



## Electronic Gas Regulator (EGR)



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## **Introduction**

The Electronic Gas Regulator (EGR) allows a model steam plant to run automatically, by controlling the gas supply to the burner. The EGR can be powered by either a 4 pack of rechargeable or dry cell batteries. It is recommended that the unit uses a dedicated power pack and is not run from the receiver batteries. This not only means that there is a good power supply at all times, but also that the steam plant can be in steam without being affected by other modellers' radio frequencies around you. The knurled nut on the pipe which is connected to the gas supply, is threaded 1/4" x 32 TPI, but a female thread converter may be purchased to enable a connection to a 1/4" x 40 TPI gas tap. The boiler pressure sensor will be 32 or 40 thread depending on requirement.

## **Safety features**

The burner will be reduced to a pilot flame when the preset pressure is attained

If the boiler runs out of water, this will also cause the burner to shut down to a pilot flame

## **Tools and equipment required**

- 1) 2 BA spanner
- 2) Silver soldering equipment (for gas jet holder)
- 3) Standard size servo (Eg: Futaba, Hi Tec etc.)
- 4) Battery pack
- 5) Steel wire (control rod)
- 6) Servo bracket (optional)

## **Fitting instructions**

The control box should be mounted where it can be easily accessed, both for initial setting up and for checking while in use. It should be away from direct heat or steam, ideally under a seat or in the cabin of a steam launch for instance. The on/off switch should be discreetly mounted but easily accessible. A small rectangle can be cut in a seat upright to allow the switch slider to protrude, fixing it in place with the faceplate and screws. The length of gas pipe supplied means that the gas valve will of necessity need to be mounted close to the gas tank and burner. The valve can either be remotely controlled via the servo with a long control rod, or alternatively the gas valve bracket can be bonded to the servo side with epoxy glue.

The boiler pressure sensor is screwed into an unused bush at the top a vertical boiler, and preferably a tapping in the dome of a horizontal boiler. It ideally needs to be in the pressure vessel itself, rather than in the top of a water gauge fitting for instance, as this gives the best performance in use.

## **Setting up instructions**

When you have decided the best position in the model for the EGR, start by disconnecting the gas jet holder from the burner and gas supply. The servo gas valve comes with a nut and 1/8" coned union for connection to the gas jet holder end which should be cut off and silver soldered to the coned union. Alternatively, a new gas holder, diameter 5/16" - 8mm, may be purchased and screwed onto the outlet of the valve. The new gas supply pipe, which has a 1/4" x 32 TPI knurled nut for connection to the gas supply tap, can be converted to 1/4" x 40 thread with the addition of a female thread adaptor. This is fitted to the tank outlet with sealant. The end of the gas pipe which has the nut for connection to the servo gas valve, will need to be given a tight but uniform bend to enable screwing to the gas valve inlet, so that the valve is in a vertical position. All pipe bends should be eased into shape before bending to final position, as the pipe becomes work hardened if bent too much.

When you have finalised the servo gas valve and pipe layout, you will see whether the servo gas valve bracket needs to be glued to the servo or mounted remotely. A servo bracket is available as an accessory and this would enable the gas valve to be mounted to this after drilling additional holes. The control lever of the gas valve and the servo arm should be the same height and in line at their ends. To start setting up the gas valve, plug the servo lead onto the control box pins, noting the correct orientation of the wire colours. It is recommended that servos such as Futaba or Hi Tec are used, as they have the plug wires in the correct order. If another make is used, the wires may need rearranging in the plug. A straight type servo arm will need to be used. Connect the switch plug to the control box pins and a fully charged battery pack to the input end of the switch lead. With a small loop of wire connected across the sensor connector block of the control box, switch on then off the power supply and the servo arm will move to its full clockwise position. When looking down on the servo, the end of the arm which will control the servo gas valve lever, should be at about 2 o'clock. The gas valve should be mounted on its bracket with the outlet in the desired position and tighten the gas inlet nut before tightening the bracket lock nut. This ensures that the connection is gas tight. Move the lever on top of the valve until it is parallel with the servo arm, with the valve spindle in the fully shut position. The lever position is adjusted by loosening its lock nut, moving the lever and re-tightening. The control rod is made from a piece of steel wire that just fits into the servo and lever arm holes. Bend a Z in the servo end and a flat V shape in the horizontal plane. Finally, holding the Z end of the wire over the servo arm outer hole to check the hole centre to centre length to the lever arm hole, bend the wire down long enough to ensure it will stay in the lever arm in use. Cut off the excess wire. Pass the Z end through the outer servo arm hole and the free end into the lever hole. The V bend in the control rod allows fine adjustment of

the rod length. With a small flat bladed screwdriver, turn the pilot adjustment on the control box to give the servo its full travel anti-clockwise, about 10°. This will enable the burner to stay alight on shut down whilst adjusting the unit.

Screw the pressure sensor into the boiler bush with sealant, making sure that you tighten on the body only. Remove the wire link across the pressure sensor terminals and connect the two ends of the pressure sensor wires.

### **Initial boiler test**

With the boiler filled to its correct level, connect the gas supply and switch on the power supply. The servo will move the gas valve to its open position and the red LED on the control box will be showing. Partially open the gas tap and whilst holding a flame over the chimney, check that the burner lights. After about 30 seconds, open the gas tap two complete turns. Doing this, allows the boiler to warm up before full heat is applied. The pressure adjuster should be in the full anti-clockwise position and should not be moved until the boiler reaches about 30 PSI/2 bar, at which point the gas valve will shut down to the pilot position. Run the engine to use steam and when the steam pressure drops sufficiently, the gas valve will open again to build up pressure. It will shut down at a lower pressure than it did initially, so with the small screwdriver, make fine adjustments of the potentiometer allowing the valve to shut down each time. Adjust the controller until the desired maximum pressure is indicated on the pressure gauge. This should be just below the pressure that the safety valve is set to blow. Stop the engine running, wait for the gas valve to move to its pilot position and adjust the pilot potentiometer until the burner just keeps alight without the risk of it extinguishing. This completes the setting up of the unit and no other adjustments should be necessary. If the model is used in extremes of ambient temperature, the pilot may need slight adjustment. When the steam plant is used from cold, the safety valve will tend to release until the unit has settled down to running temperature.

If the pressure sensor should need removing at any time, a 2 BA spanner should only be used on the body of it, never on the nut, or else the sensor will be irreparably damaged. Disconnect the wires from the controller to prevent twisting of the lead.

If performance of the EGR seems to deteriorate, the likely cause is a fully or partially blocked gas jet. The gas is inherently dirty and will prevent the burner from supplying full heat should the jet clog up. If this is the case, disconnect the gas supply, unscrew the gas jet holder and remove the jet. Under no circumstance should the jet be poked with wire, only blown through with an airline from the outside in. Replace the jet with a drop of sealant after first checking that the thread is clean.

## **ELECTRONIC GAS REGULATOR PARTS LIST**

		QTY
1)	ELECTRONIC CONTROL BOX	1
2)	PRESSURE SENSOR LEAD	1
3)	GAS CONTROL VALVE	1
4)	SWITCH LEAD	1
5)	GAS SUPPLY PIPE	1