memory ot the switch.

c) Setting of the output current of 40 mA: press 1xS to choose current petting, 1xL to confirm selection, 1xS to set current 40 mA and 1xL to save set current to memory ot the switch.

d) Set the first section (on for 1 second): press 2xS to choose the first section setting, 1xL to confirm selection, 0xS to set 0 tens of seconds, 1xL to confirm it, 1xS se set 1 second, 1xL to confirm it, 0xS to set 0 tenths of a second, 1xL to save set time to memory of the switch.

e) Set the second section (off for 5 second): press 3xS to choose the second section setting, 1xL to confirm selection, 0xS to set 0 tens of seconds, 1xL to confirm it, 5xS se set 5 second, 1xL to confirm it, 0xS to set 0 tenths of a second, 1xL to save set time to memory of the switch.

Then turn the power off, connect the button to next channel, press the button, turn on the power and repeat for all steps the next channel.

Basic technical data:

Supply voltage:	4-25 V.
Output current:	adjustable from 20 to 120 mA to step 20 mA.
The length of each section:	adjustable from 0.0 s to 25.5 s at speed 100%.
Number of sections:	up to 40 (20x and 20x turned off).
Sequence length:	0.2 s to 1020 s (at speed 100%).
Generated sequences:	once or cyclically.
Generated speed:	adjustable 50%, 100%, 200%, 300%, 400%, 500%.
Dimensions:	60 x 34 x 11 mm.
Weight:	14 g.

Warranty:
Warranty is 24 months from date of sale.

Produced by:
***BEL* s.r.o., Eliasova 38/745, 160 00, Prague 6, Czech Republic**
e-mail: info@bel-shop.eu, WWW: http://www.bel-shop.eu

..... date of sale

..... stamp, signature

Six-channel adjustable switch

Basic description:

Adjustable switch (switch primarily LEDs) can be used to control up to six independent circuits with LEDs, but also other loads, for example relays. Behavior of each output can be set in 40 sections (sections 20 and 20 sections turned off) by user, each of the sections can be long from zero to 25.5 sec. Total length of the sequence can be at 100% speed from 200 ms to 1020 s. The sequence can be performed only once or can be repeated continuously. Speed of each output can also adjust the rate of 50%, 200%, 300%, 400% or 500% and by this way slow down or speed up the sequence. The switch can be used in many applications, such as traffic lights, crossing lights for model railways, model aircraft lighting, rotating beacon, blinkers, for various advertising posters. Each output has own current stabilizer, adjustable (PWM) from 20 to 120 mA, which allows direct connection of the LEDs without protective resistors. For higher output current more outputs can connect parallel together. Appropriate setting and outputs association can be used for output current in 36 levels controlling with step 20 mA, the same way can be used for change of current total amplitude during one period in 21 levels and step 20 mA.

Power supply, setting button and load connection:

1) Power supply - connect to double-pins (NAPÁJENÍ 4 – 25 V PLUS a MÍNUS) in the corners on the right side of the switch.
2) Setting button - connect to one of the six double-pins (PROGRAMOVACÍ VSTUPY), which are placed between double-pins for power supply
3) LEDs - connect to 12 double-pins (VÝSTUPY 20 – 120 mA), two double-pins for each output on the left side of the switch. Top row of pins (switch has descriptive label on the top) is connected to the positive supply voltage, bottom pins are switched (with a set current limit) to the negative supply voltage. Note: that if the load has inductive character (electric motor or relay coil) so it must be parallel to the load connected protection diode (e.g. 1N4007), cathode to plus oft power supply!

Calculation of maximum permissible load current:

To avoid overload of transistors that stabilize the current for LEDs, it is necessary to check whether they are loaded with allowed power. To calculate the maximum current use relationship: Imax = 0.6 / (Usup - ULED), where Imax is the maximum allowable current, Usup the supply voltage and ULED is the total voltage of LEDs connected in series to the corresponding output.
Note: the supply voltage must be about 0.7 V higher than supply voltage all LEDs connected in series. When a larger number of LEDs is requested LEDs can be connected in series-parallel, but there should be added resistors to ensure proper flow distribution in all parallel branches. Conversely, if the voltage at the LEDs is significantly lower than the supply voltage, a suitable resistor can be wired in series to transfer the load from the power switch to the resistor. The flow is regulated by varying the duty cycle (PWM) and the maximum amplitude of 120 mA. If it bothered some loads, set the 100% duty cycle current limit and series resistor. When using the load as a piezo siren or relay coil must also be set to 100% duty cycle (i.e. current 120 mA).

Mode, current and lengths of sections setting:

If you want to insert switch to setting mode so connect setting button to setting input and press and hold it during switch connecting to power. The button is used for mode of operation, output current and length of each section petting in selected channel. Briefly pressing (within 1 second) parameter is set, after long press (over 1 second) is set parameter saved. The length of the section is set in the XYZ format where X is the number of tens seconds, Y is the number of seconds, and Z is the number of tenths of a second duration. Pressing the button for longer than 5 seconds deletes all values from memory just the set output, which should be done before programming each new sequence.

Confirmation button is pressed and stored in the memory:

Short switching (0.1 s) of all outputs - short press the confirmation
Long switching (2 s) of all outputs - long pressing confirmation, actual parameter setting continues.
Long switching (2 s) + five short (0.1 s) switching of all outputs - long pressing confirmation, actual parameter setting has been completed and value was saved.
Very long (5 s) + five short (0.1 s) switching of all outputs – very long pressing confirmation, after which all data on set output have been reset.

Note: mode of operation means that the preset sequence initiated only once or is cyclically repeated and at what speed. If you want to set up more outputs in the same sequence, connect button when adjusting at all relevant inputs. Attention! When button is just pressed so there is output current 120 mA at set channel. If it could damage the connected load disconnect it during setting.

Number of button presses determination:

Inquired mode, output current and sections duration of the sequence is set using the programming button. The corresponding number of the button presses is determined using conversion tables.

Mode and speed petting	once 100 %	cyclic 50 %	cyclic 100 %	cyclic 200 %	cyclic 300 %	cyclic 400 %	cyclic 500 %			
Short press number	0	1	2	3	4	5	6			
Current setting	20 mA	40 mA	60 mA	80 mA	100 mA	120 mA				
Short press number	0	1	2	3	4	5				
Tens of second setting	0	1	2							
Short press number	0	1	2							
Units of second setting	0	1	2	3	4	5	6*	7*	8*	9*
Short press number	0	1	2	3	4	5	6	7	8	9
Tenths of second setting	0	1	2	3	4	5	6*	7*	8*	9*
Short press number	0	1	2	3	4	5	6	7	8	9

When trying to set time over 25.5 seconds so maximum time 25.5 seconds is saved.

Operation mode setting: press and hold the button long (over 2 s) once to enter mode of operation setting. Then press 0x short, if you want to switch all sequence only once after power-on and at speed 100%, press 1x short, if you want to set cyclic mode at speed 50%, press 2x for cyclic mode at speed 100%, 3x for speed 200% 4x for speed 300% 5x for speed 400% or 6x for speed 500%. Then press the button and hold long (over 2 s), setting is saved, all outputs are switched once long and five short and mode setting is completed.

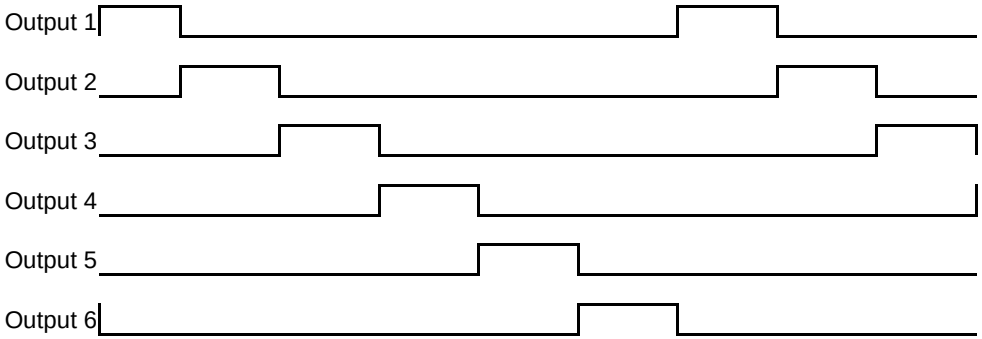
Output current setting: press the button one short and one long to enter to output current setting. Then press the button 0x short, if you want output current 20 mA, 1x short for 40 mA, 2x short for 60 mA, 3x for 80 mA, 4x for 100 mA and 5x for 120 mA. Then press and hold (over 2 s) the button, current setting is saved, all outputs are switched once long and five short and mode setting is completed.

Section time setting: press the button short 2x to 41x (even numbers determine sections when output is switched-on, odd numbers determine sections when output is switched-off), in according what section you want to set and press the button long to confirm it. Then press the button short as many times as tens of seconds you want to set. Then press the button long to confirm it. Then press the button shortly, as many times as seconds you want to set. Then press the button long to confirm it. Then press the button shortly, as many times as tenths of seconds you want to set. Then press the button long, set time is saved, all outputs are switched once long and five short and mode setting is completed. If you want to set the next section, repeat all steps again and again. If you want to set another channel, turn off the power supply, move the programming button at next input and repeat all steps.

Example:

To better understand the principle of switch setting let us to try to set six LEDs blinking in the circle. LED current will be 40 mA, and each LED will light 1 second.

1) First, on graph paper, draw course lighting up the LEDs. Length of sequences of all LEDs must be same (in this case 6 s).



2) Selected modes, currents and times of sections write to the table.

Output	Mode (0)	Current (1)	Switch-on (2)	Switch-off (3)	Switch-on (4)
1	cyclic, 100 %	40 mA	1,0 s	5,0 s	0,0 s
2	cyclic, 100 %	40 mA	0,0 s	1,0 s	5,0 s
3	cyclic, 100 %	40 mA	0,0 s	2,0 s	4,0 s
4	cyclic, 100 %	40 mA	0,0 s	3,0 s	3,0 s
5	cyclic, 100 %	40 mA	0,0 s	4,0 s	2,0 s
6	cyclic, 100 %	40 mA	0,0 s	5,0 s	1,0 s

Corresponding number of button presses you find in table **Determining the number of button presses** (1xL is one long press, 3xS means 3 short press, 0xS means don't press).

3) Set the first channel:

a) Connect button to enter the channel you want to set, press it and switch the power supply. The selected channel will be in programming mode, the other channels will be switched off.

b) Setting mode to cycle 100% on output 1: press 0xS to choose mode setting, 1xL to confirm selection, 2xS to choose cyclic mode at speed 100% and 1xL to save set mode to