Illumination Unit NF-1 RC

Description:

NF-1 RC units are designed for illumination of the Slow and ParkFly models for flying at night. They are designed to power color ultra bright LEDs (Light-Emitting Diode) with the nominal current of 20mA. It contains four independent current-powered outputs. Two outputs are for position lights. The third output is designed to power the anti-collision flash lights and flashes with one-second frequency. The fourth output, being controlled by the receiver, powers the landing lights. The receiver circuit and the light circuits are separated by an opto-coupler. Unit is compatible with Graupner or Hitec-type connectors. The built-in trimmer enables for the control stick to be put into position when it operates.

The circuits maintain the nominal current in the wide range of voltage from 6 to 14V without the need to connect compensating resistance series in the circuit. The stabilization starts working from 4.5V, therefore it is possible to connect the unit with the used NiCd or NiMH batteries with 4 -10 cells.

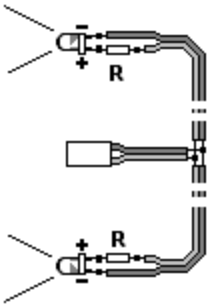
As the number of the cells of the powering accumulator increases, so does the number of diodes that can be connected (serially) in one circuit. Using seven-cell-accumulator, 2 green or white diodes and/or 3 red or yellow diodes can be connected in one circuit. The colors of diodes in one circuit can be combined.

A short-term short circuit does not harm the circuits thanks to the current outlets. The circuits are powered from the positive pole of the accumulator and the negative pole is joint by all circuits. The unit input is diode-protected against reversing of polarity.

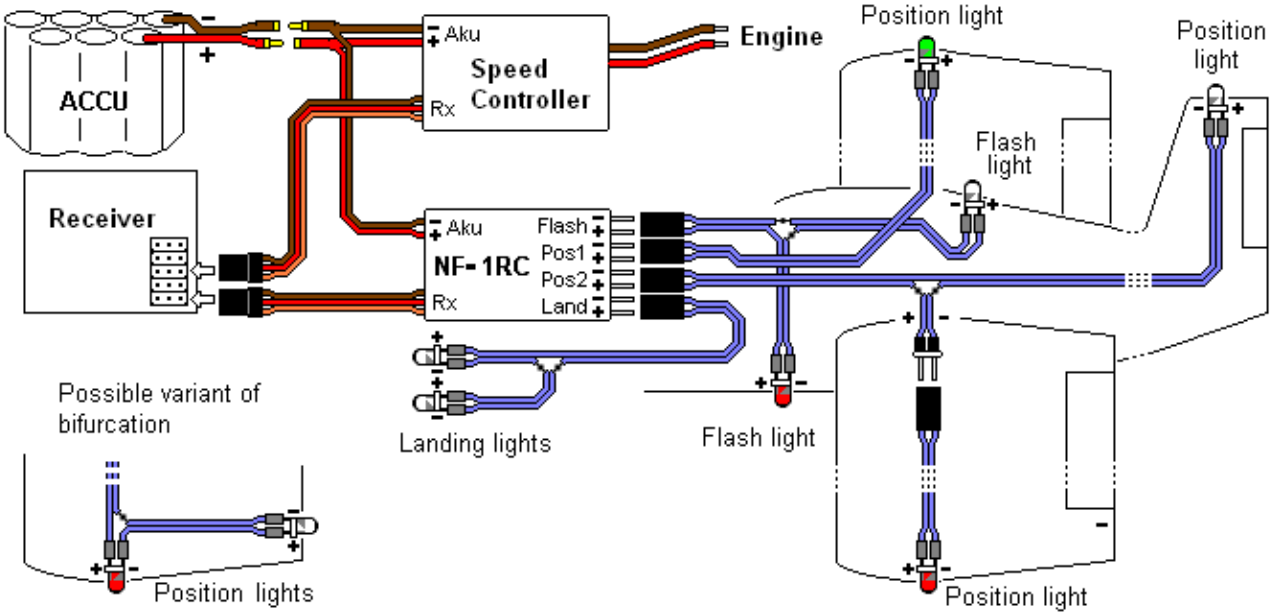
Installation procedure:

Number, color as well as position of diodes in a specific model may vary. Components can be ordered additionally if needed. You may check function of the unit by connecting it to the accumulator. There are two diodes shining through the black cover on the rear side. One diode indicates connection to power, the other indicates the flashing function. You may also check function of the unit by touching light circuits with diodes. In this way it is also possible to check the diode's color. The fourth circuit should be turned on without receiving signal from the receiver. If you observe the input voltage, there is no danger for the diodes. Change of polarity at the contacts is not destructive. However, it is not recommended to try to connect the diodes directly to the accumulator. Without using a compensating series resistance you would destroy the diodes.

Another step is to design the LED position and cabling. You have also to keep certain rules to ensure the model to be visible in all positions so that flying at the night is secure. Ultra bright LEDs are directional light sources compared to light bulbs. They light with angles of 15, 23, 30, rarely 70°. The directional characteristics of diodes should be adjusted so that they are visible from large angles. The easiest way to do that is by roughening them with emery paper. It is also possible to drop some adhesive from a fuse pistol on the diode, or combine these two methods. If the wing has a thick profile that would block the position light for thr pilot in a certain angle, it is preferred to put better two diodes there, one on the leading edge and the other on the trailing edge of the wing.



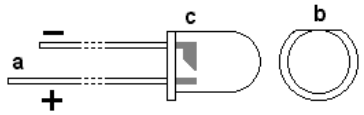
Installing the lights on an accomplished model is not trivial. It is easier to start with a new model. With models made of EPP it is possible to cut in the material two slots of approx. 2 mm depth and push a thick enameled wire into them, and once in every couple of centimeters drop adhesive on it. If working with thin enameled wires, it is important to avoid mutual contact because the enamel is not suitable for flexible joints, it could break or wear through but it is lighter than the stranded conductor (3,5m=11g). If the weight is important to you, you may combine enamel with the stranded conductor. The cables should not create local loops. Both wires should be drawn as close as possible to each other. Cables should not be put in parallel with the receiver



antenna. It could affect the sensitivity of the receiver.

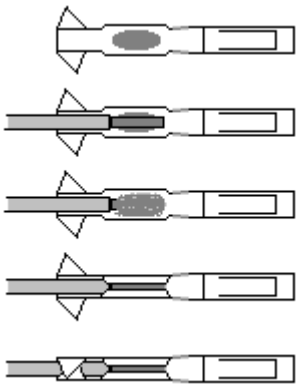
A separate supply for the model illumination can be used too, but it is easier to connect the NF-1 RC to a power supply accumulator the way it is shown in the picture. The total average current consumption by all circuits being connected is about 55mA in case of seven-cell supply. During 10 minutes of fly the light circuits burn only a little bit more than 1 % of capacity of a 700 mAh accumulator.

The wiring should be designed with disassembly in mind.
If you are going to connect diodes, see to it that the total voltage on the circuit diodes plus 1.8 V (necessary for optimum regulation) is below the voltage of accumulator. The smaller is the power supply voltage i.e. the closer it is to the above figure, the circuit regulation starts to decrease the current in the diodes and the luminosity goes down. When calculating the above, do not go out of the voltage of a new-charged accumulator but measure the voltage after landing. The chart 1 shows the reference voltage rates on diodes according to color. The circuit regulates the current by burning the voltage difference between the supply voltage and the necessary voltage for diodes in the transistor. The worst condition for the unit is the case when the circuit is supplied by high voltage and short circuit at the output occurs. In that moment, the entire power (the passing current x power supply voltage) changes to heat in the transistor. The transistors cannot burn more than 0.25W for a long-term period which means there is voltage of maximum 12 V. In case there is at least one diode connected to the circuit, the transistor is relieved. The maximum operational voltage of 14V stated in the parameters is in accordance with that (12V transistor + approx. 2V diode). By a bigger amount of diodes in all circuits the circuit can theoretically operate up to the voltage of 17V (twelve-cell). However, the warranty does not apply by such an operation.
When connecting the diodes you have to observe the polarity. The positive pole has a longer outlet (**a**) and the negative pole has a trimmed edge **(b)** and usually extends inside the body **(c)** to hold the chip. See the picture above.



Making the cabling:
Whether you use any pair-cable or enamel, it is necessary to prepare cables with a sufficient reserve. A few centimeters in excess can be hidden but just one missing centimeter will cause you trouble. Before connecting the diodes remove the insulation from 5mm of the cable and tin the diode and the cable. This will shorten time needed for soldering. If you are going to put termo-shrinkable insulation tube over the connection, prepare 9mm-long pieces of insulation. They shall be pulled on the wire beforehand as far as possible from the intended soldered connection – if not, they could shrink in a wrong place. After soldering in both stems and cooling pull the insulation on the connection and heat it gently from all sides with the solder so that it would shrink (you need to try it). It is recommended to heat at a place behind the tip where the solder is clean. Thus the insulation will not be contaminated with remnants of tin and resin.

After fixing the diodes and checking the length of cables we must connect the connectors. They could be crimped without soldering but if you have the solder in hand and do not have the tools for crimping, I recommend soldering. Divide the couple of wires for about 20-25mm and remove the insulation of 4mm of wire and tin it. If you are not fast, the insulation will recede a little more. Shorten the un-insulated tinned wires to 2-3mm. Break off two sockets and gently clamp them paralelly in a clamp at a distance at which they will be in the connector. The included fork adaptor can be used for clamping as well. Ideally you fix the sockets and the wire on a surface area. Drop a little tin in the middle part of the socket, not too much. The thin tube tin is easier to dose. Put the wire in the farther socket and heat it so that the tin connects. Then repat it with the closer socket. See to it that the wire and the socket would be in line. If your hand slips, you can heat the wire again and when it gets released, fix it. Keep eye on the solder temperature, you might lose the insulation. Keep the same polarity with all the cables, it is aesthetical. If you e.g. solder the diodes' positive pole on the farther socket, the locks of all connectors will be oriented upwards.



Bend the borders of the channels round with flat pliers. Then bend the plates around the insulation and finally put the sockets in the connector so that the locks would lock on. If there is resistance, gently try to lift the lock on the connector with a tip. Not too much, otherwise it will stay open forever. Lean the tip at the edge of the socket and gently move it forward. You probably used too much tin or bent the borders too little.

Have a nice flying.

Night Fly NF-1RC

Technical parameters:	**min.**	**typ.**	**max.**
Input Voltage:	6 V	9 V	14 V
Consumption:	15 mA	17 mA	20 mA
Circuits 1 and 2:	19 mA	20mA	23 mA
Circuit 3 (1 Hz flashing):	typ.38 mA, pulses 75 ms		
Circuit 4 (controlled):	26 mA	28 mA	31 mA
Operational temperature:		0 - 70°C	
Weight:		7,2 g	
One diode weight:		0,32 g	
Dimensions:		45 x 24 x 7 mm	
Pulse width set up:		1,11 - 1,88 ms	

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