

Gas Analysis | DEMS

Technical Information TI-20030

Integration of Metrohm Autolab Potentiostat with Hiden HPR-40 DEMS Mass Spectrometer

Cable connection allows Autolab Nova software to send Trigger, Current and Potential to Hiden Software



Figure 1: The HIDDEN – Autolab Interface cable

The Hiden HA-061-069, 3 metre cable provides a connection between the analogue and digital outputs of the Autolab Potentiostat and AUX I/O of Hiden RC Interface, making it possible for the Potentiostat to trigger HIDDEN software to start and have Potential and Current values displayed with MS data in real time in HIDDEN software. The appropriate Autolab Monitor Cable

is also required to send potential and current to Hiden software.

Reading Current into HIDDEN Software

Current is available as an external input output by connecting the Autolab iout BNC of the Hiden cable to the iout BNC of the Autolab Monitor cable. A voltage corresponding to a measured current is sent to Auxiliary 1 of the AUX I/O of the Hiden RC Interface. The voltage is converted back to the correct current and displayed in Hiden software.

The current to voltage conversion depends on the measured current range.

Reading Potential into HIDEN Software

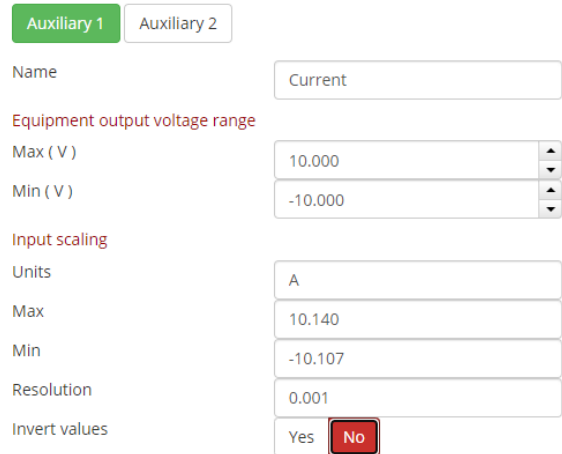
Potential is available as an external input by connecting the Autolab Eout BNC of the Hiden cable to the Eout BNC of the Autolab Monitor cable. A voltage corresponding to the measured potential is sent to Auxiliary 2 of the AUX I/O of the Hiden RC Interface. The voltage is converted back to measured potential and displayed in Hiden software. The output signal is reversed with respect to Nova measured values.

The Eout facility has a voltage range of $\pm 5V$ centered on the starting voltage of a test. If a test is run that has a voltage spread of more than this range then the monitor will send incorrect voltages.

Configuration of Auxiliary Inputs

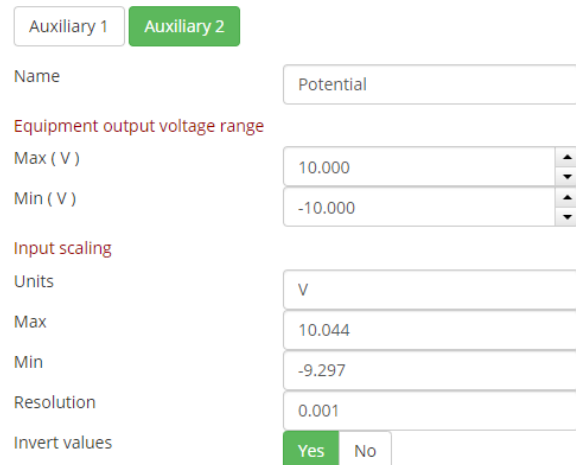
The auxiliary Inputs must first be configured by following the procedure detailed in Hiden document HA-131-524 'HAL10 Configure Auxiliary Inputs Procedure'.

The appropriate values for the auxiliary inputs are detailed in Figure 2 & 3. For potential, the output signal is reversed with respect to Nova measured values so requires inversion.



The screenshot shows the configuration for Auxiliary 1. The 'Name' field is set to 'Current'. Under 'Equipment output voltage range', 'Max (V)' is 10.000 and 'Min (V)' is -10.000. Under 'Input scaling', 'Units' is 'A', 'Max' is 10.140, 'Min' is -10.107, and 'Resolution' is 0.001. The 'Invert values' option is set to 'No'.

Figure 2: Auxiliary 1 'Current' setup



The screenshot shows the configuration for Auxiliary 2. The 'Name' field is set to 'Potential'. Under 'Equipment output voltage range', 'Max (V)' is 10.000 and 'Min (V)' is -10.000. Under 'Input scaling', 'Units' is 'V', 'Max' is 10.044, 'Min' is -9.297, and 'Resolution' is 0.001. The 'Invert values' option is set to 'Yes'.

Figure 3: Auxiliary 2 'Potential' setup

After re-interrogation, 'Current' and 'Potential' will be available as an input device and can be added as an external input to EGAssoft or QGA software using the 'Engineering Settings', 'External Inputs' options. Add the device names directly to the External Input box.

Setting up a Trigger to Start Hiden Software

The trigger write signal is sent from NOVA software to start and stop mass spectrometer scans at the same time as electrochemistry scans. The trigger cable should first be connected to the DIO connection on the Autolab potentiostat. The trigger should be set up in the Autolab Control section of Nova software with trigger output as 'Falling Edge'.

With the 'Triggering' box ticked, EGAsoft can be set to ready mode by pressing Start in the software.

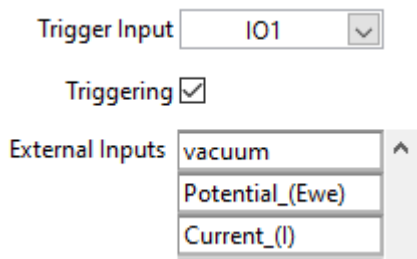


Figure 5: EGAsoft External Input settings

The scan will wait 'on Trigger Start'. The scan can be started and stopped manually using the Trigger Override button.

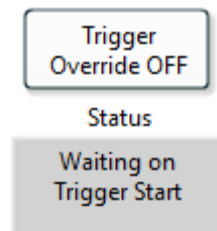


Figure 6: EGAsoft scan status indicator

The Nova experiment can then be started and the EGA scan will begin at the same time. When the electrochemistry scan finishes the EGAsoft scan will also stop.

If EGAsoft is used to create a sequence then the scan will be stopped and started again by running multiple experiments in Nova software

A scan can also be triggered in QGA. For details, use the Help buttons within QGA software

Chart 1: Example of EGAsoft presentation of MS signal v's Potential v's Time

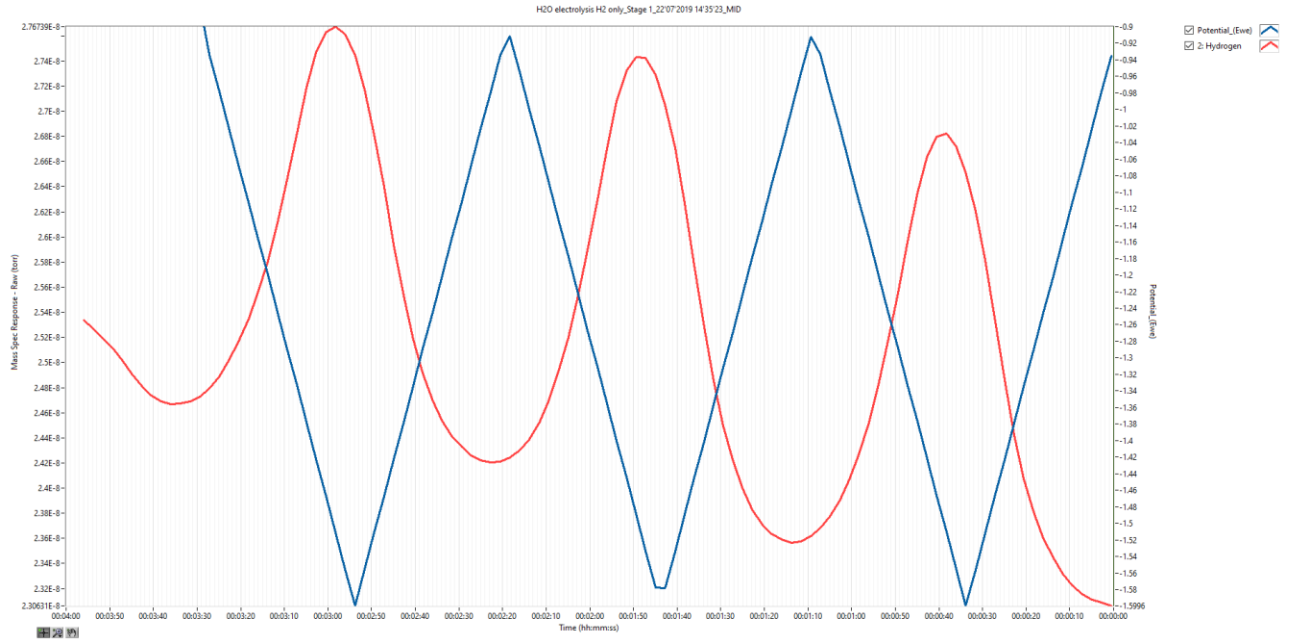


Chart 2: Example of EGAsoft presentation of MS signal v's Potential v's Current

