



# DATA ACQUISITION

GRAPHIC USER INTERFACE

**USER GUIDE**

# SAFETY, HANDLING & SUPPORT

The Data Acquisition Graphic User Interface (DAQ GUI) application is specially designed to work only with Spectronik fuel cells – specifically the Protium-1000, Protium-1500, Protium-2000 and Protium-2500. By using the software, user agrees and acknowledges that he/she has sufficient knowledge in operating a fuel cell system and strictly adheres to the operating instructions listed separately in the fuel cell user guide.

Software license is valid for multiple users within the buyer's organization, and solely for the purpose of usage with Spectronik fuel cells. Software is Spectronik proprietary and any duplication, dissemination and distribution is strictly prohibited.

***Note:*** *Software only runs on Windows. Please check for system compatibility.*

For technical support, contact: [support@spectronik.com](mailto:support@spectronik.com)

# 1 OVERVIEW

The DAQ GUI software transmits live fuel cell performance and captures valuable operating parameters. User can record and analyze the information by connecting a PC/laptop to the fuel cell system via the Radio Modem Receiver's USB cable provided. The data log files saved can be exported to Excel for further analysis.

## Getting started – software installation & running the program

1. Double-click on the installer to install the software. Follow the on-screen procedure.
2. After the software is successfully installed, the 'Spectronik DAQ GUI' shortcut icon should appear on the desktop. Double-click on the icon to run the program. The interface page will appear.



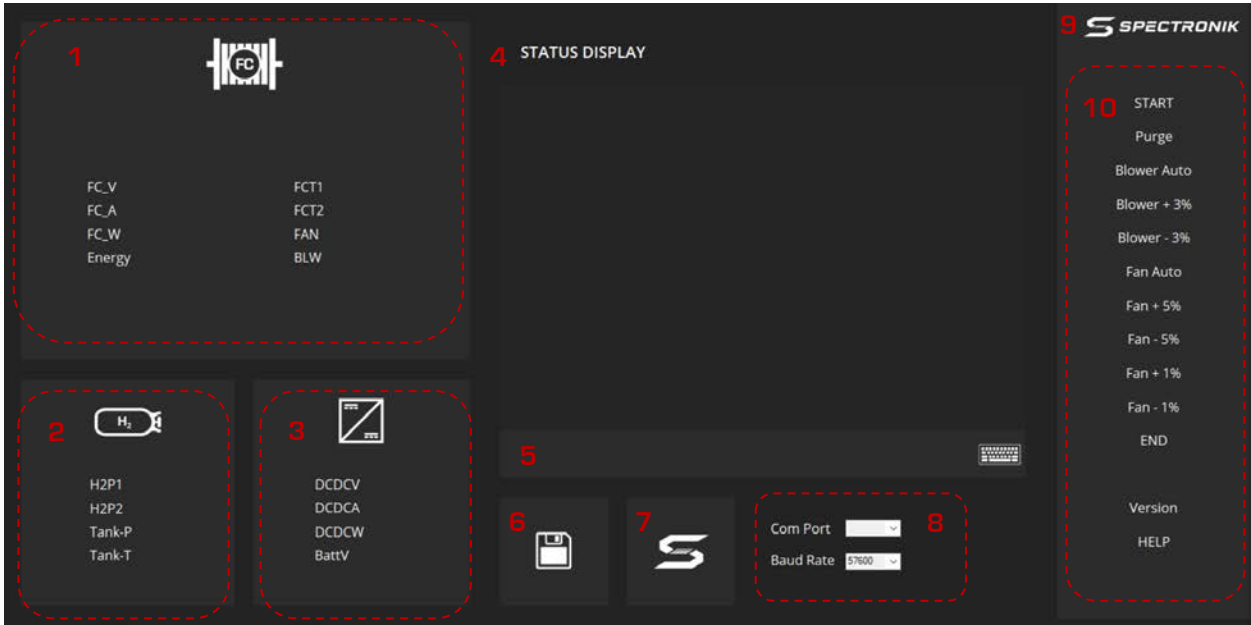
Spectronik  
Fuel Cell  
DAQ GUI



Spectronik  
DAQ GUI

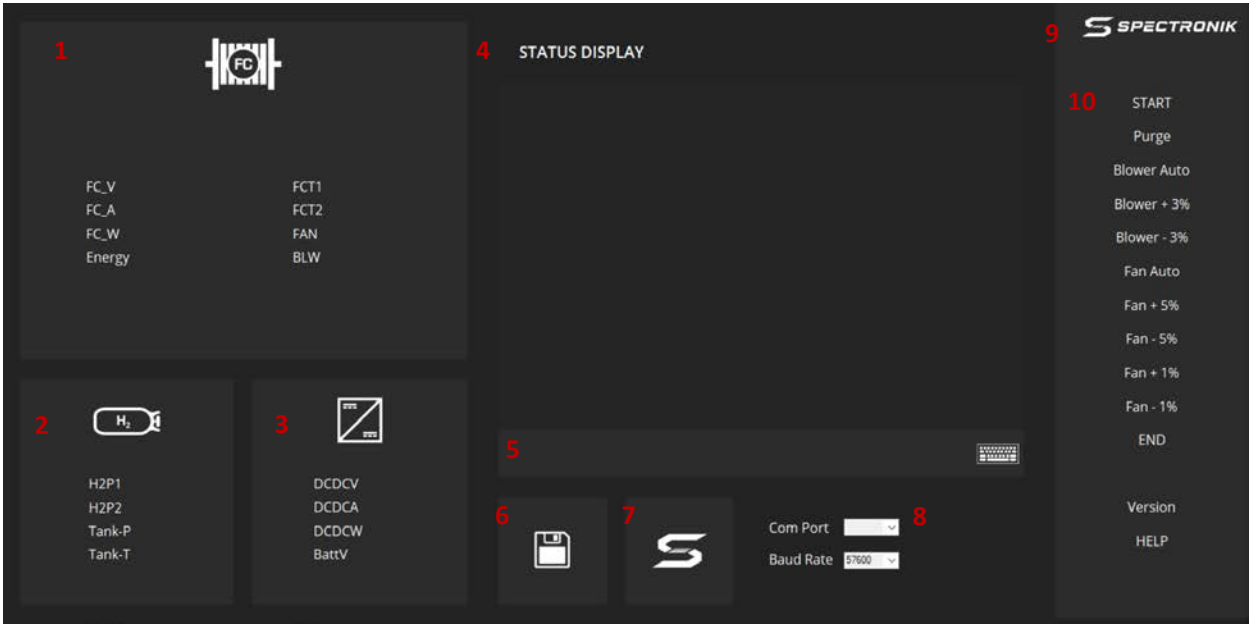
# 2 INTERFACE

## DIGITAL DISPLAY VIEW:



ITEM DESCRIPTION	
1. Fuel-cell stack parameters	6. Data logger button
2. Fuel supply parameters	7. Connect/Disconnect button
3. DCDC converter parameters	8. Communication port and baud rate selector
4. Message display screen	9. Spectronik logo
5. Keyboard input	10. Command panel

DIGITAL DISPLAY VIEW:



1. FC\_V: FC voltage [V]  
FC\_A: FC current [A]  
FC\_W: FC power [W]  
Energy: Energy delivered by the fuel cell during this operation [Wh]  
FCT1: FC temperature at location 1 [°C]  
FCT2: FC temperature at location 2 [°C]  
FAN: Cooling fan duty cycle [%]  
BLW: Oxidant blower duty cycle [%]

2. H2P1: H<sub>2</sub> supply pressure [Barg]  
H2P2: H<sub>2</sub> pressure in FC [Barg]  
Tank-P: Gas tank pressure [Barg]  
Tank-T: Gas tank temperature [°C]

3. DCDCV: Converter voltage [V]  
DCDCA: Converter current [A]  
DCDCW: Converter power [W]  
BattV: External battery voltage [V]

4. Display system messages from the fuel cell

5. Keyboard to input command

6. Log data: Save data into csv format

7. Connect/Disconnect: Start/stop live transmission of data

8. Communication port and baud rate selector: The comm port depends on the user's PC USB port; The default baud rate is set to 57600;

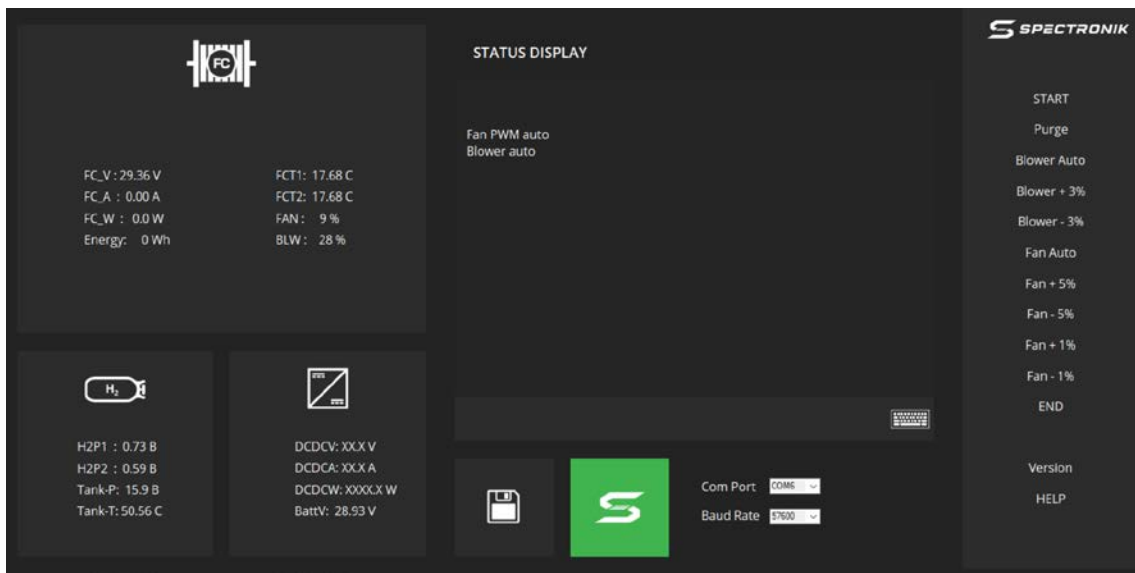
9. Spectronik logo: Hyperlink to Spectronik website

10. Start: Start fuel cell system  
Purge: Perform manual H<sub>2</sub> purge  
Blower auto: Set oxidant blower to automatic control  
Blower +3%: Increase blower duty cycle  
Blower-3%: Decrease blower duty cycle  
Fan auto: Set fan to automatic control  
Fan +5%: Increase fan duty cycle  
Fan -5%: Decrease fan duty cycle  
Fan +1%: Increase fan duty cycle  
Fan -1%: Decrease fan duty cycle  
END: Shutdown fuel cell system  
Version: Display firmware version  
Help: Command panel description

# 3 OPERATING PROCEDURES

## SETTING UP THE GUI:

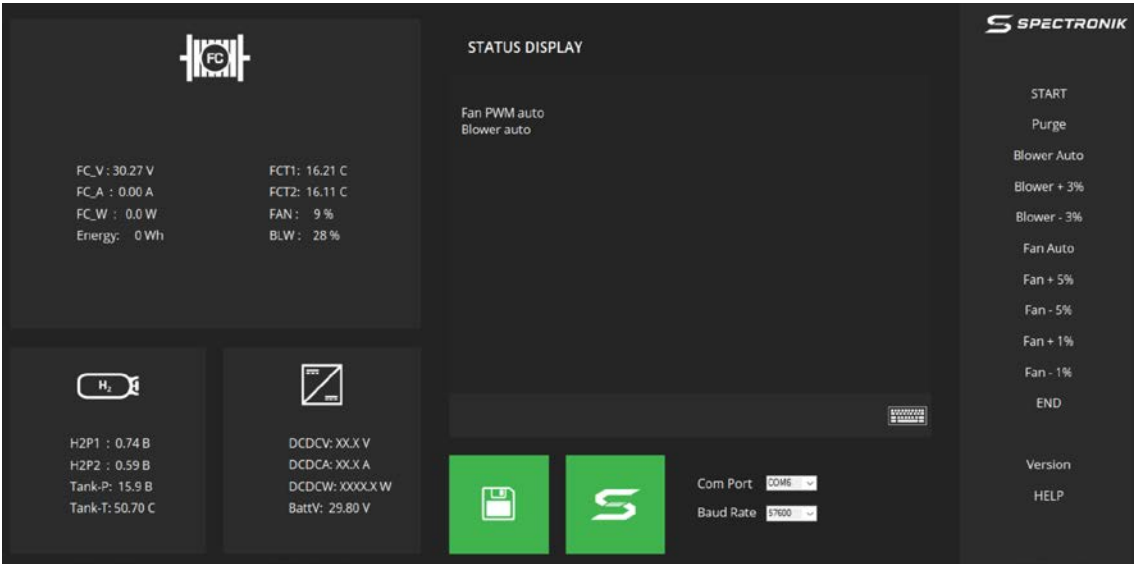
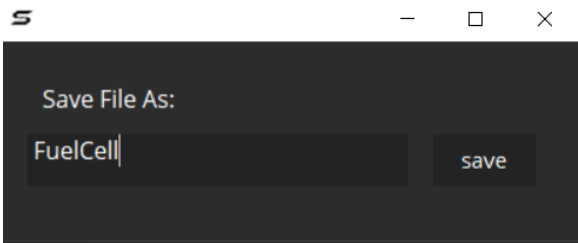
- Connect the PC to the fuel cell system using the Radio Modem Receiver's USB cable.
- Run the software by clicking on the 'Spectronik DAQ GUI' icon on the desktop. The default digital display view should appear.
- Click on the connect button. The 'S' button should turn green. The software is now on and ready for incoming data.
- Click START button to start the fuel cell system.
- Turn on the fuel cell system following its own set of instructions as per normal. If the software is connected properly, a status message should appear in the status display box, followed shortly by all the parameters values.
- The software is now projecting live values of the fuel cell system and is ready to use for data collection.



## SAVING A DATA FILE (DATA ACQUISITION):

Even though the software is 'live', it does not record the values unless instructed to do so. To start saving data:

- i. Click on the log data button, a pop-up window will appear. Key in the desired file name, otherwise the default name 'Fuel Cell' will be used. Press enter. The log data button should now turn green. The software starts recording data. The file will be saved in desktop.
- ii. The software will continue recording data until the log data button is clicked again. The button color will turn off. The software is now no longer recording value.



## DATA REVIEW AND ANALYSIS:

After the fuel cell system is turned off, you can review the collected data and print-screens for further analysis.

- i. Go to 'desktop', 'Fuel Cell' .
- ii. Data is saved in csv format, open the file with Microsoft Excel. You should see the following:

X1																		
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1		FC_V (V)	FCT1 (C)	H2P1 (B)	DCDCV (V)	FC_A (A)	FCT2 (C)	H2P2 (B)	DCDCA (A)	FC_W (W)	FAN (%)	Tank-P (B)	DCDCW (W)	Energy (Wh)	BLW (%)	Tank-T (C)	BattV (V)	
2	14:17:04	29.36	18.07	0.73 XX.X		0	17.97	0.59 XX.X		0	9	15.9 XXXX.X		0	28	50.56	28.82	
3	14:17:05	29.36	18.07	0.73 XX.X		0	17.97	0.59 XX.X		0	9	15.9 XXXX.X		0	28	50.56	28.82	
4	14:17:06	29.36	18.07	0.73 XX.X		0	17.97	0.59 XX.X		0	9	15.9 XXXX.X		0	25	50.56	28.82	
5	14:17:07	29.36	18.07	0.73 XX.X		0	17.97	0.59 XX.X		0	9	15.9 XXXX.X		0	12	50.56	28.82	
6	14:17:08	29.36	18.07	0.73 XX.X		0	17.97	0.59 XX.X		0	9	15.9 XXXX.X		0	12	50.43	28.82	
7	14:17:09	29.36	18.07	0.73 XX.X		0	18.07	0.59 XX.X		0	24	15.9 XXXX.X		0	12	50.56	28.82	
8	14:17:10	29.36	17.97	0.73 XX.X		0	18.07	0.59 XX.X		0	25	15.9 XXXX.X		0	12	50.43	28.82	
9	14:17:11	29.36	18.07	0.73 XX.X		0	17.97	0.59 XX.X		0	21	15.9 XXXX.X		0	12	50.43	28.82	
10	14:17:12	29.36	17.97	0.73 XX.X		0	18.07	0.59 XX.X		0	21	15.9 XXXX.X		0	12	50.43	28.82	
11	14:17:13	29.36	18.07	0.73 XX.X		0	18.07	0.59 XX.X		0	21	15.9 XXXX.X		0	81	50.43	28.82	
12	14:17:14	29.36	18.07	0.73 XX.X		0	18.07	0.59 XX.X		0	26	15.9 XXXX.X		0	15	50.43	28.82	
13	14:17:15	29.36	18.07	0.73 XX.X		0	17.97	0.59 XX.X		0	27	15.9 XXXX.X		0	15	50.43	28.82	
14	14:17:16	29.36	18.07	0.73 XX.X		0	18.07	0.59 XX.X		0	27	15.9 XXXX.X		0	15	50.43	28.82	
15	14:17:17	29.36	18.07	0.73 XX.X		0	18.07	0.59 XX.X		0	32	15.9 XXXX.X		0	15	50.43	28.82	
16	14:17:18	29.36	18.07	0.73 XX.X		0	17.97	0.59 XX.X		0	30	15.9 XXXX.X		0	15	50.56	28.82	
17	14:17:19	29.36	18.07	0.73 XX.X		0	18.07	0.59 XX.X		0	29	15.9 XXXX.X		0	15	50.56	28.82	
18	14:17:20	29.25	17.97	0.73 XX.X		0	18.07	0.59 XX.X		0	28	15.9 XXXX.X		0	15	50.56	28.82	
19	14:17:21	29.25	17.97	0.73 XX.X		0	18.07	0.59 XX.X		0	28	15.9 XXXX.X		0	15	50.56	28.82	
20	14:17:22	29.25	18.07	0.73 XX.X		0	18.07	0.59 XX.X		0	23	15.9 XXXX.X		0	15	50.56	28.82	
21	14:17:23	29.25	18.07	0.73 XX.X		0	17.97	0.59 XX.X		0	9	15.9 XXXX.X		0	15	50.43	28.82	
22	14:17:24	29.25	18.07	0.73 XX.X		0	17.97	0.59 XX.X		0	9	15.9 XXXX.X		0	81	50.56	28.82	
23	14:17:25	29.25	17.97	0.73 XX.X		0	18.07	0.59 XX.X		0	9	15.9 XXXX.X		0	15	50.56	28.82	
24	14:17:26	29.25	18.07	0.73 XX.X		0	18.07	0.59 XX.X		0	9	15.9 XXXX.X		0	28	50.56	28.82	
25	14:17:27	29.25	18.07	0.73 XX.X		0	18.07	0.59 XX.X		0	9	15.9 XXXX.X		0	40	50.56	28.82	
26	14:17:28	29.25	18.07	0.73 XX.X		0	18.07	0.59 XX.X		0	9	15.9 XXXX.X		0	50	50.56	28.82	
27	14:17:29	29.25	18.07	0.73 XX.X		0	18.07	0.59 XX.X		0	9	15.9 XXXX.X		0	53	50.43	28.82	

Column A is the time of a particular data point while columns B to Q show the respective parameters' values that are recorded. Using this Excel spreadsheet, any graphs can be created for more in-depth analysis and data scrutiny.



# 4 TROUBLESHOOTING

**If the software does not work, perform the following checks:**

- Make sure the fuel cell system is running normally and check that the USB cable connection is properly secured.
- Plug the USB cable into the PC port before running the software. Otherwise, close the program and restart it.
- Remember to click the connect button ('S' logo), it should turn green when clicked on.
- If the software still does not work, restart everything and try using another USB port.

If the error persists, contact Spectronik's technical support at [support@spectronik.com](mailto:support@spectronik.com).