

BREENA FIRING SYSTEMS

SEQUENCER S 20
V 2.6.0

HOW TO CHANGE THE INPUT VOLTAGE RANGE VALUE (IVR)



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1 - Introduction

The BFS sequencer is compatible with the most pyrotechnic firing systems available on the market today.

In fact, BFS S20 has got 4 different input voltage ranges you can set, in order to let it working with input voltage from 9V to 80V.

You can set the best voltage range according to the output cues voltage of your firing system; **please note that you can set one voltage range at time.**

1.1 - Input Voltage Ranges (IVR)

The BFS S20 has got 4 different input voltage ranges:

a) - Nominal: 9V - 24V	-----	Real: 6V - 34V	(IVR A)
b) - Nominal: 25V - 40V	-----	Real: 18V - 50V	(IVR B)
c) - Nominal: 41V - 60V	-----	Real: 34V - 70V	(IVR C)
d) - Nominal: 61V - 80V	-----	Real: 54V - 90V	(IVR D)

- **Nominal value** is the ideal value of working
- **Real value** is the effective working range measured values.

To determine wich is the best IVR you need to set in your BFS unit, we suggest you to follow this sample rule:

- If you have a single firing system with a specific cue voltage, please refer to **Nominal**
- If you have different firing systems with different cue voltage, please refer to **Real**, in order to “capture” the most cue voltage value as possible in a single real range.

To help you to determine wich is the best IVR, we provide a IVR table, you can find at the end of the user manual.

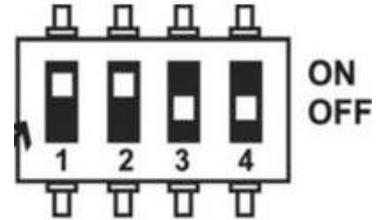
1.2 - IVR Table

The IVR table provides 3 different informations:

- **IVR information:** are the 4 different input voltage range
- **PIN combinations:** are the pin combinations to set each IVR
- **Electric Current Values:** are the measured current values (Ah) you need to provide to the BFS in combination to IVR.

- **IVR informations:** Are the 4 different ranges listed at 1.1;

- **PIN combinations:** are the for different pin combinations (each combination for a specific IVR) you need to set on your BFS S20 unit, in order to use the IVR you decide to set up. It is a combination on ON/OFF pin positions.



IVR A - Nominal: 9V - 24V

--- Real: 6V - 34V



IVR B - Nominal: 25V - 40V

--- Real: 18V - 50V



IVR C - Nominal: 41V - 60V

--- Real: 34V - 70V



IVR D - Nominal: 61V - 80V

--- Real: 54V - 90V



- Electric Current Values

The electric current value is the amount of electric current that the BFS S20 requires with the IVR to activate the trigger in. This ECV is provided by the cues of your firing system and determines how many S20 sequencer you can activate in the same time when connected in parallel mode in the same cue.

Every BFS unit has got a minimum ECV value, that is **0.6A** at IVR A; to activate 1 S20 unit, you need for **0.6A** when IVR A is set. (0.6A required for 9-24V range). So, to fire 1 S20 unit with IVR A set, the cues of your firing system must provide no less than 0.6A and a voltage output value between 9V and 24V.

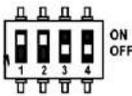
When you set the S20 with bigger IVR (IVR B, IVR C, IVR D) also the ECV required is bigger; the values of ECV required are written on the IVR table.

If you want to know how many BFS S20 unit your firing system can activate with the same cue (in parallel mode on the same cue), you need to proceed as follow:

- 1) **Please determine wich is the best IVR according to your firing systems**
- 2) **On the IVR table, check the actual IVR column, and then intersects with the number of modules: the blue number is the ECV required.**

In this way you can calculate wich is the **maximum number of S20 you can connect in parallel mode on the same cue of your firing system**; of course you need to know the maximum output current provided by your firing system.

MINIMUM VALUES FOR CURRENT ACTIVATION TRIGGER FOR EACH VOLTAGE RANGE

Sequencers in parallel mode on the same cue	Minimum required Amperage X (9-24V) (up to 34V tolerance)	Minimum required Amperage (25-40V) (up to 50V tolerance)	Minimum required Amperage (41-60V) (up to 70V tolerance)	Minimum required Amperage (61-80V) (up to 90V tolerance)
1 Module	0.6A	1.4A	2.1A	5.0A
2 Modules	1.2A	2.8A	4.2A	10A
X 3 Modules	1.8A	4.2A	6.3A	15A
4 Modules	2.4A	6.0A	8.4A	20A
5 Modules	3.0A	7.4A	10.5A	25A
6 Modules	3.6A	8.8A	12.6A	30A
	1 2 3 4 ON OFF OFF OFF	1 2 3 4 OFF ON ON ON	1 2 3 4 OFF ON ON OFF	1 2 3 4 OFF ON OFF OFF

Note: For each voltage step (ex: 9-24V), you have an +10V tolerance, so the permissible voltage value is: 9-34V.
Attention! The values shown in the table, refer to a full or medium battery charge. Please test it preventively!

In this example, if you set your BFS unit on IVR A (9-24V), to fire 3 x BFS unit, connected in parallel mode on the same cue, your firing systems must provide 1.8A or more for each cue. (and of course from 9 to 24V)

The IVR table helps you also to understand which is the best IVR to set, when the cue voltage of your firing system overlaps 2 different IVR:

for example, if your firing system provides 28V voltage output, the BFS S20 can be set on IVR A or IVR B, because the real value of IVR A is 6-34V.

To decide if IVR A or IVR B, we suggest you to evaluate also the ECV required; in fact, to fire the same number of S20 in the same cue, IVR B requires more current than IVR A.

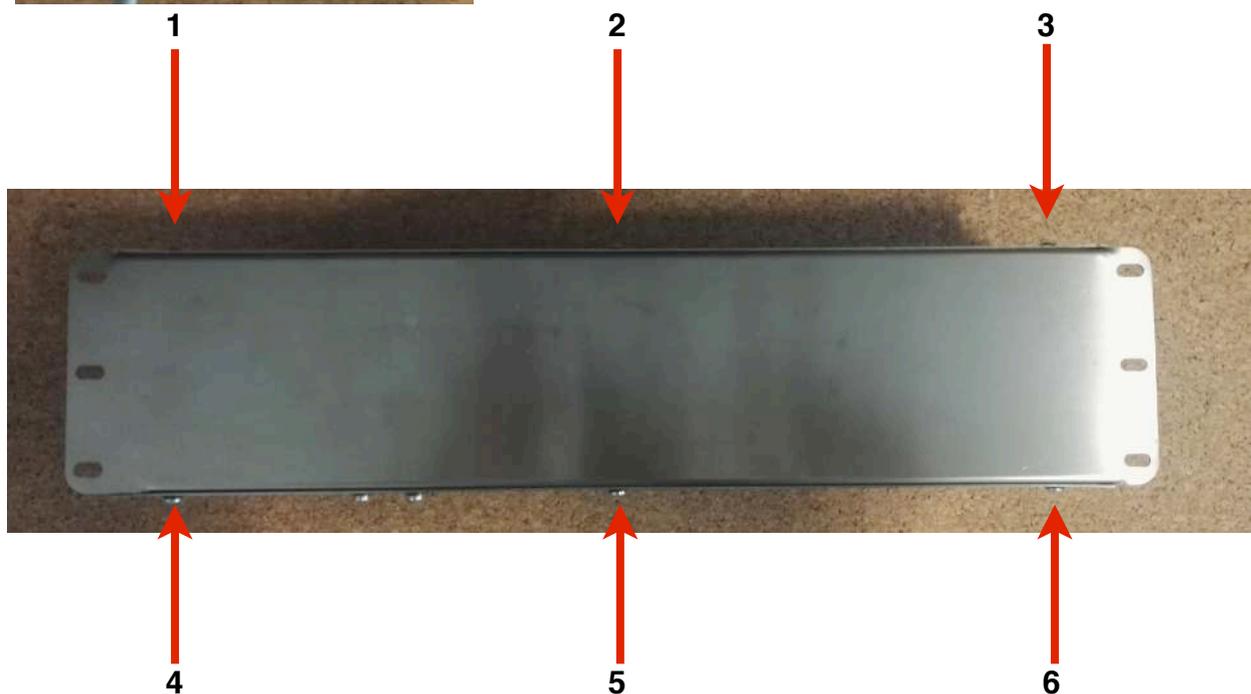
Your decision will depend on how many BFS you want to connect in the same cue of your firing system, and on the maximum current provided by your firing system.

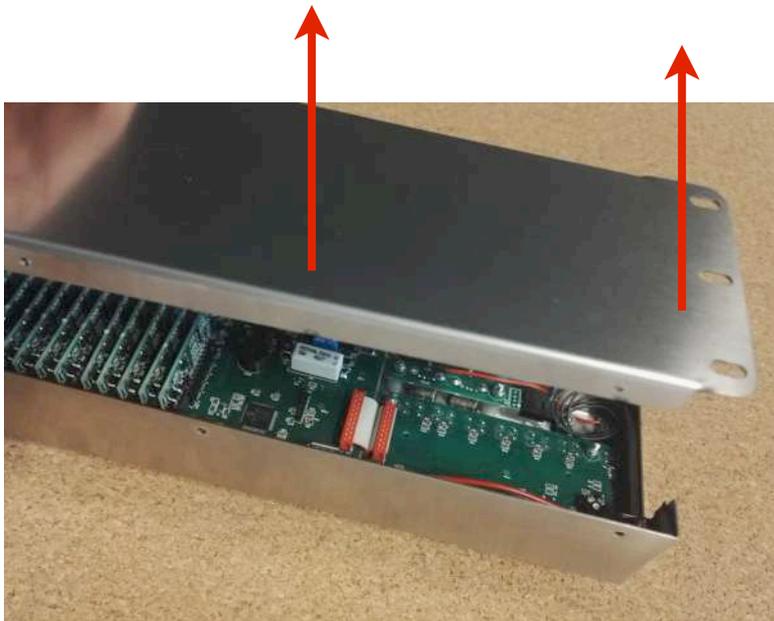
2. HOW TO SET THE IVR ON YOUR S20 UNIT

To set the IVR on your S20 sequencer, you need to open the unit: to do this, please follow the instructions listed below.

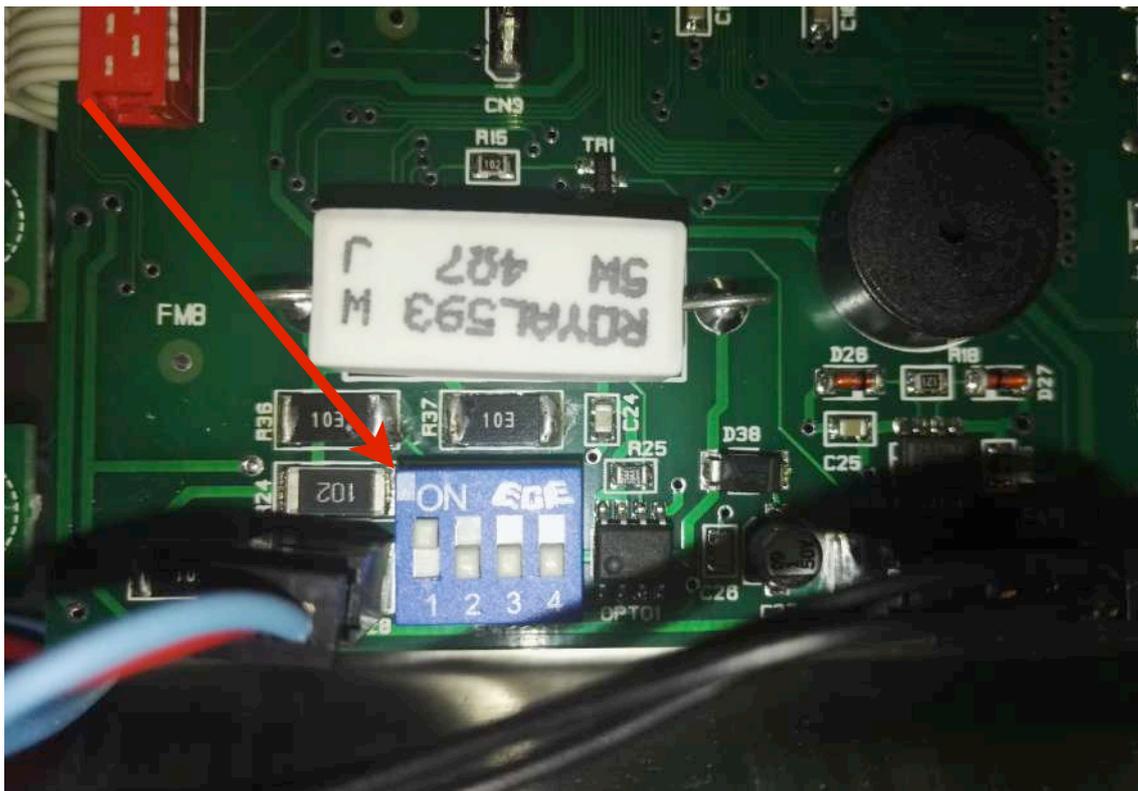


1) Remove the 6 body fixing screws





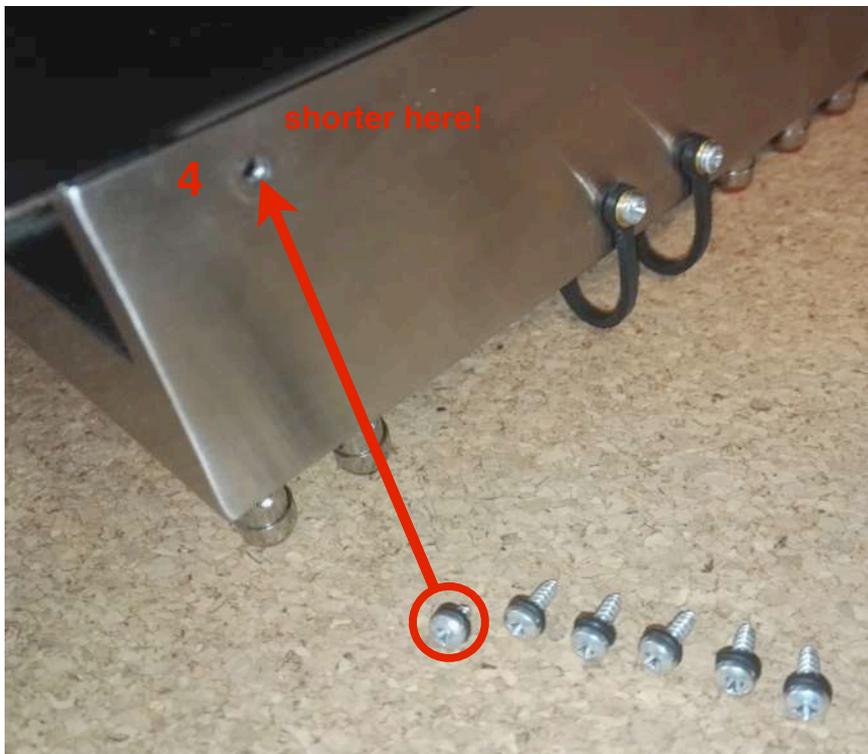
2) When finished to remove the 6 screws from the BFS, remove the underside of the body by pulling upwards



3) Search for the 4-pin resistance, and set it with the IVR you need, using the pin combination showed in this manual (you can find the pin combinations also on the IVR table)



4) Close the unit and pay attention to do this in the right direction



5) Screw the 6 screws: remember that the screw number 4 is shorter than the others and you must place it in position 4!

6) Now your BFS S20 is ready! Please TEST it before use, in order to check if everthing has been set in the best way!



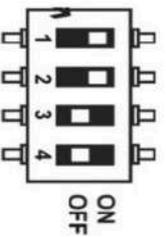
For assistance please write to: **breenafireworks@gmail.com**

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