

## **FuelCell Addendum – Auxiliary Digital Output Controls**

D. Johnson, Scribner Associates, Inc.

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### **Introduction**

This addendum describes the auxiliary digital output controls implemented in FuelCell versions 3.60 and later. The auxiliary output controls appear as extra On/Off settings in the Setup Fuel menu. They are not directly related to other fuel controls and can be used for any general purpose digital (On/Off) control.

The FuelCell software should be installed and the system tested without the auxiliary controls prior to enabling these controls.

### **Hardware Support**

For 890B units, the anode uses Digital Output line 8, the cathode uses digital output line 9. Note that this is a “zero based” numbering where the Digital Outputs are labeled 0 through 15. If they are labeled 1-16, used outputs 9 and 10

For all other 850/855/890 units, “burp valve” signal lines are used.

Contact Scribner Associates for further instructions on access to these signal lines in the Load Unit.

## Enabling Auxiliary Output Support

Auxiliary Output support is enabled by manually editing the “fuelcell.ini” configuration file. At this time, it cannot be configured through the Instrument Configuration screens in the FuelCell program.

- Open the “fuelcell.ini” located in the C:\FuelCell\ directory file using Notepad.
- Add the EnableAuxOutput=1 line to the end of the [System] section of the ini file as shown below. Note that other settings in the [System] section may differ from those shown below.

```
[System]
EnableAnodeGas=1
EnableAnodePurge=1
EnableAnodeTemp=1
EnableCathodeGas=1
EnableCathodePurge=1
EnableCathodeTemp=1
EnableCellTemp=1
EnableAuxOutput=1
```

Optionally, custom text may be specified. This Long text is used to describe the control in the Setup Fuel screen and should be limited to 40 characters or less. The Short text is used in the Data Values list and should contain less than 15 characters. To add custom text, add the [Aux] section to the ini file as shown below.

```
[Aux]
AuxAnodeOutputNameLong=Aux Anode Output
AuxAnodeOutputNameShort=Aux Out
AuxCathodeOutputNameLong=Aux Cathode Output
AuxCathodeOutputNameShort=Aux Out
```

## Auxiliary Output settings in the Setup Fuel screen.

The Aux Output controls are in the Setup Fuel screen as shown below.

The screenshot shows a dialog box titled "Setup Fuel (Standard)" with a close button in the top right corner. The dialog is divided into two main columns: "Anode Fuel" and "Cathode Fuel".

**Anode Fuel:**

- Minimum Flow (cc/min): 100
- Load Based Flow:**
  - cc/min /Cell: 0
  - +cc/min /Amp /Cell: 7
- Temperature:**
  - Setpoint (C): 55
  - Maximum (C): 100
- Aux Anode Output:**
  - 0: Off
  - 1: On

**Cathode Fuel:**

- Minimum Flow (cc/min): 100
- Load Based Flow:**
  - cc/min /Cell: 0
  - +cc/min /Amp /Cell: 15
- Temperature:**
  - Setpoint (C): 60
  - Maximum (C): 100
- Aux Cathode Output:**
  - 0: Off
  - 1: On

At the bottom of the dialog are three buttons: "OK", "Cancel", and "Help".

Note: When shutting down the system, the background Auxiliary Output settings remain applied to the unit.

The background settings are saved so that the next time the system is started, the controls will default to their previous settings.

### Changing Auxiliary Output settings from the Experiment List:

As with other fuel controls, the auxiliary output conditions can be changed in an experiment list by inserting a "Setup Fuel" experiment into the list.

**Changing Auxiliary Output conditions from an Arbitrary Control Experiment:**

The auxiliary output settings can be changed by an action line in an arbitrary control file. The action is described below. Consult the FuelCell manual for more information on Arbitrary Control experiments.

```
' Action = 28    set wet/dry gas valves
' example    28    1    0
' set anode output to 1: On
' set cathode output to 0: Off
'
```

**Recording Auxiliary Output Data:**

The state of the auxiliary controls is displayed in the measured parameters list. In the Anode Fuel and Cathode Fuel sections, the Aux Out value is 0 when then control is OFF and 1 when the control is ON.

Items that are checked will be saved in the data file.

