FuelCell Addendum – Using Reformate Channels to Create an O2/Air Switch

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Introduction

This addendum describes a method to use Main and Reformate mass flow controllers to switch between O2 and Air for the Cathode gas.

Software Support

Requires FuelCell versions 3.9d or later. The software version is displayed in the FuelCell program Help | About FuelCell… screen.

Hardware Support

Requires the 890C or 890e.

Contact your Gas Control Unit supplier or Scribner Associates for information on accessing the Reformate Mass Flow Controller signals.

Enabling Multi Cathode Gas Support

In this section, we will assume that O2 is the normal cathode gas and has been configured and tested using the File | Instrument Configuration… screen in the FuelCell program.

For this example, a 1 L/min O2 source is connected to the main cathode gas MFC, and an Air gas source, using a 2 L/min MFC is be connected to Reformate channel 1.

The cathode reformate configuration files are manually edited using a text editor.

- Using the Windows file explorer, go to *C:\FuelCell* and open the file "ReformC.ini" to open it in Notepad.

- Add the [MainGas1] section as shown below. By specifying O2 as the first *MainGas,* it prepares the system to use other Reformate gasses as replacements for the MainGas. The FlowScale setting should match the full scale flow of the O2 gas MFC.

- Add the [TankGas1] section as shown below. FlowScale2=2 indicates that the Air controller has a maximum range of 2 liters/minute. ValveNo=1 indicates that the Air controller is connected to reformate signal channel number 1. The PureFraction=0.21 indicates that the Air source contains 21% of the pure reactive gas (21% O2). This parameter is used to calculate Stoichiometry.

- Add the [TankGas6] section as shown below. No additional gas source is necessary. This parameter is necessary to provide backward compatibility with various older hardware systems.

- Save and close the modified *ReformC.ini* file.
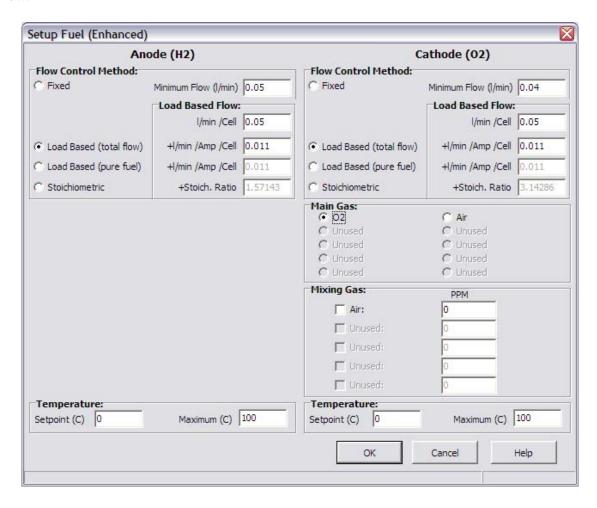
```
[Program]
ReformerType=1

[MainGas1]
TankName=O2
ComponentName=O2
ComponentConc=1000000
FlowScale=1
PureFraction=1
ValveNo=-1

[TankGas1]
TankName=Air
ComponentName=Air
ComponentConc=1000000
FlowScale=2
PureFraction=0.21
ValveNo=1

[TankGas6]
TankName=O2
ComponentName=O2
ComponentConc=1000000
FlowScale=1
ValveNo=0
```

Operation of Multi Cathode Gas System

The cathode gas can be changed between O2 and Air using the Setup Fuel screen as shown below.

When the Main Gas is changed between O2 and Air, the full gas flow is changed between then Main Cathode Gas Controller (pure O2) and the Reformate Channel #1 that contains Air. The Main Gas selection will change between 100% O2 and 100% Air. Using this method, it is not necessary to use the Mixing Gas section.

If a blend of O2 and Air is necessary, select O2 as the Main Gas. It is then possible to use Air as a mixing gas and select the desired PPM of Air.

Because the PureFraction of the O2 and Air gasses are both specified in the configuration files, the Stoichiometric Ratio can be calculated for any combination of O2 and/or Air.