Hints for external control of EFOY Pro fuel cell

The EFOY Pro fuel cell is capable to receive commands from an external controller. To use this functionality you can send serial commands or use switching contacts of "Data Interface". To use external control functionality, EFOY Pro offers three possibilities:

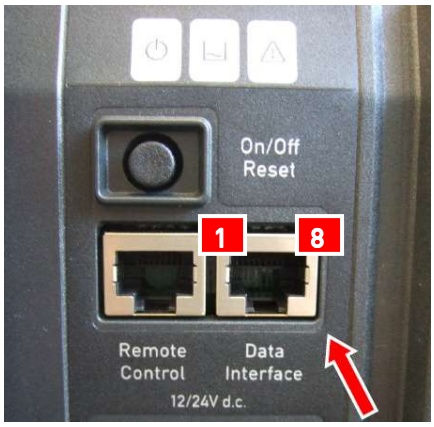
1) Button commands via serial communication

Via serial communication (RS-232) the same commands triggered by the buttons of EFOY Pro's remote control can be sent to the fuel cell. Three commands „Button On", „Button Off" and „Button Auto" cover this functionality. The fuel cell reacts the same way as if these buttons are used on EFOY Pro's remote control. Details for setting up serial communication are described in the manual for Interface Adapter.

2) „Remote On" Signal

If EFOY Pro receives „Remote On" signal by switching contacts of serial communication it starts the charging cycle until switch off voltage is reached. In the display of the remote control you can see „R" in the first line on the right as long as "Remote On" Signal is active. Is „Remote On" Signal still active after a complete charging cycle, another charging cycle will start. Therefore we recommend to reset „Remote On" signal after charging cycle has started.

Switching contacts on data interface:



Pin	Function
1	DuoCartSwitch
2	RxD (Data)
3	TxD (Data)
4	GND, Ground
5	Battery +
6	Fuel Cartridge Sensor
7	**Remote On**
8	**Hybrid**

3) Hybrid Mode

For using Hybrid Mode you need two signals: „Hybrid“ and „Remote On/Off“. In Hybrid Mode the internal voltage measurement system and charging control is deactivated and the fuel cell just reacts on external commands. Other signals from display e.g. will be ignored.

Hybrid Mode can only be started, if the fuel cell is in “Automatic” Mode.

Hybrid Mode via switching contacts	Hybrid Mode via serial commands
1) Connect Pin 8 „Hybrid“ with Ground of battery or Ground at Pin 4.	1) Send the „Hybrid“ command frequently to the fuel cell (at least every 15 seconds).
The display shows „Hybrid“in the first line	
2) Connect Pin 7 „Remote On“ with positive terminal of battery or Pin 5.	2) Sent „Remote On“ command to fuel cell. The command „Hybrid“ needs to be sent frequently as well.
Fuel Cell starts charging cycle. Display shows „Start phase“ or „Charging Mode “	
3) To terminate charging cycle open contact at Pin7.	3) To terminate charging cycle send „Remote Off“ command.
The second line of Display will be blank, the fuel cell switches off	
4) Open contact at Pin 8	4) Stop sending “Hybrid” command
The system is in initial automatic mode. The display shows “Automatic”.	

Notes:

- In Hybrid Mode the voltage control of the charging control is deactivated. The fuel cell charges to maximum voltage of 14,7 V. The external control has to protect the battery from overcharging, if this is not implemented, battery might be damaged.

- If „Hybrid“ Signal is reset, the current state of operation stays active. Then the fuel cells charging control is active again and switches off if “switch off” Voltage is reached.

- Anti-Freeze will be activated by fuel cell automatically, even in Hybrid-Mode.

- Discharge protection and second phase of charging with reduced current is not available in Hybrid Mode.

- For e.g. maintenance purposes you can press „auto“ and „››“ at the same time to block “Remote On” command. The display shows a padlock symbol on the right.