



# EPICYCLE RACING SERVICES

115 CARLINGFORD RD EPPING  
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## **Part # EHD001 Type 3**

**Please note:** These instructions refer to **Type 3** VariRegs.

### **VariReg** -Variable Pressure Fuel Regulator

Suitable for Harley-Davidson FLTR/FLH/FLHT/FLHR EFI models 1995-2001, 1340/1450 stock machines or machines fitted with after-market mufflers and or after-market air filter (eg.K&N) in stock air box. May be fitted to machines using Harley Davidson performance air box (Screamin' Eagle), provided the machine is fitted with HD stage 1, 2 or 3 performance kits.

The Epicycle **VariReg** will allow a fuel pressure rate from 300 kPa / 44psi (stock) and above. By increasing the pressure available at the injectors, more fuel will flow thus enriching mixtures. The available increase in fuel is from 0-17% over stock and is sufficient to correct "pinging" and allow the fitment of some performance parts if required.

The increase in fuel pressure is variable by the owner and may be altered at any time as required, however, and by design, the pressure at the regulator can never exceed the fuel pump by-pass pressure thus maintaining the safety virtues of the stock system. The unit comes pre-set at 360 kPa / 52 psi.

It should be noted that the fitment of this part can make cold start idles richer than required and therefor the idle during this sequence may have a "low" idle period, usually approximately 45-60 seconds after start up and for a duration of approx. 1 -2 minutes.

Your EFI Harley will run at it's best using Premium Unleaded fuel of octane 95 RON Australia (USA 91 RON + MON / 2) with, '95-'98 models HD 5R6A spark plugs or NGK BPR5EY-11, 1999-2001 models should use HD 6R12 or NGK DCPR7E, with the gap set at 0.043" on all models.

Should you have to use Standard Grade Unleaded fuel of octane 91 RON Australia (USA 88 RON + MON / 2) then for '95-'98 models, a spark plug change is recommended to NGK BPR5ES-11, gapped to 0.043". Note that idle speed will drop when using this plug and therefor may require adjustment.

While tests for Standard Grade Unleaded on 1999-2001 models have not yet been conducted, the fitment of NGK plug DR7EA or DR7ES **may allow** std. ULP fuel to be used.

It is recommended that the **VariReg** be fitted by a Harley workshop as this will ensure maximum benefit from the unit, however instructions have been given for fitment by consumers who may not be in close proximity to a Harley workshop. It is assumed that the consumer will have a basic mechanical knowledge and access to an official Harley workshop manual for the model concerned.

**DO NOT ATTEMPT TO FIT THIS UNIT UNLESS YOU ARE COMPLETELY CONFIDENT IN YOUR OWN ABILITY AND POSSESS THE RELEVANT WORKSHOP MANUAL.**

**NO LIABILITY FOR DAMAGE TO THE MACHINE OR PERSONAL INJURY CAN BE ACCEPTED BY THE MANUFACTURERS OR THEIR DISTRIBUTORS UNDER ANY CIRCUMSTANCES ARISING FROM THE FITMENT OR ATTEMPTED FITMENT OF THIS PART.**

***Fitment by a Harley Workshop* ( for Fitment by Consumers – see page 4 )**

Please refer to the official Harley workshop manual during fitment.

1. Ensure vehicle runs correctly through all rpm ranges and idles correctly before attempting any work.



**It is highly recommended that a pressure / flow test be carried out before & after installation of the *VariReg* to determine fuel system condition.**

Stock HD 300 kPa / 44 psi, ***VariReg*** as delivered 360 kPa / 52 psi

Note: In some countries gas stations do not “final filter” the fuel & therefore we recommend that the fuel filter canister be replaced every 15,000 klms (10,000 miles). Restriction of the fuel by way of a blocked or partially blocked filter will result in difficulty in tuning or failure to obtain satisfactory results during tuning. Should you experience difficulties in tuning, see [Diagnosing fuel filter and pump faults](#)

2. Remove air filter cover, air filter and backing plate. Check Throttle Position Sensor value at completely closed throttle as best performance will be obtained at the nominated settings. This will require backing off the idle screw and cold start idle actuator and screw adjustment as described in the workshop manual. The original T.P.S. values should be recorded for possible future reference.

To set TPS values without the HD breakout box see [VariReg TPS Setting for Harley-Davidsons](#)

The T.P.S. values must be set to	1995 - 1996	175 mV (+/- 25mV)
	1997 - 2001	275 mV (+/- 25mV)

Record the original TPS value here. ....mV

YOU MUST ENSURE THROTTLE PLATES ARE COMPLETELY CLOSED AND NO BINDING EXISTS IN CABLES to obtain the correct value setting.

3. Reset idle screws to approximate previous settings, no need to start the engine.

4. Complete full or partial fuel tank removal as described in workshop manual.

5. Remove stock fuel pressure regulator as described in workshop manual and leave Horn removed from vehicle until after tuning, this will allow ease of access to the regulator.

6. Install the Epicycle ***VariReg*** using the stock clamp and as described in the workshop manual, taking care to apply a small amount of lubricant to the ‘O’ rings on the new regulator. The ***VariReg*** should be installed with the large 5mm hole in it’s side facing the left side of the vehicle and the small 1.5mm atmospheric port hole facing the right side (air box side). Please note that you must hold down the return fuel rail fitting on top of the induction module when pushing home the new regulator to stop the fuel rail fitting being pushed out of the induction module.

- 7.** Reassemble the remaining parts and complete installation of fuel tank, air filter backing plate etc., do not fit air filter, air filter cover or Horn.
- 8.** Reset cold start idle, then start the machine , warm up and reset warm idle, all as described in workshop manual. Install air filter and cover.
- 9.** Disconnect one battery lead (+ or -) for 15 minutes or relevant fuse to reset computer memory for minimum idle values. After 15 minutes, reconnect battery or replace fuse if removed.
- 10.** Do not start the engine but, set engine run switch to on and turn on ignition , the engine lamp is illuminated, after the engine lamp goes out, wait 15 seconds and turn off ignition switch only. Wait 15 seconds and then repeat this process at least once more.
- 11.** Start the engine and warm up thoroughly. The engine may now be tuned. Make adjustments using the 11mm or 7/16 AF hex head adjustment screw on the underside of the **VariReg**. Hold the body of the regulator (to stop it rotating in the induction module) with a No.1 Phillips head screw driver or 4mm Tommy Bar inserted into the 5mm side hole in the regulator body. If at any time you lose your adjustment position, then as a reference, turn the adjustment screw all the way in & then back out **3** full turns. This position is 300 kPa / 44 psi (stock) pressure. Do not turn the screw out further than this position, as damage to the component may occur.
- 12.** Most '95-'98 1340 motors in stock trim will "ping" between 2000-3200 rpm under load, therefore an acceleration test in 2nd or 3rd gear,(preferably 3rd), rolling the throttle on quickly to WOT (wide open throttle) is best to test for "pinging". If pinging is experienced increase fuel pressure by turning the screw on the regulator IN, one half turn. Retest and if pinging is still experienced, go IN one quarter turn, or if pinging has stopped, back OUT one quarter turn and retest. If still not pinging, back out one eighth turn. When you are close to correct settings, fine adjustments of one flat of the Hex are necessary.

Best overall performance will generally be obtained at a point where pinging has "just" been removed and the engine is at normal operating temperatures or slightly above. However, if ambient temperatures are high, eg 35<sup>0</sup> C(95<sup>0</sup>F) or above and machine is being ridden in traffic, some light pinging may be experienced due to excessive heat being generated at idle and limited air flow over engine fins. This can be corrected by further adjustment, but performance will suffer when engine returns to normal temperatures. The motor should not ping under normal riding conditions even at 35<sup>0</sup>C (95<sup>0</sup> F) or above.
- 13.** Once tuning is completed, reset idles if necessary, and if idles required substantial correction, then reset computer as described in points 9 & 10 above. Refit Horn.

The regulator may be adjusted slightly at any time without reset of the computer memory etc, as only idle speed will change slightly with the variation in fuel, usually insufficiently to warrant adjustment to the idle values etc.
- 14.** It is highly recommended that these instructions sheets be passed on to the consumer upon completion, this will allow the consumer access to information they may need in the future.

## ***Fitment by the Consumer***

Please read all instructions BEFORE commencing work and refer to the official Harley workshop manual during fitment.

1. Ensure vehicle runs correctly through all rpm ranges and idles correctly before attempting any work.
2. It is not possible for you to check the T.P.S. settings as described in points 2&3 of the workshop instructions. Therefore you should proceed to step 4 of the workshop instructions. **NOTE:** Please ensure that you purge the fuel lines first, as described in the workshop manual by disconnecting the electrical feed to the fuel pump (a single wire connector which exits the fuel tank console at the rear of the fuel tank, directly under the seat front nose). Then turn on the ignition ( you should NOT hear the usual fuel pump ramp-up noise), start the engine and it will run out of fuel very quickly and stall. Then press the starter button for around 5 seconds, cranking the engine over to ensure all remaining fuel is removed from the fuel lines.
3. Proceed as described in step 5 of the workshop instructions noting that it may be necessary to remove one bolt from the top engine stabiliser and swing the stabiliser to one side. You will need a Torx T-45 head socket with a small tommy bar installed in the SIDE of the socket hole or a Torx head wrench to remove the Torx head sleeve bolt which is on the top side of the induction module and secures the clamp plate for the fuel pressure regulator (under the induction module) via their connecting threads. Please note that the fuel regulator is a "push fit" into the induction module body and is secured by the clamp plate. The fuel regulator can however rotate in the body, even when the clamp plate is secured.
4. Proceed with steps 6,7 & 8 of the workshop instructions, noting that you may reset the cold start idle by trial and error. Around 1200 rpm should be ideal (after initial start up of 5-10 seconds) using the cold start idle screw (2.5mm Allen or T10 Torx) which is located in the rotating arm, near the ends of the throttle cables.  
Warm idle should be set at 1000-1150 rpm for '95-'98 models and 950-1050 rpm for '99-2001 models. The warm idle screw (T10 Torx) is positioned in the alloy induction module below and to the right of the throttle butterflies and can be accessed, with the air cleaner backing plate installed through a hole in the lower right side of the backing plate.
5. Proceed with steps 9,10,11,12 & 13 of the workshop instructions, proceeding carefully and taking time.

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