

# Using your Bisun Flexitwin V4

In all operation modes, all operation of the light is by manipulation of the normal power switch on the left hand side of the host lamp unit.

Though a 'classic mode' operating like the standard 14LED insert is available, most users will use the Flexitwin in one of its 'variblend' modes.

The V4 is pre-configured to run in the 4-power/4-beam-blend mode 2.

## **Variblend modes**

In a variblend mode, the unit operates with the power switch in the centre position, with the switch allowing the total power level and the beam-blend to be controlled independently. This keeps operation simple while allowing a high degree of control, and also gives excellent tolerance to poor switch contacts since the switch is only used briefly to change the unit settings

## **Power control**

Changing total power level is achieved by brief down-and-back-to-centre movement of the power switch to nudge the unit into the next power level in sequence, the sequence being a perpetual cycle from highest stepping down to lowest and then wrapping back round back to the highest.

## **Beam blend control**

Beam blend control operates similarly, with brief up-and-back movements of the power switch cycling through a selection of beam blends, with the sequence starting from a pure flood, with an increasing shift towards spot beam content, and then back round to the pure flood. 3 or 4 blends are available, depending on the mode. The total power level is independent of the beam blend, the blend simply controls how the total power is shared between the two LEDs.

## **Reversible spot**

To temporarily engage a full power spot-only beam for checking out distant targets, the switch is moved upwards and kept up.

After a 0.75s delay, the spot beam comes on at full power and stays on as long as the switch stays up. When the switch is centred, the unit goes back to its previous settings (possibly including 'off' - see below).

## **Turning on**

The V4 can be turned on by briefly nudging the switch in either direction and back to the centre position, when it will power up at the settings it was using before it was last turned off.

If turned on by moving the switch down, as soon as the switch is down the unit will turn the flood LED on at the 'pilot' setting. If the switch is returned to centre within 2s, the unit powers up at the last-used settings. If the switch is held down for more than 2s it will return to off when returned to centre.

Operation is similar if the switch is moved upwards when the unit is off. If the switch is moved up and returned to the centre position within 0.75s, the unit will power up at the last-used settings. If held up for more than 0.75s, the full power spot will run for as long as the switch is kept up, and the unit will turn off when the switch is returned to centre.

### **Turning off**

To turn the unit off, the switch is moved down, kept down for more than two seconds and then returned to the centre position.

After two seconds with the switch down, the main unit switches off, leaving the lamp running at an extra-low power 'pilot' setting on the flood beam via independent circuitry running directly from the switch.

From this state, returning the switch to the centre position will cause the unit to turn off completely.

### **Power ranges**

A power *range* is a set of available output power levels

Three output power ranges are available for every operating mode.

The standard power range gives good brightness with a maximum power chosen to give good runtime even at the highest level (6-8h with decent rechargeable cells).

The high range has a maximum output twice the standard maximum while widening the steps between power levels to give extended runtime at low power levels.

The boost range has the same settings as the standard, except that the highest power setting is a boosted one - for the first minute after selecting high power or changing the beam blend at high power the light runs at a double-power setting, after which it gently and imperceptibly drops to the standard high power level. In normal use, unless high power is being repeatedly re-selected, in the boost range the runtime will be basically the same as in the standard range, but with more light available for short periods, and so is the best range for most users.

### **Operating modes**

There are multiple variants of the variblend mode available, which all work in the same way but give extra choice to the user. They differ in whether there is a low battery warning, the number of beam blends, the number of power settings, and the output power levels.

There is a 'classic mode' which operates like the 14LED modules, with the unit always off whenever the switch is centred.

This has a fixed blend, with flood-heavy beams selected by having the switch down, and spot-heavy blends selected by having the switch up, and with power changed by brief turning off and back on in the same way a standard 14LED unit operates.

Mode	Type	Power Levels	Beam Blends	Battery warning	Output
1	Variblend	4	4	No	Normal
2	Variblend	4	4	Yes	Normal
3	Variblend	3	3	No	Normal
4	Variblend	3	3	Yes	Normal
5	Variblend	3	3	No	Economy
6	Variblend	3	3	Yes	Economy
7	Classic	3	Fixed	No	Normal
8	Classic	3	Fixed	Yes	Normal

For the variblend modes, in modes 1 and 2:

The available beam blends are:

Flood

A 10:1 flood:spot ratio

A 3:1 flood:spot ratio

A 1:1 flood:spot ratio

The available power levels are extra-low, low, medium and high.

In modes 3-6, the 10:1 flood:spot blend and the extra-low power level are removed to make the operating sequences shorter and simpler.

In all variblend modes, an extra-low flood level is always available by pushing and leaving the switch down to engage the 'pre-off' pilot setting, and a full-power spot is available by pushing and leaving the switch up.

The 'economy' mode has power levels 2/3 of the equivalent normal power to extend the runtime by 50%. Typically this is used in club lights to make battery changing unlikely to be needed on most normal trips even if a user keeps the light constantly on high.

**Power consumption**

The power consumption at a given power level is independent of the beam blend chosen.

With 'normal' output settings (modes 1-4), the current draw in mA and approximate light outputs in lumens are:

	Extra-low	Low	Medium	High	Boosted High *
Standard range	22mA/10lm	55mA/26lm	140mA/65lm	360mA/160lm	N/A
Boost range	22mA/10lm	55mA/26lm	140mA/65lm	360mA/160lm	700-1050mA/320-450lm
High range	26mA/11lm	80mA/35lm	230mA/110lm	700mA/320lm	N/A

(\*In boost mode, while in the initial boost period of high power, the power consumption is ~700mA except for the 50:50 flood:spot mode, where it is ~1050mA)

With 'economy' output settings (modes 5&6), the figures are:

	Extra-low	Low	Medium	High	Boosted High *
Standard range	15mA/7lm	36mA/16lm	90mA/40lm	235mA/105lm	N/A
Boost range	15mA/7lm	36mA/16lm	90mA/40lm	235mA/105lm	450-650mA/200-290lm
High range	17mA/8lm	50mA/23lm	150mA/68lm	450mA/200lm	N/A

The figures above are for the light output of the LEDs. All LED optics (as used on the spot beam) cause some light loss, so the spot LED+optic combination has an output a little lower than the above figures would suggest, though the large spot optic in the V4 has very low loss. A scratched Duo lens can significantly reduce light output, and diffuse a spot beam.

### Selecting a mode

To select a mode, first open the headset to get access to the configuration button, which depending on the model of V4 is either on the front of the mounting plate above the spot LED, or a tiny button on the main circuit board. An onboard button is best pressed using a fingernail

- a) Set the power switch to select the power range desired (see below)
- b) Press the configuration button.
- c) The spot LED will flash to indicate the current selected mode (1 through 8).
- d) Return the power switch to the centre position if it is not there already
- e) If the mode displayed is the desired one, go to step h, otherwise briefly press the configuration button to advance to the next mode
- f) Go to step c
- g) If the button is pressed and held down, the current selected mode will first be displayed by flashes and then the mode will be advanced, indicated by extra flashes, as the button is held down. If the button is kept held after mode 8 is reached, the mode will reset to 1. Once the button is released, see step c.
- h) When the desired mode number is reached, operate the main power switch up or down to exit configuration and save the mode for future use.

Finally, close the headset.

Selection of the power range depends on the main switch when entering setup. Switch down - standard range, central - boost range, up - high range.

### Storage of running settings

To make operation easier in Variblend mode with poor battery connections, the V4 flexitwin stores its current operating settings and if power is disconnected while a unit is running, it will restart running with the stored mode and power level when power is restored.

This persistent-through-power-disconnection feature means knocks to the helmet which cause temporary interruptions of power only cause brief interruptions of light.

To avoid excessive writing of settings to memory, the V4 does not store changes immediately they are made, but only after the unit has run with stable settings for a short period of time.

The only exception to this is that when turned on it immediately records that it is on, so that if a unit is turned on it can't be turned off even by an interruption of power immediately afterwards.

If a power level or beam blend is changed, that change is only stored after a short delay, of 10-20 seconds, and interruption of power before the store happens will cause reversion to the previous power and beam blend on restoration of power.

Similarly, if a unit is turned off, that turning off isn't recorded immediately, but only after a few seconds - turning off and instantly interrupting power would result in powering back up on reconnection as if it had not been turned off.

If operating in a 'boost' mode at high power, only the standard power level is stored, not the temporary boosted level, so power interruptions in the first 90 seconds of a boost will result in an immediate reversion to the standard levels.

## **Batteries**

Typically people will run the unit from 4x NiMH cells or 4x Alkaline cells.

The dummy AA cell is provided for people who choose to use '1.5V' lithium cells, (or the fairly rare NiZn Nickel-Zinc rechargeables) which have a rather higher voltage than alkaline cells, where the use of 4 cells would be inadvisable due to excessive voltage (as well as being unnecessarily costly in the case of 1.5V lithiums, since 3 lithium cells would be more than sufficient and the cells are expensive).

Duos vary significantly in terms of the quality of the various electrical connections between cells and cell holder and between the battery box and headset contacts. In some Duos with perfect connections, a V4 will operate perfectly well on 3 NiMH cells using the dummy AA cell provided, but in many Duos, voltage losses in the wiring and contacts would limit the maximum output.

**If using '1.5V' lithium cells, (or the 'NiZn' rechargeable cells) the dummy cell must be used.**

**'14500' size rechargeable Lithium-Ion cells must never be used.**

## **Low battery voltage warning**

This warning option is included for users running from 4xNiMH cells, to give them advance warning of battery depletion and to allow them to swap cells in good time before any become fully flattened, which helps maximise the longevity of the cells. When the input voltage drops below a pre-set threshold, the unit will give five 'off' pulses, kept brief for safety.

There is no automatic power level changing, just the warning. Only one warning will be given per set of batteries, to avoid repeated warnings becoming annoying.

If unsure if a warning has occurred, turn the unit off and then briefly disconnect power to allow a repeat.

The threshold is set at a level well above the voltage typically needed to run the LEDs at maximum power, so significant runtime will remain after this point. The warning threshold is not designed for use with 3xNiMH cells, and will activate early if using them.

Users who habitually run from 3xNiMH cells should select a non-warning mode if they find the warning distracting.

A voltage warning happening in a Duo soon after starting operating with 4x freshly-charged NiMH cells indicates that either one of the cells is in poor condition, or there is some kind of connection issue in the Duo - poor battery contacts, cable issues or some problems in the headset.

### **Thermal limiting**

The Flexitiwn has built-in thermal limiting to ensure the unit does not get too hot if running at the highest power levels, especially in warm environments.

This operates subtly, smoothly adjusting the power down (or back up) to keep the internal temperature acceptable, rather than stepping to different power levels.

### **Redundancy**

For added peace of mind, the Flexitiwn has redundant electronics to provide a low power level to the flood beam whenever the switch is down, irrespective of the rest of the control circuitry.

### **Photography and slaves**

The low-power flood beam that the V4 produces with the switch left down is flash-slave-safe, and so may be useful for photographers or their assistants.

For more information email [sales@bisun.co.uk](mailto:sales@bisun.co.uk)

Any suggestions for new features will be welcome - user suggestion was the reason for the 'economy' modes for group use to make the need for changing batteries on a trip.