Genesys

Congratulations on your purchase of the new GENESYS generator system for model engines!

The system works by spinning a ring of special rare earth magnets past a stationary transformer. The magnet ring bolts on your engine shaft; the transformer clamps under the engine. The voltage created is regulated by the CCU (Central Control Unit). The CCU provides current to your radio system, current to GENESYS accessories and regulates current to your battery pack. Charging is indicated by a green LED on top of the CCU.

The GENESYS system can be set up to run accessories, charge a different battery pack or run the entire model. While it can supply ample power for the radio and accessories ***never operate the model without a battery pack either attached to the CCU or attached to the receiver and always be sure there is enough charge in the battery to land the model if the engine stops.*** If the engine stops the generator will no longer supply power. As part of the failsafe design the CCU connects the battery port directly to the receiver wire to provide power in case the engine stops or any part of the system is disabled.

The maximum output of the system depends on engine speed. Figure 1 shows the output current vs speed for a 4.8V system. The system can provide from 100 mA @ 4000 RPM to 800 mA @ 15000 RPM or more. Your flight batteries will be charged at up to 200 mA, depending on battery charge state. Charging current goes down as battery voltage goes up. The LED(s) will turn off when charging current drops below 5 mA , indicating fully charged batteries. Your receiver and servos need an average of 100 to 250 mA, depending on model, size and activity of the servos. An average receiver and servos will draw about 70 mA at rest; each servo can draw 150 mA or more when exerting a large force. Remaining capacity can be used to power accessories. The engine's RPM change will be directly proportional to electrical load on the generator.

The CCU has five accessory sockets and two battery spare sockets. The accessory sockets are regulated at 5.0V and are limited to 1.0 amp total. They only operate when GENESYS is supplying electricity. The accessory sockets will tolerate a short circuit, overcurrent or other accessory failure without reducing battery power to the radio system. The battery spare sockets are connected directly to the battery and are either at 4.8V or 6.0V, depending on the battery voltage. These sockets are used for accessories that draw more than 1.0 amp for a short duration, extra receivers or accessories that must operate if the engine stops. Both GENESYS and the battery will supply power to the battery spare sockets, but there is no short circuit/overcurrent protection on these sockets. Battery spare sockets should be limited to 2.0 amps.

GENESYS Accessories are rated by current draw. Accessories plugged into the accessory sockets will not come on until engine RPM is high enough. Accessories plugged into the battery spare sockets will come on when the battery is connected. At idle the system will supply less current and the charging LED may not be on. Increasing throttle setting will increase output. Some accessories draw a large amount of current for a short time (Landing Lights, for instance). These accessories should be plugged into battery spare sockets. They will draw current from both the GENESYS system and the batteries during operation, after which the generator will resume recharging the batteries.

Figure 1

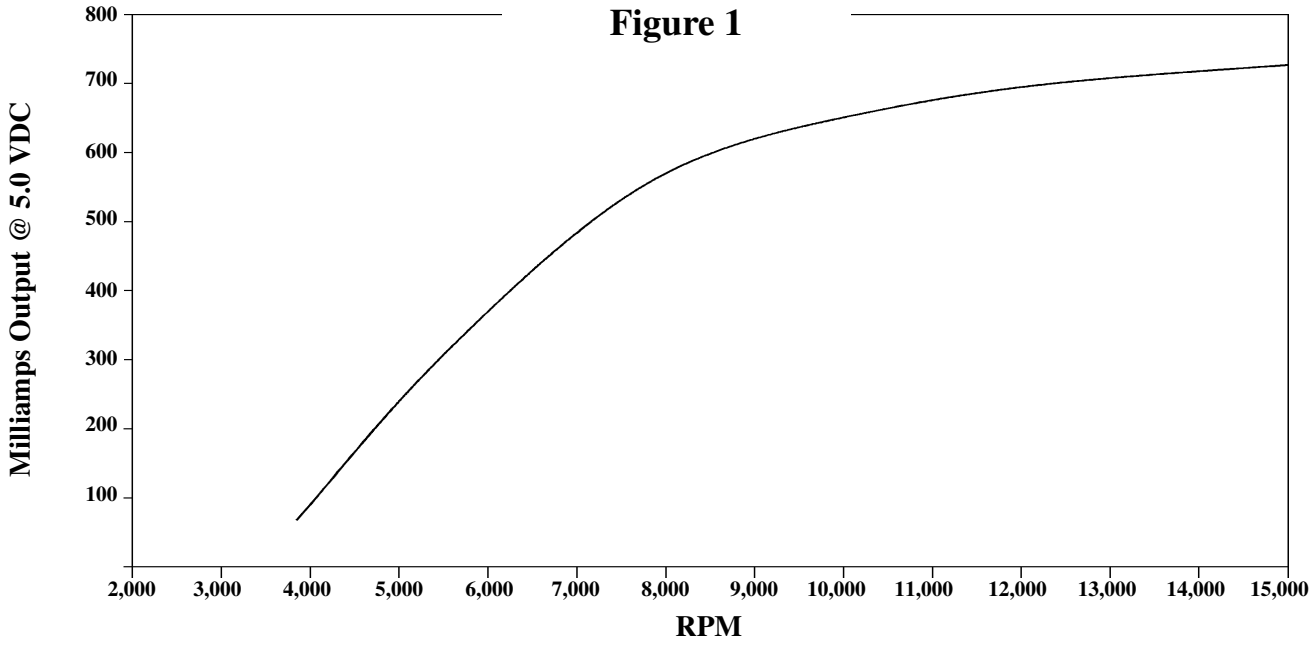
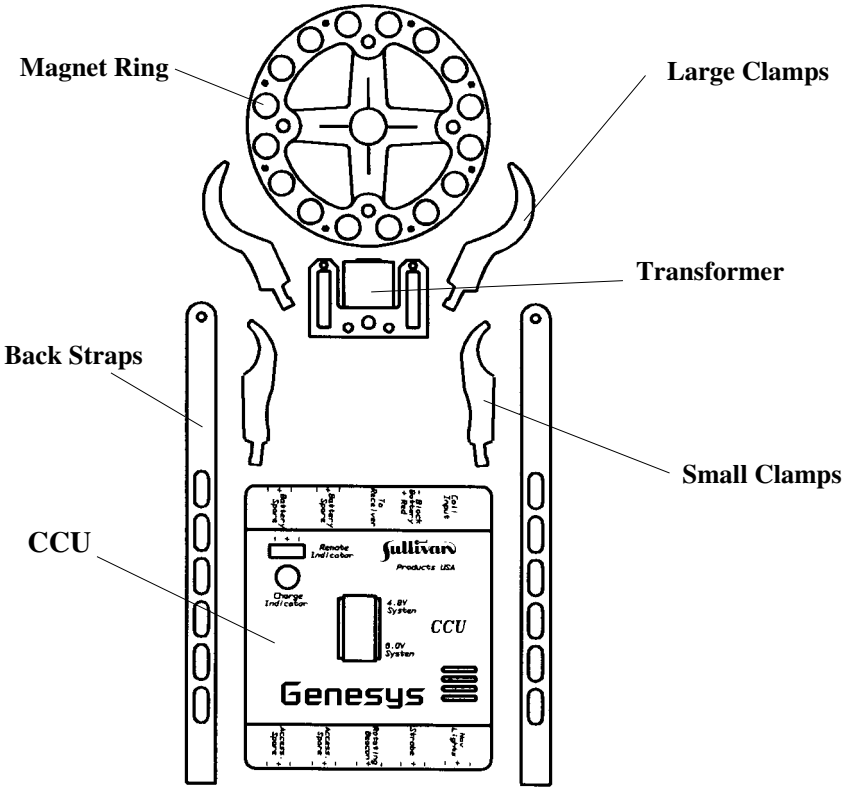


Figure 2



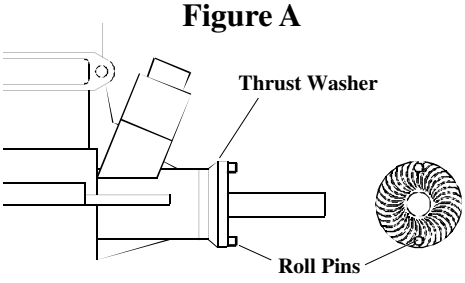
For accessory operation at all times (such as night flying) a second 4.8V battery can be plugged into an accessory socket. It will provide power to the sockets at low RPM, and GENESYS will charge the extra battery pack at higher RPM.

Your system comes with a Magnet Ring, Transformer, two sizes of Clamps, Back Straps, the CCU unit, a Remote LED Charging Indicator and assorted hardware (see figure 2).

INSTALLATION

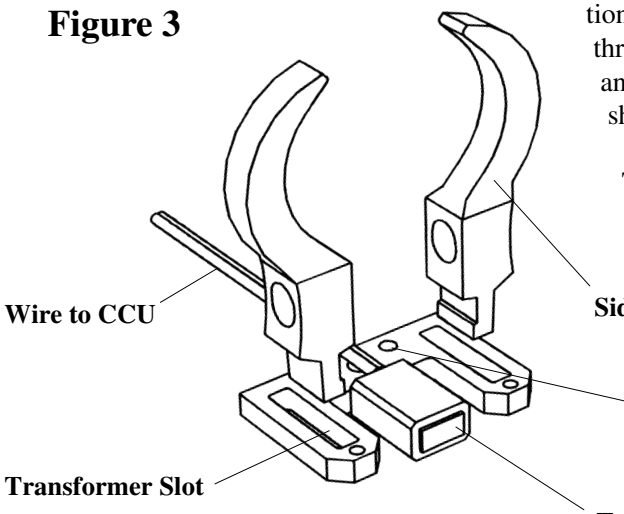
1. Attach Magnet Ring. Remove the engine from the model if currently installed. Remove anything attached to the engine (propeller or spinner). Use an appropriate spacer washer for your engine's shaft size if needed; the magnet ring has a hole for 3/8" shafts and spacer washers are provided for 10-32, 1/4", 5/16", 6mm, 7mm and 8mm shafts. Slide the magnet ring onto the shaft with the magnets facing the engine. Replace the propeller and/or spinner and tighten securely. *Notes*: If you are using a bare prop it is possible that tightening the prop nut will squeeze the prop's center and deform the magnet ring at the blades. It is a good idea to add a spacing washer or sand the prop blades where they contact the magnet ring. If you want to lock the magnet ring to the thrust washer (it is not necessary) we have supplied two 3/32" roll pins. Drill two 3/32" (2,38 mm) holes in the thrust washer at least 3/4" (19,0 mm) apart and about 1/4" (6,3 mm) deep (see Figure A). This will let the pins fit between the spokes of the magnet ring. Insert the pins and grind the ends off until they protrude 1/16" (1,59 mm) from the thrust washer. If you are using a bare prop, you can let them protrude further to help lock the prop in place as well.

Figure A



2. Attach Transformer. Select a pair of clamps for the transformer. The small clamps will fit bearing housings .600" to .950" diameter (smaller engines); the larger clamps will fit housings .950" to 1.370" (larger engines). You can modify the universal mount or fabricate your own clamping system for unusual engines or locations. Place the clamps around the housing and insert the foot of each clamp through a transformer slot (see figure 3). The transformer is in the shape of an E; the open end should be toward the magnet ring and the closed end should be toward the engine.

Figure 3



The transformer will want to stick to the magnets; that's OK. Put the 8-32 screw through the clamps and attach the 8-32 lock nut. Tighten the nut enough to remove most of the play from the clamps -- you will have to move things slightly for final adjustment.

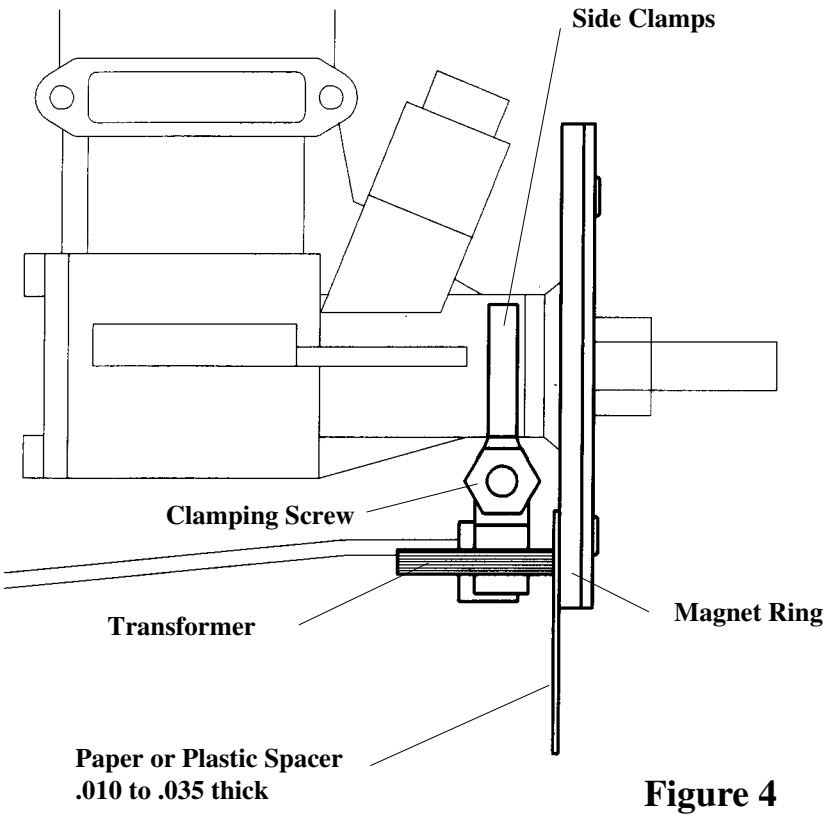


Figure 4

3. Space Transformer. Pull the transformer away from the magnet ring and slide a piece of paper or plastic between the magnets and transformer. Ideally, the transformer should be as close as possible without touching. The system will work fine with a .005 to .035 gap; three thicknesses of this instruction sheet are about .012 thick and the GENESYS package is about .030 thick. The closer the transformer is to the magnets the better the low RPM output.

Let the transformer attach itself to the magnets again, holding the paper or plastic spacer in place between them (see figure 4).

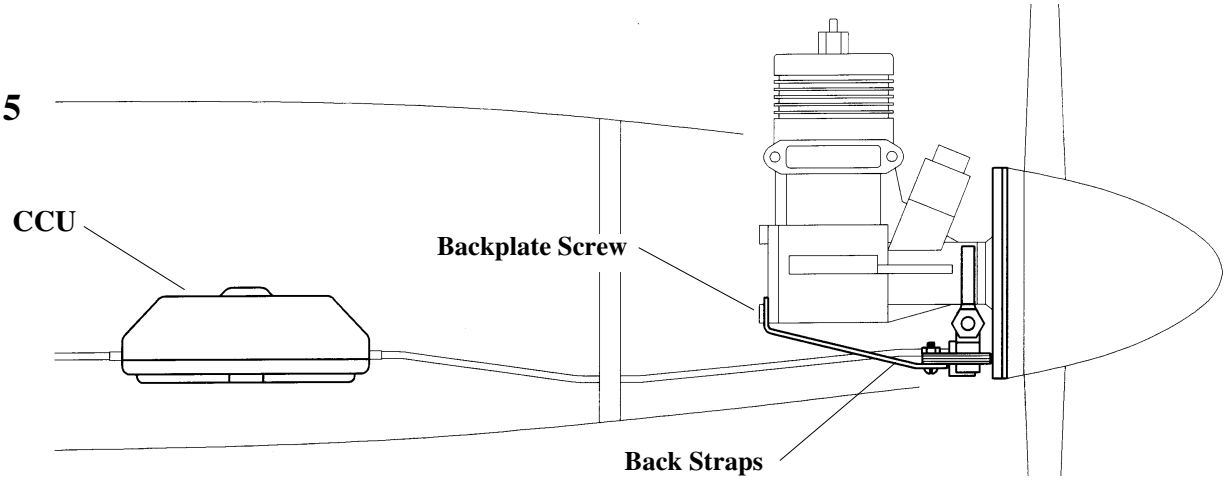
4. Attach Back Straps. The back straps are very important. They prevent the transformer from moving into the rotating magnet ring if the clamp screw loosens. They also maintain the spacing adjustment you have set. Put a 2-56 screw through the small hole in a back strap and through one of the two .090" holes in the transformer. Attach a #2 lockwasher and nut to the other end. Attach the other strap the same way. Finger tighten the nuts allowing slight rotation of the straps.

Remove one of the lower backplate screws on the engine, bend the back strap up past the exposed hole and trim the strap off about 1/2" past the hole. The strap should be bent so that when the backplate screw is reinstalled (through the strap) the strap is tight and will keep the transformer from moving toward the magnets when the paper or plastic spacer is removed. Repeat for the other strap. Reinstall the backplate screws using a threadlocker like Loctite® and tighten.

Note: extra 3mm and 4mm screws are provided in case the existing backplate screws are not long enough. The straps are made as universal as practical given the wide range of engine dimensions. You can use straps of your own design and materials as long as they attach similarly. **Do not attach the straps to a flexible engine mount** -- engine vibration will create havoc with the adjustment.

Tighten the 2-56 screws holding the straps to the transformer. At this point you should be able to remove the paper or plastic spacer and the transformer should stay in place. If it is too close to the magnet ring bend the offending strap(s) slightly to move the transformer. When the transformer is in place you can then tighten the 8-32 clamp screw, taking care not to change your adjustment. The complete assembly should look like figure 5.

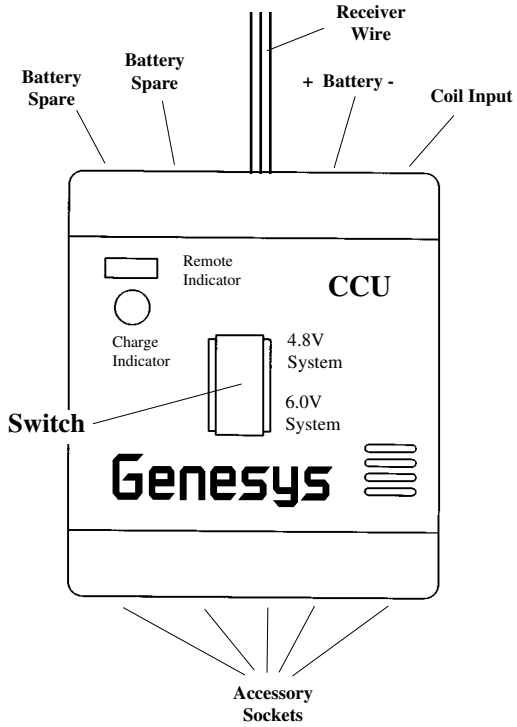
Figure 5



5. Check your adjustment. Turn the magnet ring by hand and make sure it does not touch the transformer. If it does, loosen and adjust as noted above. Attach the wire from the transformer to one of the back straps with a wire tie to keep it from flopping around.

6. The hard part's over. The engine is ready to go back into the model. Drill a hole (if one does not exist) through your firewall to route the wire from the transformer. When ready, pull the wire through to the CCU and mount the engine.

7. Install the CCU. Find a place for the CCU. If it can not be in range of the wire from the transformer or the wire to the receiver the wire(s) can be extended with careful soldering -- use at least 22 gauge wire for extensions. Mount the CCU as you would the receiver. Plug the wire from the transformer into the two pin port marked "Coil Input". The plug can go in either way. Unless you plan to unplug it later **we strongly recommend tape or a small dab of glue to prevent all plugs from vibrating loose.**



8. Wire the rest of the system. Plug the wire from the CCU into your receiver's battery socket. The red wire is positive and should go to the positive battery pin on the receiver; the black wire is negative and should go to the pin that is the battery negative. If you are not sure consult your radio's manual or match it up with your battery harness. Extra connectors have been provided in case you need to change the pin pattern. Set the switch on top of the CCU to the battery pack voltage you are using -- 4.8V for four cells, 6.0V for five cells.

Plug the connector from your switch harness into the "Battery" port on the CCU. The pin closest to the "Coil Input" port is negative and the pin closest to the wire going to the receiver is positive. ***Do not mix these up*** unless you like spending money. Again, tape or glue is recommended.

Turn the battery switch on. Assuming the battery has any charge in it, the receiver should be operable. If you will want external charge indication, glue the Remote LED Charging Indicator (included) in a visible place on the model and plug the connector into the top port marked "Remote Indicator". When GENESYS is charging the battery both LEDs will light.

9. Hook up accessories. All other CCU sockets have three pins; the center pin is positive and both outside pins are negative. GENESYS Accessories can be plugged in either way. Plug GENESYS Accessories into any of the five accessory ports. Only use the battery spare ports to test accessories and for accessories requiring higher amperage or failsafe battery power.

10. Test the system. Turn on your battery switch and start your engine. As throttle is increased the green LED(s) will glow if your battery is less than fully charged, indicating GENESYS is charging the battery. The accessories should be operating. While holding the model *securely* turn the battery switch off and cycle the radio controls. The servos and accessories should continue to operate normally without battery power. Turn the battery switch back on and you're done!

Notes:

A different battery can be plugged into the battery port and charged during operation. The main battery pack must then be plugged directly into the receiver (as you normally do) and the receiver wire from the CCU should be left unplugged.

The generator can run accessories without connecting the battery pack. Plug the battery pack directly into the receiver. Leave the CCU's receiver wire unplugged and plug the accessories into the CCU. When the engine's RPM is high enough the accessories will come on.

Do not plug in more than one battery pack on the battery spare side; only the main battery port is regulated. A 4.8V battery can be plugged into the accessory side for constant accessory power. A second receiver can be powered from either an accessory port or a battery spare port. An extra set of connectors has been provided in case the radio system is not pin compatible or you want to power a device of your own. External devices should be limited to 1 Amp current draw.