GLOW4 LP

Onboard glow plug heating for NiCd/NiMH- and LiPo-batteries, for 1- and 2-cyl. engines, 2- and 4-stroke.
Software REV3 with glow battery voltage monitor

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General

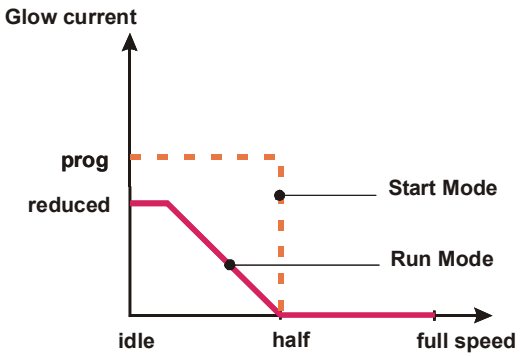
The glowplug current is controlled digitally by a microcontroller. It is possible to adjust the maximum glow current according to the glowplug type from very hot to cold. The glow current is reduced after engine start to save current and the plug. The engine runs essentially safer under all conditions by proportional transition in the partial duty range and afterglowing.
You can use either 2-3 NiCd / NiMH-cells or 1 LiPo-cell, the cell number is detected automatically.
Glow battery voltage monitor in 4 steps. With LiPo-switch-off at **3V**.
Excellent engine start features by means of increasing the start current automatically in case of a wet plug.
Comfortable Automatic Programming Mode (APM). Highest safety at power on, starting and flight.

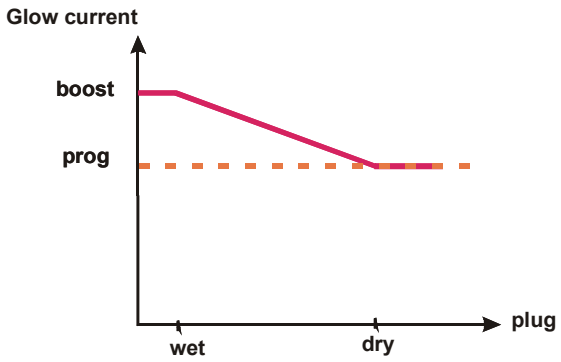
Connection to the receiver either via Y-leads or own channel with mixer to the throttle servo.

Automatic Programming Mode

- For visible controlling screw off one plug, put the plug housing on engine ground and connect the plug pin. Mount all other plugs in the engine and connect them according to the given scheme. Do not hold the external plug with your fingers, there is danger of burning!
- Take care of good contact (especially to ground at external plug), otherwise wrong values will be programmed!
- Glow plug battery shall be charged, otherwise the battery type is not detected correctly.
- Take off the PROG jumper, put throttle lever on idle position.
- Switch on the transmitter and the receiver. The green led flashes shortly after c. 5 sec. Put the throttle lever to full speed. The green led flashes once again shortly.
- Now move the throttle lever Gashebel **slowly** in direction to idle position. The status led is flashing fast in red. Stop it as soon as the desired glow strength is reached. Don´t put it to idle position instantly, there is the highest glow current dimensioned for cold plugs. A hot or middle plug could blow! When the glow plug current is interrupted there is no fast flashing red LED and no storing is possible.
- Put the PROG jumper on again, the values are stored.
- Led flashes green once. Finished! Switch the receiver off for 3 seconds and then on. The values remain stored and can be changed by a new APM.

You can start the engine from idle position to half speed with this automatic adjustment and the choosen glow current in the Start Mode. In the Run Mode the glow plug begins to glow from half speed and obtains at eighth throttle the maximum, but reduced glow current. With this current the plug glows very weak or not at all. More current is not necessary, because the engine is heating too. The bright red led indicates this function.





Starting Procedure

- Switch on transmitter and receiver and wait until the status led flashes red once shortly. This is the request for the Start Mode SM.
- The throttle servo can go in any position (for example to suck fuel) as long as the SM is not released there is no glow function. The status led is off indcating there is no glowing possible.
- Now the SM can be released by a fast movement of the throttle lever from idle position to full speed and back. The status led is indicating this function by fast red flashing.
- Starting the engine is permitted from idle position up to half speed position because of safety reasons.
- As soon as the engine is running and full speed position is reached the first time it will be switched to Run Mode with reduced glow current automatically. RM is indicated by solid red of the satus led.
- SM is finished for safety reasons after 90sec. It can be reactivated anytime with the fast throttel lever movement, even during flight.

Glow Battery Voltage Monitor
This is displayed by status led in throttel position half speed to full speed after expiring of the after glow function (1s-2s).

➢ Solid green	**LiPo-Batt. / 3 cells NiMH**	3.9V and more	**2-cells NiMH-Akku**	2.55V and more
➢ Flashing green		3.7V .. 3.9V		2.40V..2.55V
➢ Flashing green / red		3.5V .. 3.7V		2.25V..2.40V
➢ Flashing red		3.5V or less		2.25V or less
➢ Switching off because of under voltage		less than 3V		less than 2V

Glow Current Monitor
Displayed by status led in throttel position idle to half speed
- ➢ Fast red flashing : Start current
- ➢ Solid Red : Reduced glow current
- ➢ Slow red flashing : LiPo switch-off activated
- ➢ No display in RM : Plug defect or no contact

Safety for the model and its pilot
- ➢ No external battery, therefore no disturbing glow plug leeds and no dangerous handling on the plug during the engine start
- ➢ No not intended ignition at power on. Ignition has to be activated intentionally. Dangerous starting from half speed to full speed is blocked by software
- ➢ Safe and smooth idling, idle position can be lowered
- ➢ Fast and safe speed increasing by means of the afterglow function
- ➢ HOLD function at signal jamming : Last valid value remains stored until the jamming is over
- ➢ Automatic FAILSAFE: If there is more then 10sec HOLD no valid signal the glow plug heating will be switched off. It will be reactivated by a valid signal.
- ➢ Short circuit proof glow output by current control. Especially important with LiPo batteries, danger of fire and explosion!
- ➢ By extended EMV protection with ferrit core, filters, careful layout and aluminium enclosure the interference output is not higher than the basic noise of the receiver. Note the mounting hints and conduct the obligatory radio transmission test with shortened transmitter antenna.

Mounting hints
- ➢ Give a minimum distance to receiver and antenna as a precautionAntenne und Glühkerzenkabel nicht nebeneinander verlegen
- ➢ Drill glowplug cable with ground cable
- ➢ Dont place electronics and battery in the engine room, but interior of the model protected from fuel and water
- ➢ Battery has to be disconnected from electronics for charging
- ➢ Mount it with a 2-sided adhesive tape or sticking tape

Quality criterions

- ➢ All components are matching the requirements for industry or at critical parts even for military
- ➢ Less and smaller components with high integrated SMD technics, higher reliability, unsensitiv to vibrations, very low EMV input and output
- ➢ High flexible cables with golden contacts, extremely safe connection to the glow battery with 30A-MPX high current connector (standard) or 50A-LiPo connector at radial engines
- ➢ Robust aluminium enclosure with shrinking tube
- ➢ Internal reference voltage with +/- 0.5% accuracy
- ➢ Can be supplied with up to 10V receiver voltage. Therefore operation with 7.2V receiver (2 LiPo cells) also possible.

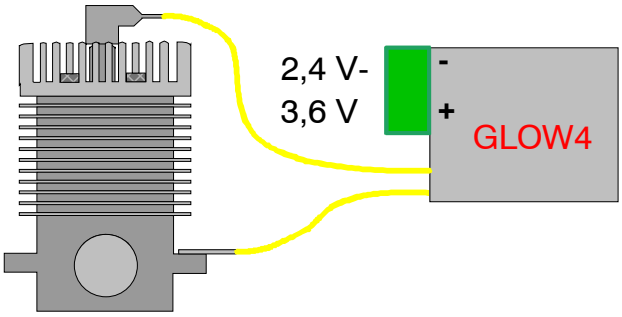
Warranty
There is warranty up to 24 months from buying. If there is no invoice, then we take the production date in connection with the serial number for fair dealing.
The flight style has to be choosen in a way that in case of an unexpected breakdown of the glowplug heating with engine stop there is no danger for objects or persons because we cannot take any responsibility for following damages or losses.
No warranty at
- ➢ Servo leeds cut or resoldered
- ➢ Opened enclosure
- ➢ Over voltage, because battery was not disconnected from electronics during charging
- ➢ Reverse voltage at the battery connection

Software Updates
For 12 months free, but there has to be added a global sum of 5.- EUR for shipping.
After 12 months 5.- EUR for the update + 5.- EUR for shipping.

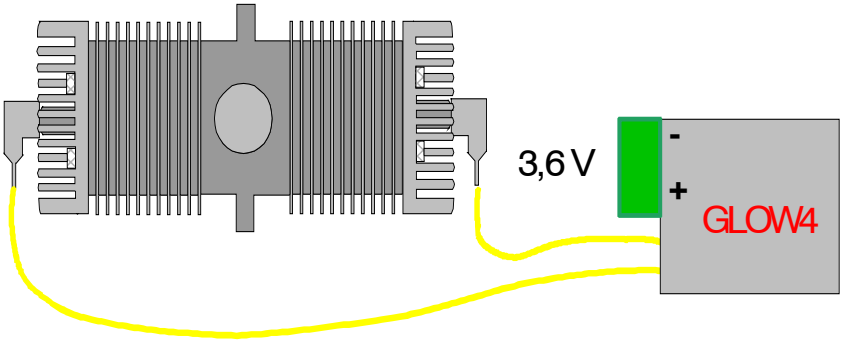
Technical data

Dimensions of the print, weight	:	32 x 22 x 5 mm, 14g mit connections and led cable
Supply receiver battery	:	4.5V to 10V = 4-6 cells NiMH or 2S LiPo
Current consumption with led	:	20 mA
Display accuracy	:	+/- 20mV
Glow current start	:	1.0 A to 2.0 A
Appropriated engines	:	1-2 cyl. 2- and 4-stroke engines
Recommanded glow battery	:	700mAh / 3.6V for 30-60min glowing, 1-2h flying
		With 2 plugs from 1000 mAh / 3.6V for 30-60min glowing, 1-2h flying
Recommanded glowplug leed	:	Low-Ohm by Microsens (ZUBI3)

1-cylinder engine



Boxer



2-engined