Revised 21.01.18

www.hpcontrols.ca

HPC Methanol / Water Injection Controller Kit

Models Covered

101005 – Universal 2-5V Input
101020 – For 2.0 Bar MAP Sensor
101025 – For 2.5 Bar MAP Sensor
101030 – For 3.0 Bar MAP Sensor
101040 – For 4.0 Bar MAP Sensor
101050 – For 5.0 Bar MAP Sensor

The HPC Methanol injection controller provides variable flow rate control for water injection systems utilizing a high pressure injection pump. It is intended for turbocharged or supercharged applications. Using the vehicles MAP sensor, injector duty cycle or other analog source as an input, the controller allows for low flow rates at lower boost pressures and increased flow rates at higher engine loads to more closely control flow. Tuning is made easy with just two adjustment knobs. In addition, the controller has circuit status feedback through the LEDs visible on the front panel for added peace of mind.

The controller can notify the driver of the following conditions

- Sensor input becoming disconnected or shorted
- Pump wire broken or disconnected
- Excessive current draw from pump

NEW FOR VERSION 2.3! – Added built in low level LED

The HPC Methanol injection controller is well suited for:

- New methanol injection installations where variable rate flow and ease of use and tuning is desired
- Existing installations to replace a basic on/off switch so as to have fine tuning control over the pump
- Direct replacement of an existing competitors injection controller which has failed

The controller may also be used as a simple on/off control for those that do not desire variable flow rate, but want the convenience of in-cabin and on-the-fly control.

This manual covers the 101005-101050 models (injection controller kit). <u>The customer must supply the injection pump and additional hardware.</u> If you require something different from what is described in this manual, contact sales@hpcontrols.ca for enquires.

Kit Contents (Kits 101005-101050)

 1 HPC Methanol Injection Controller For Voltage Input	 1 Main Power and Pump Wiring Harness with Fuse Holder	 1 Sensor Tap Wiring Harness
 1.5” Hook and Loop Tape	 1 Packet of Wiring Terminals	 1 Rocker Switch

Important Notes

Installation should only be attempted by someone who is completely comfortable with automotive wiring. Professional installation is highly recommended.

Kits 101020-101050 REQUIRE a voltage feed from the vehicles MAP sensor that ranges between 0 and 5 volts, and increases as boost pressure (engine load) increases. If the vehicle does not have a MAP sensor one must be installed separately. Kit 101005 requires an input from any 0-5 volt sensor, which increases with increasing engine load, such as a MAF or TPS. Note: some MAF sensors output a digital signal rather than 0-5 volts.

The supplied 10 amp fuse must be installed to protect the wiring and the module, warranty is void if not installed. The internal over current protection of the module only engages over 35amps, and is intended only as a backup and for momentary overloads. See the installation instructions for more information.

Failure to properly follow the instructions in this manual could result in personal injury or may damage the vehicle, either electrically or mechanically. If you are uncomfortable, have a professional install it for you.

It is advised that tuning be aided by the use of wide-band oxygen sensors, exhaust gas temperature gauges and engine knock indication systems. Failure to properly install, test and monitor for correct operation of the controller could result in severe engine damage due to pre-ignition, excessive combustion temperatures, hydro lock or other reasons. Watch your gauges.

As with any methanol injection system, using a mixture of more than 50% methanol can not only harm the pump but is dangerous. Mixtures of no more than 50% methanol, mixed with water are generally recommended. Windshield washer fluid with antifreeze protection generally contains a safe ratio of methanol to water and may be a good candidate fluid for your injection system. Avoid fluids that contain solvents and detergents such as bug wash or water repellants.

If the injection pump utilized has a built in over pressure cutoff switch, do not disable this switch without first contacting the pump manufacture. If the pump does not have an internal pressure relief valve, the pump may be damaged if its over-pressure cutoff switch is modified, disabled or removed.

Harris Performance Controls accepts no liability for injury, damages, loss of use or other perils caused by or related to the installation and use of its products.

The use of after market electronic devices will void most new vehicle manufacture warranties. If your vehicle is still under warranty, please contact the warranty provider to determine whether the use of this device is compliant with their warranty terms.

Read the entire contents of this manual before proceeding with installation. If anything is unclear, contact Harris Performance Controls at support@hpcontrols.ca for clarification.

Warranty Information

Harris Performance Controls accepts no liability in the event of damage, injury, loss of use, or other burdens and perils due solely or in part to installation and use of its products.
At the sole discretion of HPC, units found to be faulty due to manufacturing error or defect will be warranted for replacement only for one year from the date of purchase. Units damaged by misuse, abuse or incorrect installation are not covered. Additionally, this product requires the installation of the supplied fuse protection for this coverage. The customer must contact HPC prior to submitting an item for a warranty claim. Product sent without proper approval may be denied and may not be returned. The customer is responsible for any shipping or handling fees when returning the product, CODs will be denied. The customer must provide proof of purchase date when contacting HPC if their purchase is not already on file with HPC. Warranty is for HPC supplied part only, warranty does not cover labor or related parts. For further clarification or to submit a claim for consideration, please contact support@hpcontrols.ca

Methanol / Water Injection Controller Basics

HPC Methanol controllers are available for different MAP sensor ranges, and a universal voltage input. Vehicle MAP sensors on turbocharged or supercharged vehicles are typically 2.0, 2.5, 3.0, 4.0 or 5.0 bar. This is a measurement of the range of vacuum and boost the map sensor can read. Determine which your vehicle has prior to ordering. The voltage based controller may be installed on a MAF, TPS, or other 0-5 volt sensor (not for PWM/frequency based MAFs). Customized voltage ranges are available for 0-5 volt sensor inputs, contact HPC at sales@hpcontrols.ca for more information.

The controller has two knobs and two indicator lamps on the front panel.

START This is the boost pressure/voltage that the pump will begin to turn on at. This will be between 2psi/2V and the maximum your sensor or input will read.

END This is the boost pressure/voltage at which the pump will be running at 100%. If END is set higher than START, the pump output will be ramped up as the input increases, until it passes the END setting, at which time it will be 100%.
If desired, END may be set below START. In this scenario, once the boost pressure/voltage reaches the START setting, the pump will run at 100% and not vary the rate of flow – acting like an on/off switch.

POWER/LOW LEVEL The green lamp illuminates solid when the controller is powered on and no failures are detected.
The lamp changes to amber (yellow) if the low fluid level switch is being used and is activated. If the yellow light is on it will override the green light functions until the fluid is refilled.
The green lamp flashes at one flash per second if the sensor input wire shows less than 0.10 volts for MAP or other sensor inputs.
The green lamp flashes at five flashes per second if the controller detects that the pump wire is disconnected or short circuited. The controller cannot detect an open or short circuit until it has reached the start setting and has attempted to power up the pump.
If an error is detected, the controller will continue to flash the POWER lamp for three seconds to make errors easier to spot.

ACTIVE This blue lamp illuminates only when the pump is powered. It will flicker quickly when the pump is at a lower output, and will increase in intensity until it stays illuminated fully at which time the pump is running at full power.
A red lamp will illuminate only if the pump output wire is short circuited or is drawing excessive current and the controller has stopped the output to the pump.

Installation Instructions

Ensure you have the correct tools for the job. Read the instructions completely before starting to ensure you are properly equipped. Disconnect the vehicles battery before beginning.
Ensure you have enough wire to reach your ignition power source, sensor or injector splice, ground and the pump. Refer to wiring diagram at the end of the manual for the instructions below.

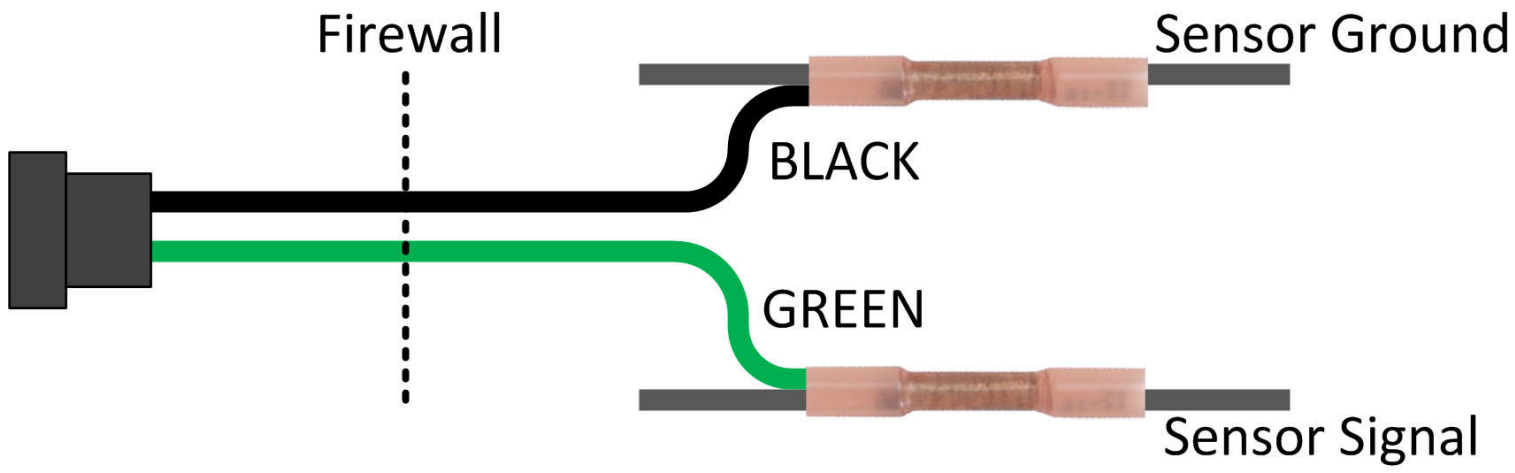
New Installation of Pump and Controller

1. **Connect sensor wires.**

Route the sensor tap harness from the cabin into the engine bay. This is the harness with a green and black wire.

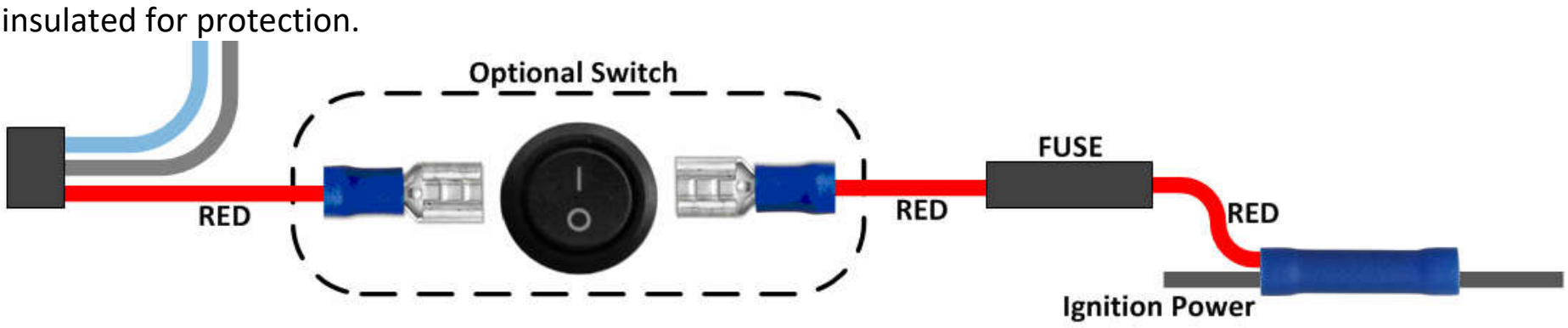
- For 101005 models, locate the desired sensor input source. This may be a throttle position sensor, a 0-5V MAF (mass air flow) sensor or similar input. Tap the green wire into the sensor signal wire, and the black wire into the sensor ground wire.
- For 101020-101050 models, locate the engine MAP (manifold absolute pressure) sensor. Connect the green wire to the sensor output signal wire, and the black wire to the sensor ground. To verify which wire to tap, a volt meter may be used. Refer to troubleshooting section below for nominal voltage outputs of the different sensor types.

Protect wiring harness by installing alongside or within existing wiring harnesses loom. Keep well clear of sources of abrasion or excessive heat. Do not disconnect any sensor from the ECM, instead piggyback on the same wires.



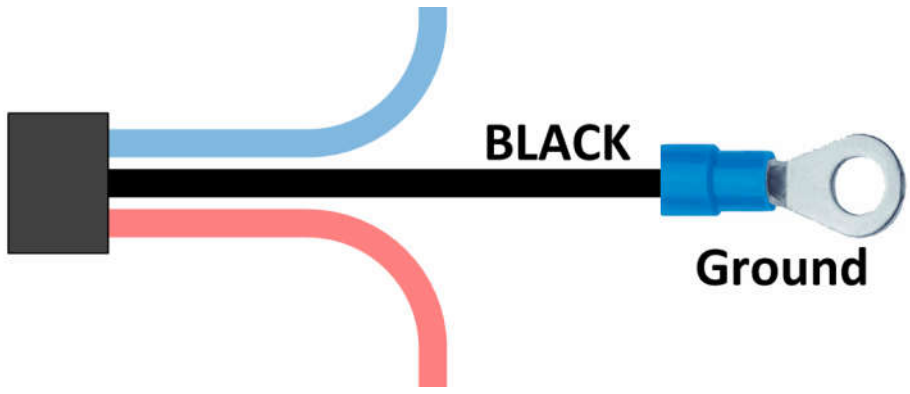
Soldering this particular connection is highly recommended. Alternatively, the installer may wish to utilize two of the provided butt connectors containing integral heat shrink tube. Ensure these two connections are water tight when complete so as to not compromise the original wiring or the sensor output.

2. Locate a switched ignition feed. The methanol injection controller should only be powered when the vehicles ignition is on. Locate a switched 12V circuit that is on when the key is in the RUN position, using an accessory circuit is not advised. Connect the red wire from the controller's main wiring harness to the switched ignition feed. Ensure 10A fuse is correctly installed in this wire. If the circuit being used is suspected to already be heavily loaded, the use of a relay (not supplied) may be desired. To make this connection, a switched power wire may be cut and reconnected with the controller's power wire using the supplied butt connector (non heat shrink type). Otherwise, this wire may be soldered and insulated for protection.

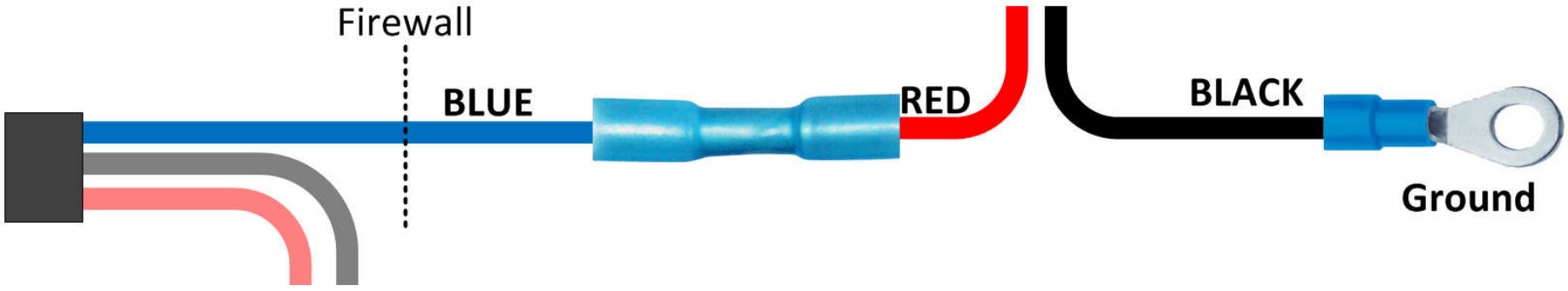


If the installer wishes to be able to switch the controller on and off, install the supplied switch on this wire by cutting the wire and installing the two supplied spade terminals. Installing this switch is optional but is recommended.

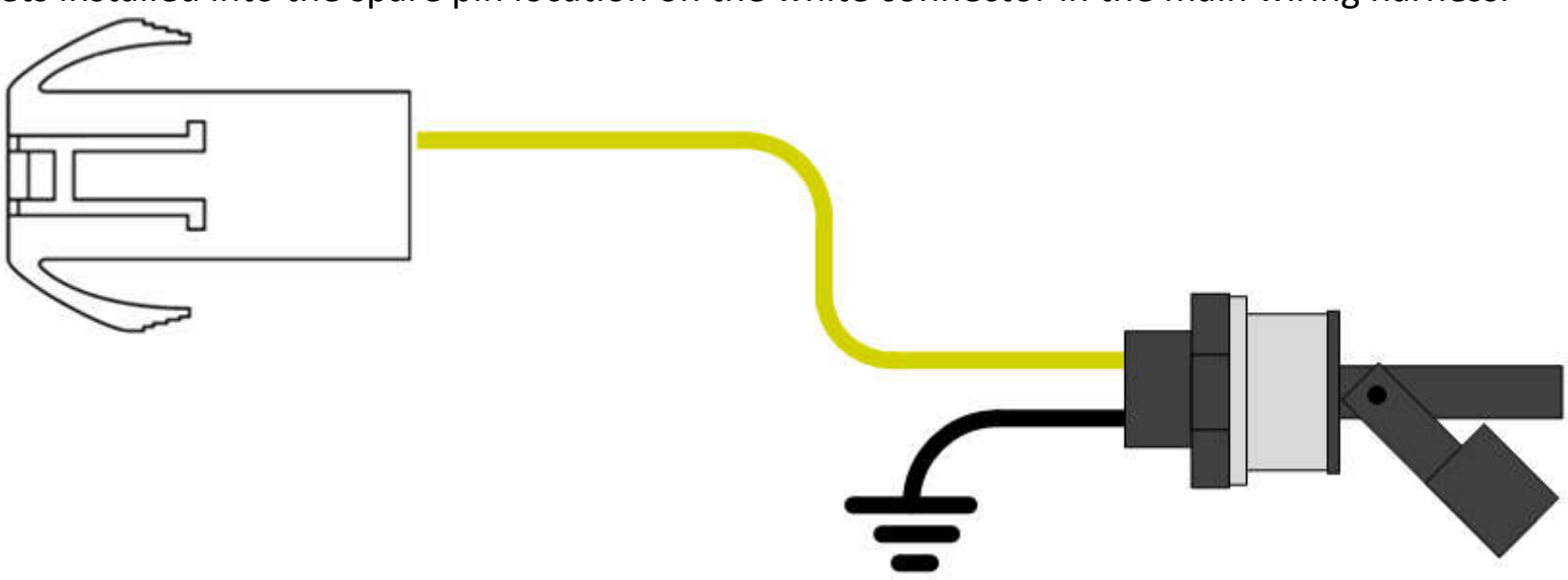
3. Connect the controller to ground. Locate a suitable body ground to connect the black wire from the controller's main wiring harness. Existing body ground locations are acceptable as long as they are clean and installing the controller will not compromise the existing wiring. A ring terminal has been provided for installation convenience.



4. Connect to the pump. Route the blue wire from the controller's main wiring harness from within the cabin to the injection pump (usually in the engine bay). Connect the blue wire to the pumps positive (RED) wire. Connect the pumps negative wire to a body ground. Route the blue wire along side or within existing wiring harnesses loom to reduce chance of abrasion or exposure to excessive heat. A heat shrinkable butt connector and an additional ring terminal have been provided for this connection.



5. Optional low level indication hookup. The controller can be connected to a low fluid level switch in the methanol/water reservoir. This switch must close when the level is low (make contact), and the other switch terminal must be connected to ground. That way, when the fluid is low the yellow wire from the controller will be grounded. This will change the POWER LED from green to amber. The yellow wire is supplied loose with a pin on the end to give the installer the choice to use it or not. It gets installed into the spare pin location on the white connector in the main wiring harness.



Replacing an Existing Electronic Pump Controller

Most controllers will have the same connections and may be changed out in minutes. Verify which wires are power, ground, MAP and pump as different brands may use different color schemes. Retain the inline fuse regardless of existing wiring configuration. If the existing controller does not have a dedicated ground wire connecting to the sensor input this wire must be connected now. Refer to step 1 (above) for details on sensor wire taps.

NOTICE: Some competitor's kits may ground the pump at the controller, instead of feeding it power. If this is the case with your installation, ensure that the pump wiring is updated to reflect a positive feed from the controller. This would involve connecting the pumps negative wire to the vehicles ground and the positive wire to the controller as outlined in the above instructions. Additionally, if replacing a pressure switch controlled system; ensure the BLUE wire from the controller feeds the pump directly, not through the existing relay. If desired, a relay may be installed ahead of controller, but not after.

Now all the electrical connections should be complete and all equipment installed. If further clarification is required, see the wiring diagram at the end of this manual or contact HPC at support@hpcontrols.ca.
Verify all connections are secure and that there are no leaks. Install fuse, if not already done, and reconnect battery.

Test for correct operation.
Turn the ignition on, the pump should not be running. The POWER lamp should be illuminated and not flashing. The ACTIVE lamp should not be lit. Warm up the vehicle and go for a drive. Adjust the knobs to the desired set points and verify pump begins operation by watching for the blue ACTIVE indicator light. Once the system is verified, tuning may begin.
Do not exceed speed limits and please observe safe driving practices while tuning.
If the pump runs when it is not expected to, fails to run, or the module indicates an error - consult the troubleshooting section below.

Troubleshooting

Green POWER light does not come on

- Check fuse. A blown fuse may indicate reversed electrical connections or wiring short circuit.
- Check for power on red wire at the controller and for ground continuity on black wire. Repair broken wires or bad connections as necessary.

Green POWER light flashes slowly (once per second)

- 101005-101050 models: Sensor input signal is disconnected or under 0.10 volts. Correct sensor wiring.

Green POWER light flashes quickly (five times per second)

- No draw on pump wire detected, correct pump wiring and check for broken wires or poor pump ground.
- Pump circuit overloaded. Check for short circuit to ground on blue pump wire.

Green POWER light does not go off

- Power source is not a switched ignition feed. Relocate red wire to switched feed.

Amber light instead of green light for POWER

- Installed low level switch is showing the methanol/water reservoir is low.
- The yellow wire is shorted to ground. Disconnect the wire from the controller to verify.

Blue ACTIVE light is on with engine off

- Wrong MAP sensor-controller combination. Refer to chart (right) to determine which sensor you have. Try setting the START knob higher.
- Wrong wire tapped for MAP sensor. Use volt meter to verify correct wire is being used.
- Pump ground wire connected to 12V instead of ground. Refer to installation instructions and wiring diagrams.

Map Sensor Voltage at 0 PSI

2 BAR	2.5 V
2.5BAR	2.0 V
3 BAR	1.6 V
3.5 BAR	1.4 V
4 BAR	1.3 V
5 BAR	1.0 V

Blue ACTIVE light does not come on above set point

- Lower start knob to minimum, and re-test. May be due to incorrect map sensor range or poor ground on black wire in the sensor tap wiring harness.

ACTIVE light is illuminated Red

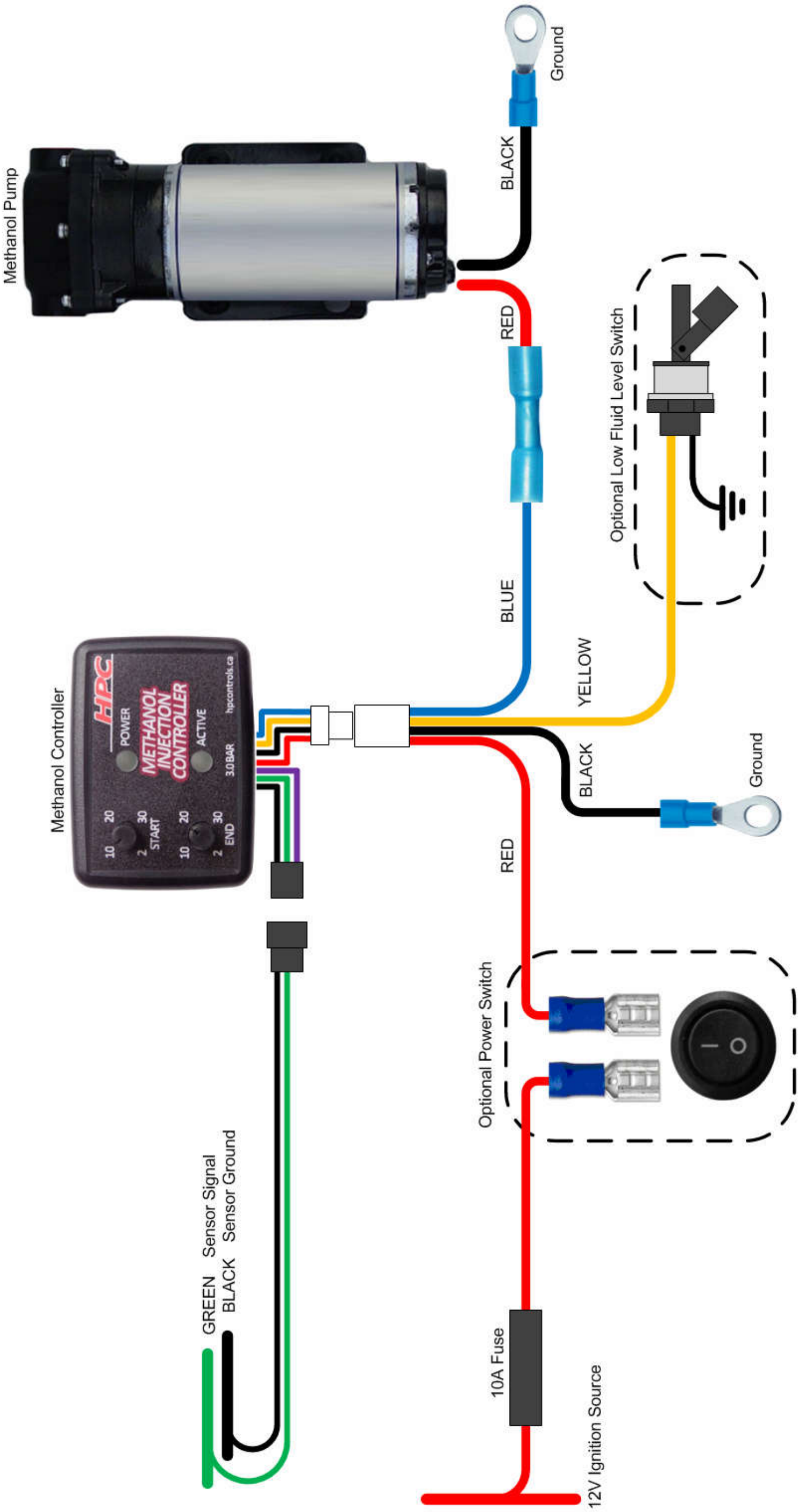
- A current overload will illuminate a red indicator light rather than the blue light. This means that either the current draw by the pump exceeds specifications or that the controller has become internally overheated. This is generally due to a short circuit in the pumps blue feed wire, or a defective pump.

If at any time the controller activates the pump when it is not expected stop engine and remove fuse or turn off switch as quickly as possible. To avoid hydro-lock, remove all the engines spark plugs and turn engine over to remove any built up water from the cylinders. If nozzle is mounted in another location than the intake manifold, take similar measures to ensure excess water is removed from the systems charge pipes or similar.

If the above troubleshooting fails to resolve the issue, it may be due to a failed control module or another problem.

Please contact support@hpcontrols.ca for assistance.

Wiring Diagram



Please send us you feedback, comments & suggestions! **sales@hpcontrols.ca**