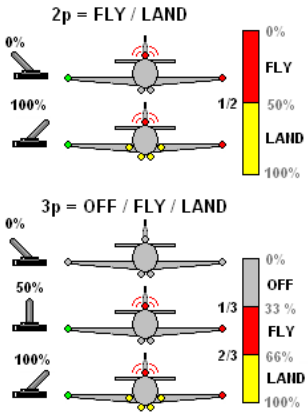
Illumination Unit NF-2m

Description : NF-2m is designed for decorative lighting of small plastic models with SMD LEDs and LEDs with diameter of 1.8 mm and for lighting of "Indoor" and "SlowFly" models for night flying, where is expected to use high-intensity LEDs having a diameter 3 mm and 5 mm. Circuit controls the five outputs for connecting lights: 2x position light (**P1** and **P2**), 1x anti-collision flash light (**FL**) and 2x landing light (**L1** and **L2**).

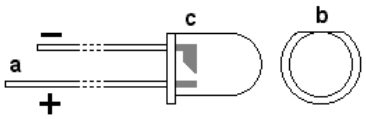


The anti-collision light flashes once per second. The jumper contacts make possible to set the number of flashes. Disconnected = 1 flash, jumper on position **"2x"** = 2 flashes, on position **"3x"** = 3 flashes. The jumpe**"3p"** allows to select the light control mode. Disconnected jumper = 2-position mode. In this mode, the position and anti-collision lights are on continuously and landing lights are controlled from the transmitter. The three-position mode is the standard range of servo divided into three areas. In the first lights are swiched off, in the second position and anti-collision lights are swiched on and in the third all lights are swiched on.

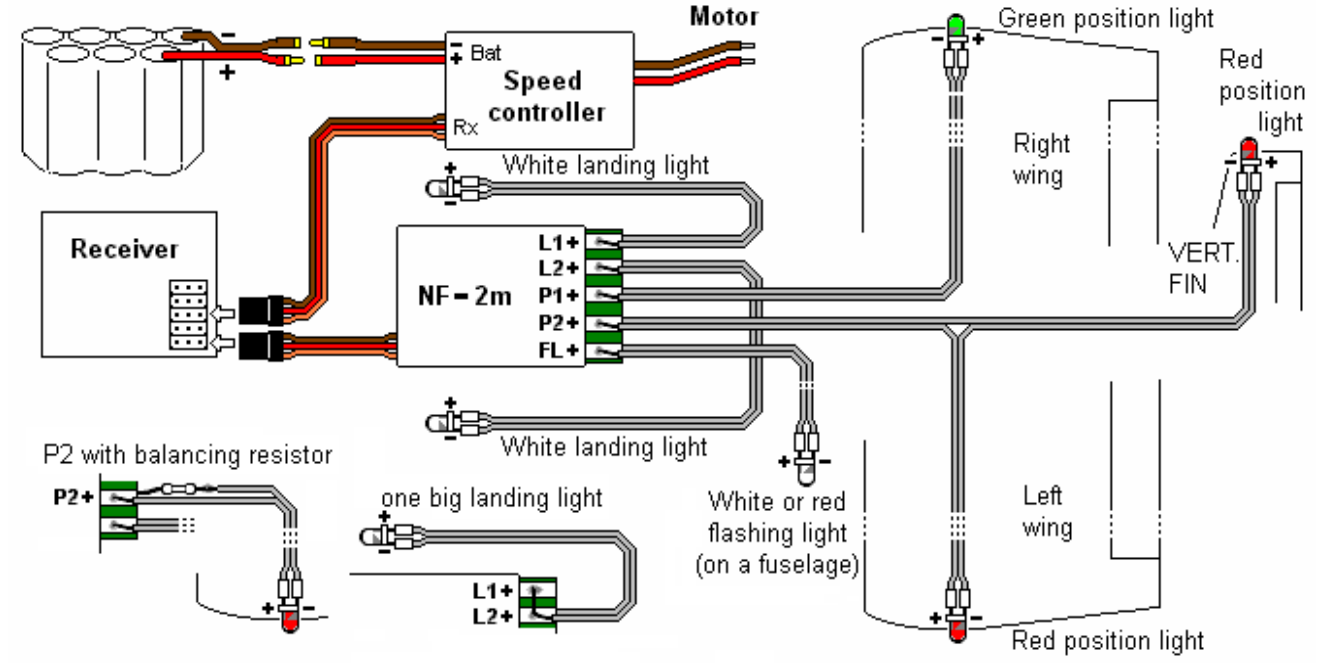
The continuous flashing landing and anti-collision lights indicates the failure of the signal in receiver (certain types). Connection to a receiver is via a connector type Graupner, Hitec. Circuit is connected directly to the receiver and it is powered with 5V tolerance BEC. The circuit is not protected against reverse polarity other than by the lock on the connector. LEDs are powered from the voltage across resistances, positive pole have in common. On each circuit one diode can be connected. Positional circuit P2 (red) can be equipped with one or two red LEDs in row. Diodes´ current is around the nominal value depending on the color. Circuits of landing lights L1 and L2 (Landing lights) may be in the case of using only one landing light connected in parallel, whereby it is possible to increase the current and double the light output of the diodes.

The unit can be used also as non-controlled. The unit is in non-controlled mode if the orange (signal) wire of Rx cable is not connected to the receiver. When connecting as a non-controlled unit (no orange contact) NF-2m utilizes the receiver just as the power source. Then the position and anti-collision lights are turned on permanently and jumper **"3p"** is used to control the landing lights. They will be in the **"2p"** mode turned on and in the **"3p"** mode turned off. The unit can be powered from a different source as well, if the voltage is ensured in the range of 4.5 - 5,3V. When exceeding the upper limit the unit can be damaged. In this case connect the red wire on the "+" and brown on "-" pole of the accumulator.

The total average consumption of current drawn from the source when you turn on all the lights is about 32 mA (version 5 mA) and 10 mA (version 2 mA). The lightning consumes less than 1% capacity of the accumulator 700mAh during the 10 minutes flight.



Installation procedure: The typical installation is shown by the scheme below. Position as well as color and number of diodes in a specific model may vary. You may check function of the unit by connecting it to the receiver. The function of circuits can be checked by putting diodes on the circuit's contacts. In that way it is possible to check the diode's color as well. If the input voltage is inside expected limits of 5V BEC (4,7V – 5,3V), there is no danger for the unit and for the diodes as well. The reversal of polarity on the LED contacts is not destructive in this case. DO NOT TRY the diodes by connecting them directly to the accumulator. Without a compensating resistance you would destroy the diodes. Unit power supply shall not exceed 5.3 V. When connecting the diodes one must observe the polarity. The positive pole has a longer outlet (**a**) The negative pole has a trimmed edge **(b)** and usually extends inside the body **(c) to** hold the chip



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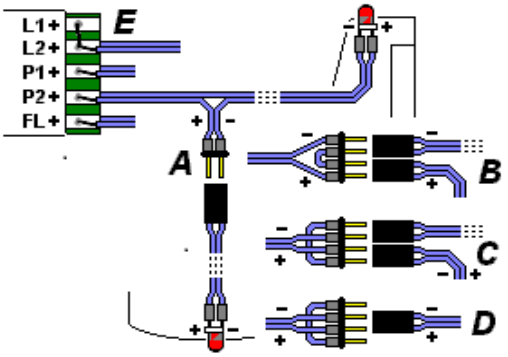
The P2 circuit (red) is calculated to supply series connection of two red diodes, as shown on image. You can connect only one diode, but then it is advisable on the place of the second red diode in the circuit attached ballancing resistance 390Ohmů to provide comparable luminous intensity with the green LED on the circuit P1.

It is useful to keep certain rules to make sure the model is visible in all positions and that night flying be safe. Unlike bulbs, ultra bright LEDs are narrow directional light sources. They light with angles 30, rarely 70° and 120°. 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. Installing the lights on an accomplished model is not trivial.

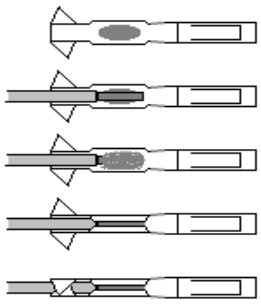
It is easier to start with a new model. With models made of EPP it is possible to cut in the material two slots of approx. 2 mm depth and push a thick enameled wire into them, and once in every couple of centimeters drop adhesive on it. If working with thin enameled wires, it is important to avoid mutual contact because the enamel is not suitable for flexible joints, it could break or wear through but it is lighter than the stranded conductor. If the weight is important to you, you may combine enamel with the stranded conductor. Also decide in advance if you solder the cables directly to the unit contacts or if you use a detachable joint with connectors. This results in the lightest possible, but permanent connection. To have the dismountable joints, you can solder the strip 2x5 pins directly onto solder pads unit, which is part of the package and buy installation kit with connectors which will connect individual lights. Examples **A, B** and **C** in the figure show a possible realization of removable strips. Variant C compared to variants A and B have the advantage that the splitter can involve only a single connector, see Fig. option **D** (NOTE the polarity, the connector must then be rotated). If you install only one landing reflector, you can increase its shine bridging L1 and L2, as indicated by Figure **E.** This must be done on the other side of the unit as well.



Interference : Diodes´ current wires thanks to considerable length can produce its own interference, interference from other electrical appliances and in particular from insufficiently shielded engine. They should not run in parallel with the antenna. They could affect its sensitivity. They should not form surface loops. Both wires should go as close as possible to each other to do not produce interference. The twisted pair gives the best result. It may happen that the model before lighting installation flew without problems can begin (e.g. at a particular engine speed) jerk or can be generally more susceptible to interference. It is advisable first to check model´s behavior on the ground. If necessary improve the interference or to insert the interference unit.

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 to a cable remove the insulation from 5mm of the cable and tin it. Thin also the diode´s contacts. This will shorten time needed for soldering them together. If you plane to put termo-shrinkable insulation tube over the connection, prepare 9mm-long pieces of insulation. They shall be pulled on the wire beforehand. Place the insulation 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, we 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 parallel 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.



Night Fly NF-2m

Technical parameters:	**min.**	**typ.**	**max.**
Input voltage:	4.5V	5V	5.3V
Consumption (unit):		32mA	
Flash (freq. 1 Hz) :		impulses 66ms	
Temperature :		0 - 70°C	
Dimensions :		34 x 15 x 6mm	
Weight :		3,5g	
Weight of LED 3mm:		0,15g	
Weight of LED 5mm:		0,29g	

Have a nice flying.

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