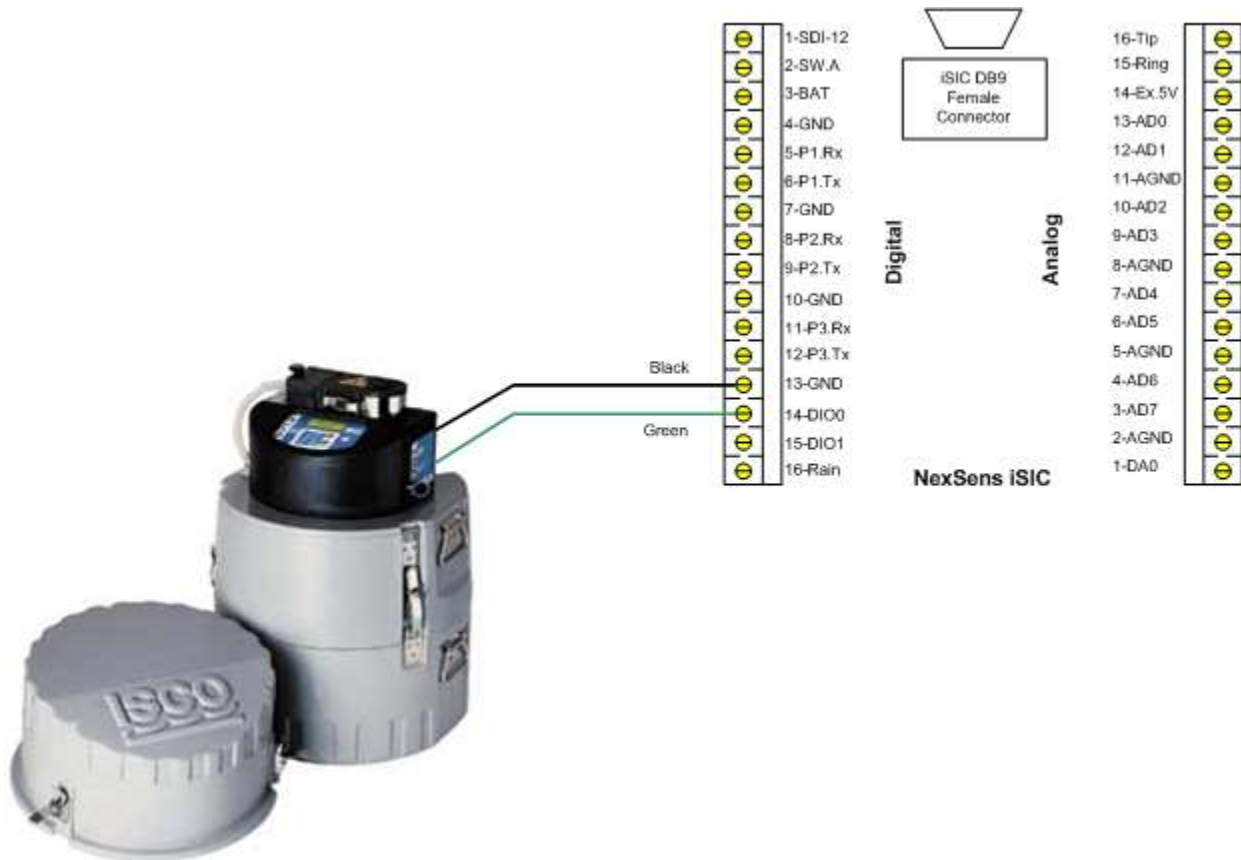
To trigger an attached ISCO 67xx or 37xx sampler to start a uniform time-based sampling continuously for as long as the reading is above an event threshold, it should connect to an iSIC data logger via the MS6 Flow Switch connector located on the ISCO sampler. The NexSens part number for this cable is:

- A59 – ISCO Interface Cable, 20ft

ISCO Connector:

6-PIN MALE, SEALED

B Ground
F Inhibit In



For wiring to the iSIC data logger: connect the **Black** wire of the A59 – ISCO Interface cable to GND and the **Green** wire to either DIO.0 or DIO.1.

Programming an ISCO Sampler

To trigger an ISCO sampler from an external data logger, the program running on the sampler should be set to trigger a sample on (1) flow pulse.

Below is an example of the ISCO program menu for triggering. As many complex sampling options are available for the ISCO sampler, see the ISCO manual for specific setups screens for your installation. The following should be a good guide to follow:

6712 SAMPLER
STANDARD PROGRAMMING
For HELP at any
screen press ? key.

After the ISCO has been powered, click the On-Off key to start the menu system. The start up menu will disappear after 8 seconds.

RUN
PROGRAM
VIEW REPORT
OTHER FUNCTIONS

Once the menu system appears, click the down arrow and select **Program**. Then press the enter key.

SITE DESCRIPTION
"NEXSENS"
CHANGE?
YES **NO**

On the next screen, enter a new site description or select **No** to keep the existing description. Then press the enter key.

NUMBER OF BOTTLES
1 2 4 8 12 **24**

Select the number of bottles in your bottle kit by pressing either arrow key until the correct number blinks. Then press the enter key.

BOTTLE VOLUME IS
1000 ml (300-30000)

Type the volume for the bottles in your kit. Then press the enter key.

SUCTION LINE LENGTH
IS 10 ft
(3-99)

Type the length of the suction line. Then press the enter key.

TIME PACED
FLOW PACED

If sampling once or sampling multiple on event, select **Flow Paced**, otherwise select **Time Paced**. Then press the enter key.

Note: your sampler may have additional options such as non-uniform or uniform-time paced sampling.

IF TIME PACED SAMPLING:

TIME BETWEEN
SAMPLE EVENTS
0 HOURS, 30 MINUTES

Enter the number of hours and minutes you would like between sampling. Then press the enter key.

IF FLOW PACED SAMPLING:

FLOW BETWEEN
SAMPLE EVENTS:
1 PULSES (1-9999)

Set the flow between sample events to **1** so that the sampler will initiate a sample on one pulse from the datalogger. Then press the enter key.

RUN CONTINUOUSLY?
YES NO

Select yes for run continuously so that the program will run until reprogrammed. This assumes filled bottles are replaced at regular intervals. Then press the enter key.

PROGRAMMING COMPLETE
RUN THIS PROGRAM
NOW?
YES NO

Select yes to start running the program. Then press the enter key.

After running the program the ISCO screen will display the sampling status.

IF TIME PACED SAMPLING:

BOTTLE 1
IN 00:29:54

If the interface line connected to the sampler is high (an event is occurring, such as turbidity exceeded its preprogrammed threshold), the ISCO will display a count down until the next sample.

PROGRAM DISABLED
05:56:26 FR 6-JUL

If the interface line connected to the sampler is low (un-programmed or turbidity does not exceed its preprogrammed threshold), the ISCO will display a programmed disabled message.

IF FLOW PACED SAMPLING:

FLOW BETWEEN
SAMPLE EVENTS:
1 PULSES (1-9999)

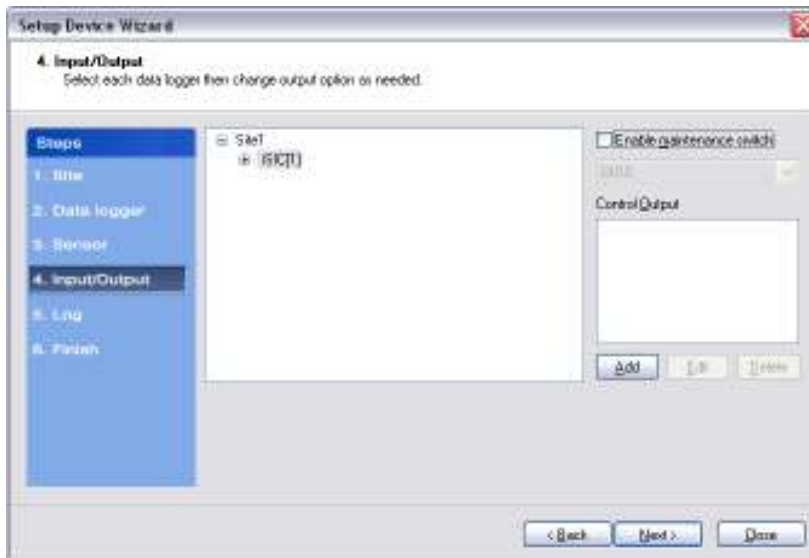
Set the flow between sample events to **1** so that the sampler will initiate a sample on one pulse from the datalogger. Then press the enter key.

Configuring in iChart Software

The ISCO sampler is triggered based on a parameter alarm configured on the iSIC data logger. After setting up a project with sites, data loggers, and sensors; run the **Setup Device Wizard** from **Project | Setup Device Wizard**.

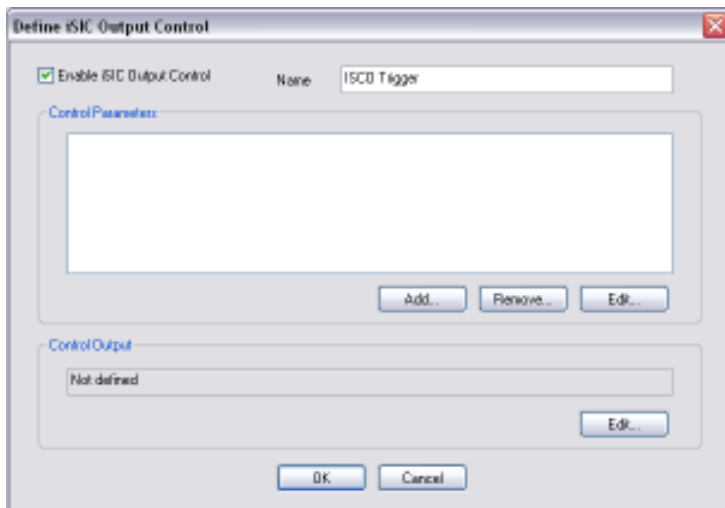
Follow sensor interface manuals or the iChart manual for more information on setting up sensors and parameters for triggering:

<http://www.nexsens.com/support/manuals.htm>

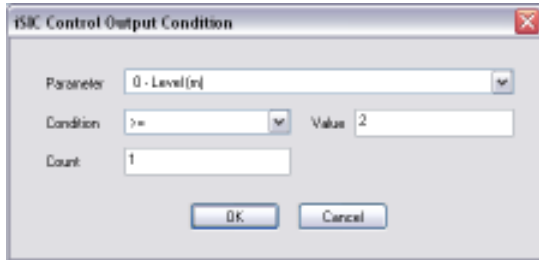


After having devices setup in the database, on the **Input/Output** tab of the **Setup Device Wizard** iSIC alarm controls can be setup. Select the data logger the ISCO sampler is connected to and click the **Add** button under **Control Output**.

Place a checkbox in **Enable iSIC Output Control** and give it a name. This name will be used when identifying this control.



Click the **Add...** button to open the **iSIC Control Output Condition** dialog box.



From the drop down menu, select one of the parameters logged by the selected iSIC data logger. Next, select a parameter limit condition, the value the condition should check against and how many times the value must exceed the condition before it should trigger the ISCO.

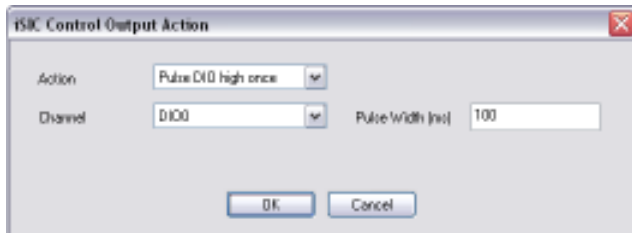
Note: only devices logged in the data logger can be used for controls. When using YSI Sondes, OTT Thalimedes, etc in RS232 mode, the parameters are not logged in the iSIC. These devices can be wired and configured for SDI-12 to allow controls to be setup.

Click **OK** and then click **Edit** in the **Control Output** section to open the **iSIC Control Output Action** dialog box.

1. For **Sample Once on Event** select **Pulse DIO high once**.
2. For **Sample Multiple on Event** select **Pulse DIO high multiple**.
3. For **Sample Time Based on Event** select **Set DIO high**.



Then from the **Action** drop down menu and then select the DIO channel the ISCO is connected to. We used **DIO.0** in the beginning wire diagram. The ISCO requires a minimum pulse width of 25ms, so leaving it at the default 100ms is sufficient.



Click **OK** and finish the **Setup Device Wizard** to complete the setup. Note: you will need to reprogram the data logger on the **Finish** tab for the triggering to be enabled.

