



INSTALLATION INSTRUCTIONS



PART NUMBERS 20-0001, 20-0002, 20-0003

If you need any assistance please call 1-800-858-3333 to speak with a representative in our Customer Service Center before returning the product.

NOTE: FAILURE TO FOLLOW INSTALLATION INSTRUCTIONS AND NOT USING THE PROVIDED HARDWARE MAY DAMAGE THE ENGINE.

WARNING: Use caution and proper safety procedures when working on open fuel systems. Be sure to work in a well-ventilated area, gasoline vapor is extremely flammable and may result in fire or explosion if exposed to spark or open flame.

NOT LEGAL FOR SALE OR USE ON ANY POLLUTION CONTROLLED MOTOR VEHICLE IN CALIFORNIA OR STATES ADOPTING CALIFORNIA EMISSION PROCEDURES.

See knfilters.com for CARB status on each part for a specific vehicle

PARTS (INCLUDED)

DESCRIPTION



K&N® ECI Control Unit



K&N® ECI PLATE ASSEMBLY



K&N® ECI WIRING HARNESS



**BOSCH® WIDE BAND OXYGEN
SENSOR**



**K&N® CARBURATOR
GASKET & STUD PACK
PART#82931 / 82932**



**K&N® O2 BUNG & NPT
PART#85-2447 / 82933**



K&N® SOFTWARE DRIVE



USB CABLE

OPTIONAL PARTS NEEDED (NOT INCLUDED)



**AUTOMETER® TEMP
SENSOR PART #2258**



FUEL LINE



BARBED TEE



BARB NPT ADAPTERS



AN FITTINGS

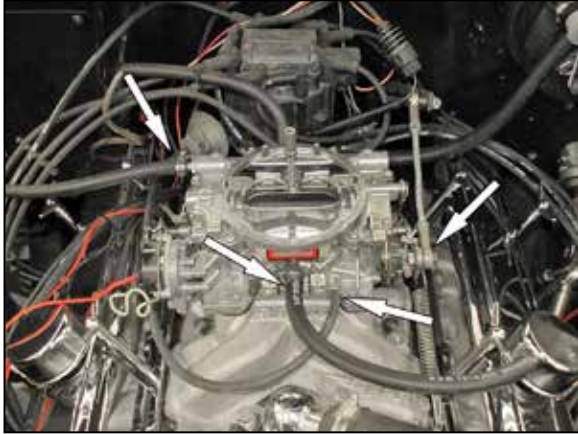


**MSD® TACH ADAPTER
PART# 8910**

(Required for HEI & Standard Ignition systems)

PLATE INSTALLATION

The following steps describe the procedure for the installation of the ECI plate and supporting hardware. Specific layouts may vary on your application.



1. Turn off the ignition and disconnect the negative battery cable and remove the air filter assembly. Label all the vacuum lines prior to disconnecting for ease of reassembly, i.e. vacuum advance, brake booster. Disconnect the throttle linkage, fuel line, vacuum lines, electrical wiring etc. from the carburetor. Be sure to capture any fuel that may leak out of the fuel line. Pay close attention to any lines that may be damaged, replace them at this time.

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2. Remove the bolts that secure the carburetor to the intake manifold. Remove the carburetor and gasket from the manifold.



3. Be sure that the mounting flange on top of the manifold is clean and dry. Install the provided extended carburetor studs and new base gasket onto the manifold. Be careful that no debris falls into the manifold as SEVERE engine damage may result.



4. Assemble the ECI injector plate. The injector(s) and fuel rail(S) can be installed two different ways onto the injector plate. It is advisable to mock up your installation on the engine to determine the best position for your injector(s) and fuel line(s) to be routed. Once you have determined the best position for your situation, install the injector(s), Fuel rail(s), fuel line fitting(s) and plug(s) into the injector plate.

NOTE: Be sure to apply a small amount of lube to the injector O-rings and Teflon® thread sealer to all npt treads.

PLATE INSTALLATION



5. Install the assembled injector plate and new carburetor base gaskets onto the intake manifold.



6. Install the carburetor and reconnect the throttle linkage, vacuum lines and electrical connections.



7. Install a TEE into the fuel line. Using a suitable fuel hose, connect the TEE to the injector supply.

NOTE: See diagram on page 6.

NOTE: On systems that use barb style fittings, barb fittings and fuel line will need to be purchased separately. On systems that use AN style fittings, AN fittings and fuel lines need to be purchased separately. ALWAYS use hose specific for automotive fuels as fuel line, not vacuum line.

NOTE 2: The ECI system can operate on as low as 5psi fuel pressure. If you will be using an electric fuel pump, it is recommended to use Pre-regulated fuel pressure directly from the fuel pump as the source for the ECI system.



8. If you desire to connect a coolant temperature sensor to the system, find a suitable location in the cooling system to install the coolant temperature sensor. Usually this will be in the intake manifold near the thermostat housing.

NOTE: A coolant temperature sensor is not provided. An AUTOMETER® temperature sensor PN 2258 will need to be purchased separately.



9. Reinstall the air filter assembly.

PLATE 20-0001 & 20-0002 INSTALLATION

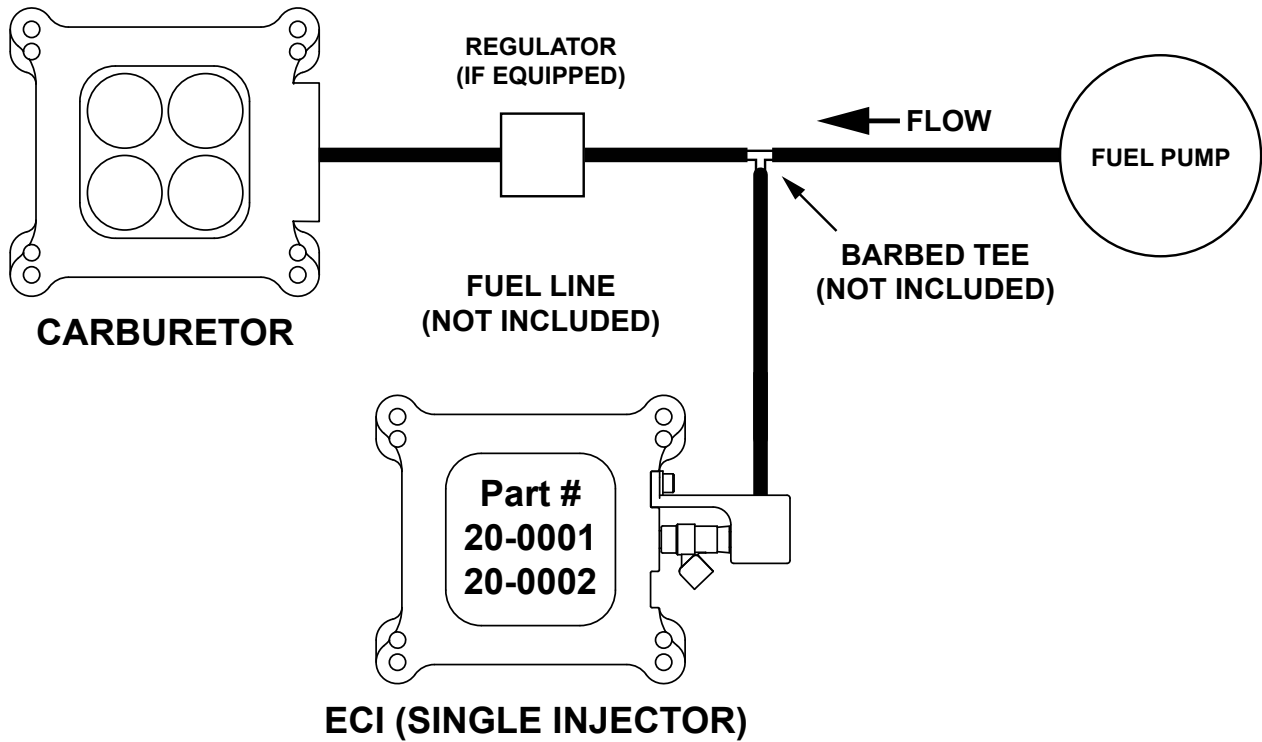
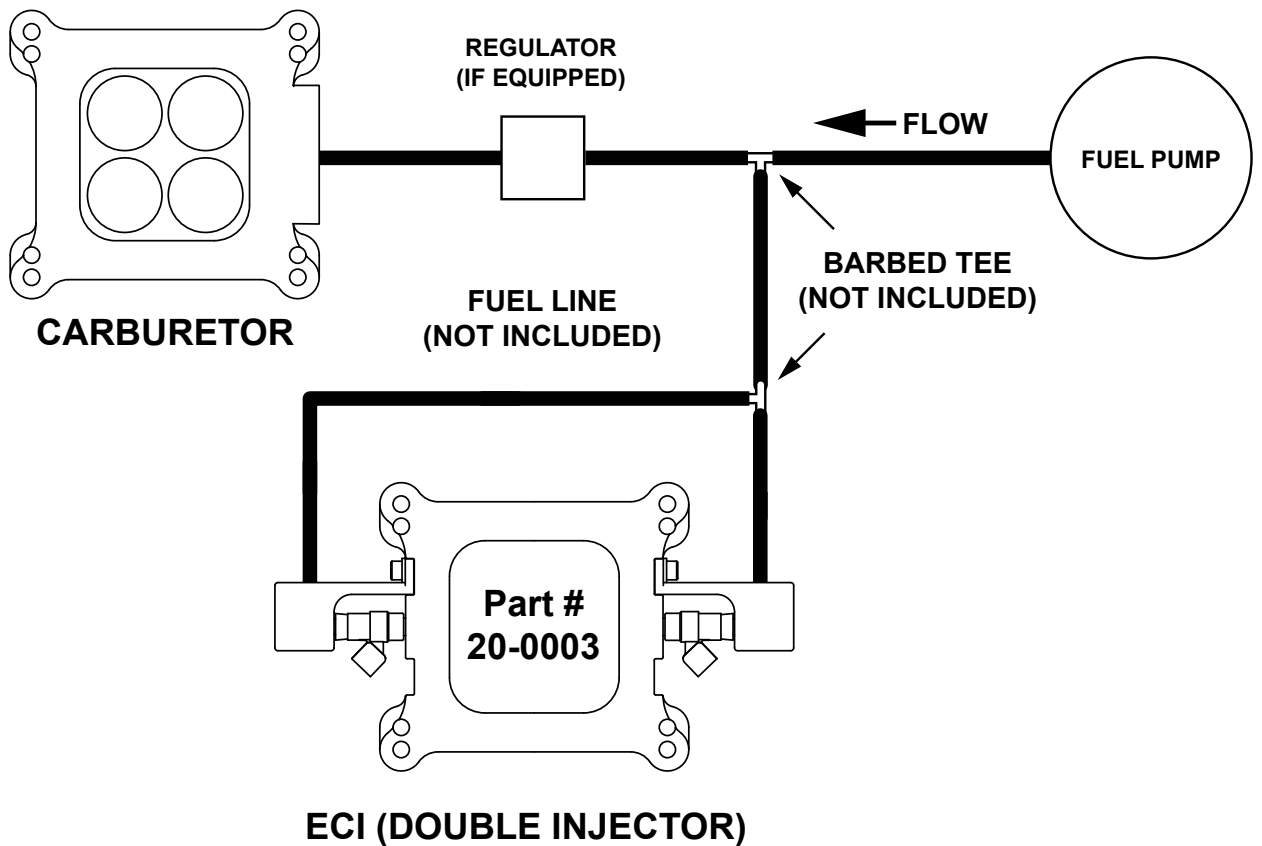


PLATE 20-0003 INSTALLATION



O2 SENSOR INSTALLATION

1. The following steps describe the procedure for the installation of the O2 sensor, bung and pigtail routing. Specific layouts may vary on your application.

1. Turn off the ignition and disconnect the negative battery cable. Jack up the car and place on suitable stands to enable access to the exhaust system.



2. Find the best suitable location to install the O2 sensor. It is recommended that the sensor be 6" to 10" after the point where the individual cylinders merge and placed between 10 and 2 o'clock position, (SEE DIAGRAM ON PAGE 8). It is also recommended that there be at least 18" of exhaust pipe after the sensor. Mark the desired sensor location for drilling. If your vehicle is equipped with catalytic converters, The O2 sensor should be mounted between the engine and the catalytic converters. It is critical that the O2 sensor is NOT mounted on the bottom of the exhaust to prevent condensation from entering the sensor. Verify the O2 sensor cable is away from any heat source to prevent damage to the cable.

NOTE: See diagram on page 8.



3. Drill a 3/4" id hole in the marked location. Deburr the hole after drilling.

NOTE: The exhaust pipe was removed for illustration. It may be necessary to remove the exhaust pipe to perform this step.



4. Weld the provided O2 sensor fitting into the exhaust pipe.

NOTE: The exhaust pipe was removed for illustration. It may be necessary to remove the exhaust pipe to perform this step.



5. Install the provided O2 sensor into the fitting.

NOTE: Apply anti-sieze compound to threads.

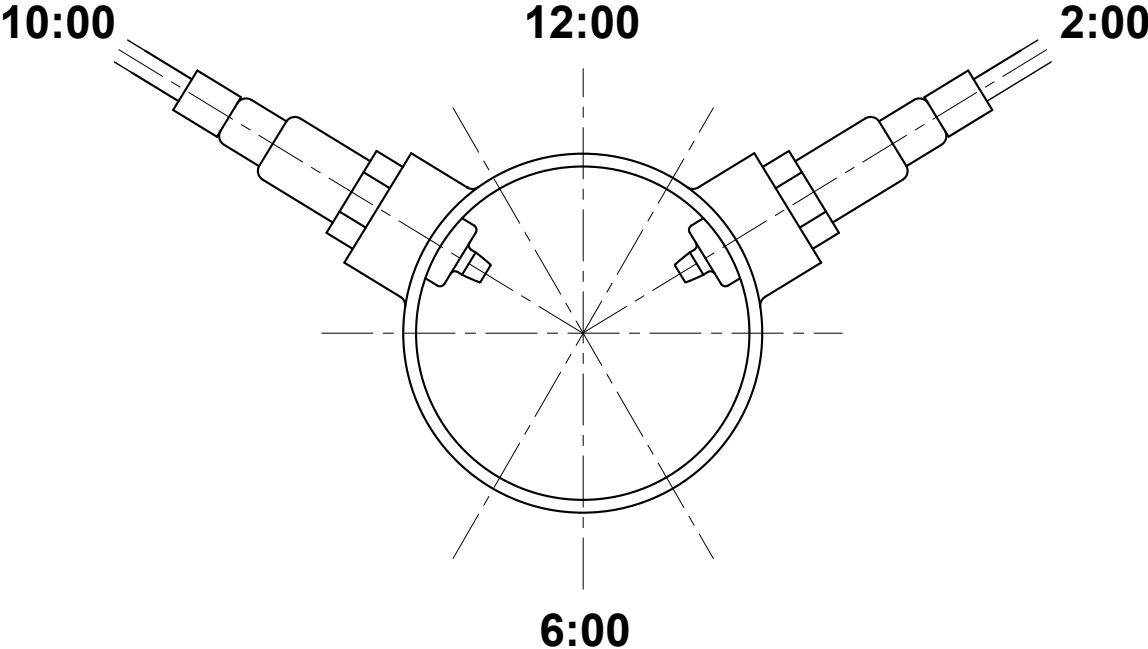


6. Connect the O2 sensor pigtail into the ECI wiring harness.

7. Lower the vehicle and reconnect the negative battery cable.

02 SENSOR INSTALLATION

Orientation of 02 sensors should be set at either 10 or 2 O'clock



WIRING INSTALLATION

1. The following steps describe the procedure for the installation of the Wiring harness and associated connections. Specific layouts may vary on your application.



2. Find a suitable location to mount the EC1 control unit that is away from direct heat, wet conditions and any mechanical interference. Place the control unit in position and mark the location for holes to be drilled.



3. Drill the holes and mount the control unit in the desired location.



4. Connect the wiring harness to the control unit.



5. Route the wiring pigtails for the injector(s) and other optional connections so they will not interfere with mechanical assembly or exhaust and then connect them to the injector(s) and optional locations.

NOTE: See diagram on page 11, all of the wiring pigtails and connectors are labeled.

6. The following electrical connections will need to be made and routing will vary depending on your application. (SEE CHART & DIAGRAM ON PAGES 10 & 11).

- RPM signal**
- O2 sensor**
- 12 volt ignition on**
- Ground**
- Injector(s)**

OPTIONAL CONNECTIONS

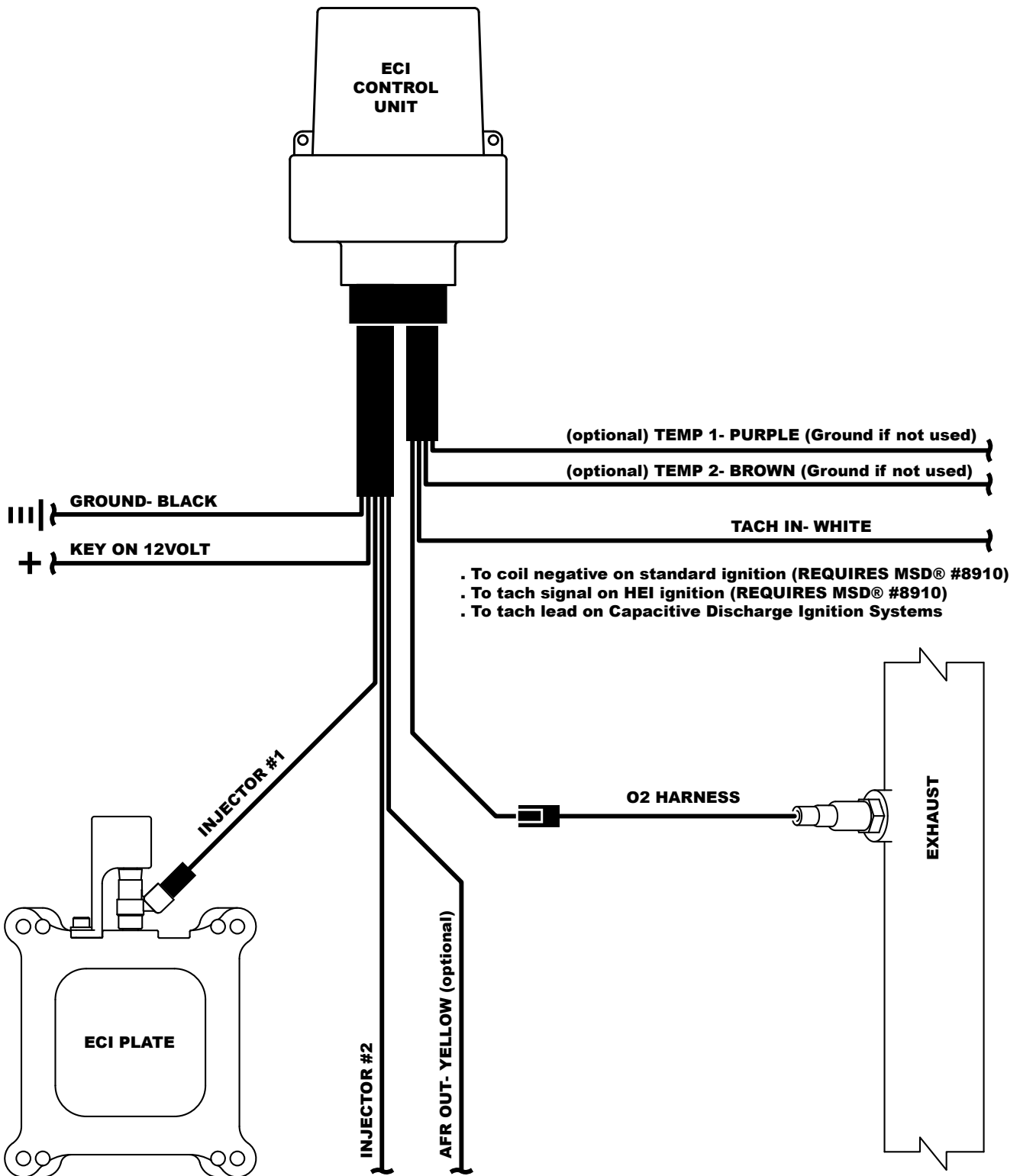
- AFR out**
- Temperature 1, 2 coolant temperature**
- MSD® tach adapter part# 8910**

WIRING INSTALLATION

WIRING DESCRIPTION





BLACK	GROUND: Wire connects to a good ground, engine block or battery negative (-) terminal.
RED	POSITIVE 12V: Wire connects to a positive (+) 12 volt source, live in key on position.
2 PIN GREEN / ORANGE	INJECTOR #1: Connector plugs into #1 injector.
2 PIN BLUE / ORANGE	INJECTOR #2: Connector plugs into optional #2 injector for use with the 2 injector plate.
WHITE	TACH IN: Wire connects to tachometer lead or with MSD® tach adapter #8910 as per instructions .
PURPLE	TEMP 1: (Ground if not used) Wire connects to optional AUTOMETER® TEMP SENSOR PART #2258.
BROWN	TEMP 2: (Ground if not used) Wire connects to a second optional AUTOMETER® TEMP SENSOR PART #2258.
6 PIN	O2 HARNESS: Connects to BOSCH® WIDE BAND OXYGEN SENSOR.
YELLOW	AFR OUT: Wire connects signal to optional AFR gauge.

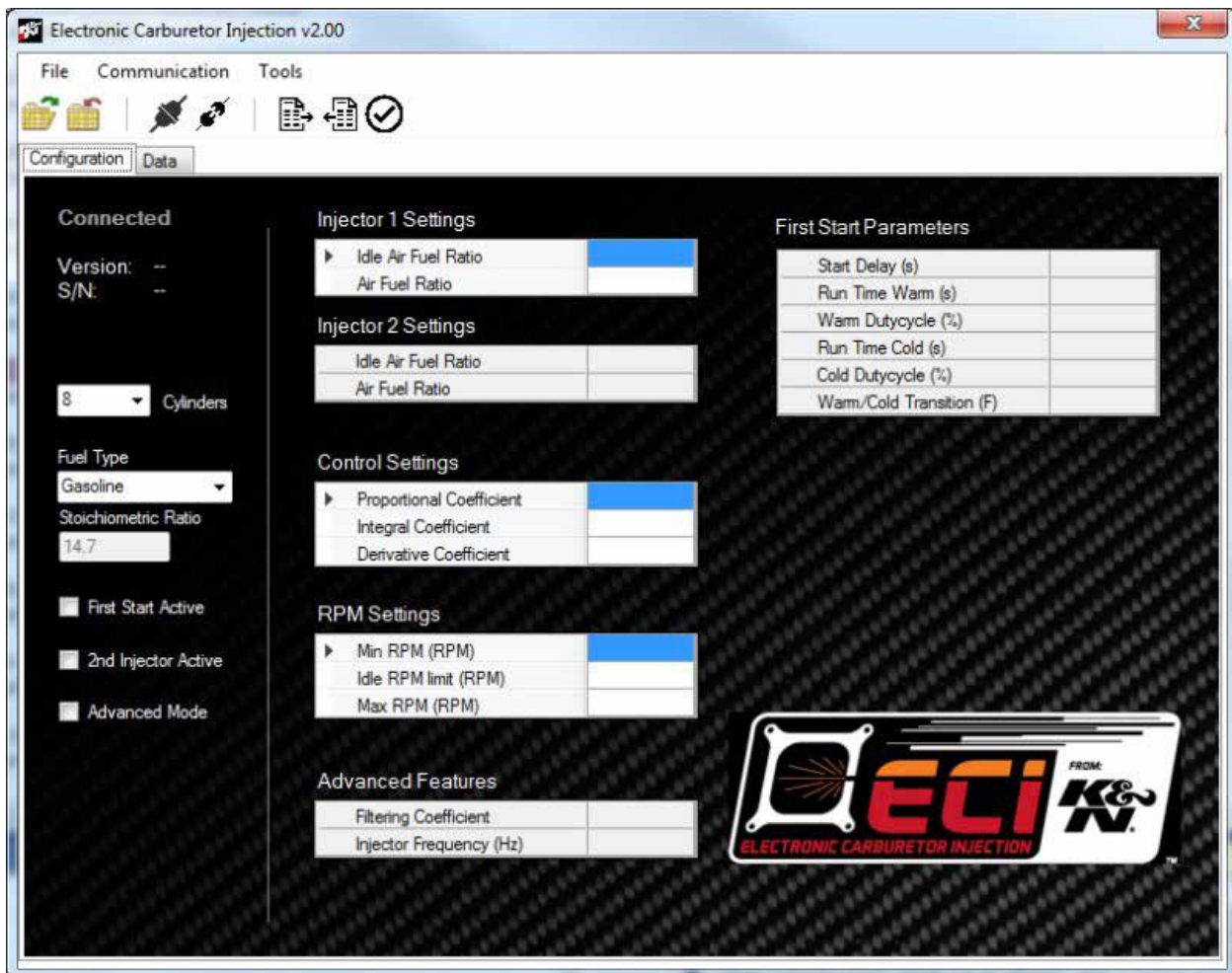
WIRING INSTALLATION



PROGRAMING

TO START PROGRAMING...

1. Insert the K&N® thumb drive to a USB port on your computer and install the provided software by following the instructions in the setup file (setup.exe).
2. After installing the software, connect the ECI to your computer using the provided USB cable.
 - a. The ECI does not need 12-volt power to access and change settings. It will receive power from the USB for communicating. It is recommended to program the ECI before powering it up with a 12-volt source.
3. Click the Connect to Device icon  or “Connect” in the Communication drop down menu.
4. Populate desired values in the Injector 1 Settings, Injector 2 Settings (if applicable), Control Settings, and RPM Settings. See below for description of user defined settings.
5. Select desired values in the drop-down boxes for # of Cylinders, Fuel Type and Stoichiometric Ratio (will default based on fuel type). See below for description of user defined settings.
6. Select applicable check boxes for First Start Active, 2nd Injector Active and Advanced Mode. See below for description of user defined settings.
7. Click the Send Configuration icon  . This sends the set-up configuration to the ECI. You can also select “Send” in the Communication drop down menu.
8. To verify, click the Verify Icon  or “Verify” in the Communication drop down menu.
9. To retrieve a previously loaded set-up in the ECI, click the Retrieve Configuration icon  . This will be the last loaded set-up sent to the ECI.
10. Tool tips are available by hovering the mouse over each setting to provide a description of the setting.
11. To save or view an existing set-up, click the file drop down menu.
12. Power up the ECI (key-on or switched 12-volt source).



PROGRAMING

Injector 1 and 2 Settings

Idle Air Fuel Ratio – Setting to add fuel at idle when in the idle RPM range. The Min RPM and Idle RPM limit must be set for this function to work.

Example: If Idle Air Fuel Ratio is set to 14.7, minimum RPM set to 500 and Idle RPM limit is set to 1500, the ECI will add fuel above (lean) the Idle Air Fuel ratio of 14.7 and in the range of the minimum RPM and Idle RPM limit (500-1500 RPM).

Air Fuel Ratio – Setting to add fuel when above the idle RPM limit.

Example: If set to 14.7 and idle RPM limit set to 1500, the ECI will add fuel above (lean) Idle Air Fuel Ratio (14.7) and above the 1500 RPM Idle RPM Limit.

Control Settings

Proportional Coefficient - This value is the base fuel multiplier. It gets multiplied by the Air Fuel Ratio error to decide how much fuel to add/remove.

Example: if this value is set to 10, Air Fuel Ratio target is 14.7 and Air Fuel Ratio actual from O2 sensor is 15.7 then: Fuel = 10 * (15.7-14.7) = 10% duty cycle.

Integral Coefficient - This value is the error multiplier. If the fuel added/removed is still not enough to reach the target Air Fuel Ratio, this value effects how much more fuel is added/removed.

Example: if 10% (duty cycle) fuel still is not enough to reach the target Air Fuel Ratio, more fuel would be added based on this value. The larger the value, the faster it adds. The default value should be adequate for most.

Derivative Coefficient - This value is this change multiplier. The larger this value, the more fuel it adds/removes on sudden changes in the AFR. The default value should be adequate for most.

RPM Settings

Min. RPM – Minimum RPM the ECI will start adding fuel.

Example: If set at 500 RPM, the ECI will start adding fuel above this RPM and above (lean) the Air Fuel Ratio setting

Idle RPM Limit – Maximum RPM the ECI will add fuel at idle.

Example: If set to 1500 RPM, the ECI will add fuel to this limit above (lean) the Idle Air Fuel ratio setting.

Advanced Features

Filtering Coefficient – Controls how the sensitivity of the ECI. The larger the value, the less sensitive and slower it responds to sensor input. If this number is too small, it may respond too fast and overcorrect.

Injector Frequency – The number of times the injector turns on. A larger number means more smaller pulses. A smaller number is fewer and larger pulses. If the engine lopes at idle, increase this number.

First Start Parameters (Cold Start)

Start Delay – Delay before adding fuel during cold start.

Example: If set to 20 seconds, the ECI will add fuel for cold start ability 20 seconds after key on or switched 12 volts.

WARNING – If adjusting valves or working with key on, it is highly recommended you disconnect the injector or disable the First Start Active function.

Run Time Warm – How long to add fuel when engine is warm. This works only when the temperature sensor is connected and a value is set for the Warm/Cold Transition.

Example: If the Run Time Warm is set to 20 seconds, and the Warm/Cold Transition is set to 100° F, the ECI will add fuel above 100°F engine temperature for 20 seconds. .

Note – If using a temp sensor, it cannot be shared with other gauges or data logging equipment. It must be dedicated to the ECI. See wiring diagram if not using a temp sensor.

CONTINUED...

PROGRAMING

CONTINUED...

Warm Duty cycle – Amount of fuel to add when warm engine temperature transition occurs.

Cold Duty cycle – Amount of fuel to add when engine temperature is cold.

Warm/Cold Transition – Temperature value to determine if engine is warm or cold.

Other

Cylinders – Drop down menu to select number of cylinders.

Fuel Type – Drop down menu to select type of fuel being used. A custom fuel type setting is available.

Stoichiometric Ratio – Ideal air fuel ratio for selected fuel. If custom fuel setting is selected under fuel type, the stoichiometric ratio must be input.

First Start Active – Check box to enable or disable the First Start Parameter (Cold Start).

2nd Injector Active – Check box to enable or disable the 2nd injector.

Note – 2nd injector only available on part number 20-0003 for Holley® 4500 carburetors.

Advanced Mode – Check box to enable or disable the Advanced Features.

HELPFUL TIPS

- You can adjust the Proportional Coefficient until the motor responds but is not too rich or trying to stall.
- It is recommended to start with the default values for the Integral and Derivative Coefficients (0.3).
- You can adjust the Integral Coefficient over time if the motor still needs more fuel which may be the case when the motor is under load.
- If a quick shot of fuel is needed, increase the Derivative Coefficient.
- It is recommended to make changes in this order:
 - Adjust Proportional Coefficient until a substantial change is noted.
 - Adjust Integral Coefficient over time if it will not reach target Air Fuel Ratio.
 - Last adjust the Derivative Coefficient if the ECI is slow to respond.
 - Slight tweaks to the Proportional Coefficient may be needed as Integral and Derivative Coefficients are changed.

Stoichiometric Air-Fuel Ratios

- Gasoline: 14.7
- Ethanol: 9
- Methanol: 6.4
- E85: 9.8

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