

CMGS STAGE 3 PLUS

The CMGS Diesel Stage 3 Plus system is designed to help you get better fuel mileage, more power, lower EGT and extend the range between fuel fill ups. The concept is simple:

The PUMP: High pressure 200-250 PSI pump

The Controller: CMGS all in one controller controls 2 independent progressive stages.

Stage 1: Smaller injector is set up to turn on at cruise. It will ramp up until your MAX EGT setting.

Stage 2: Larger injector turns on at the TEMP you set for your threshold and will be progressive from that point until your MAX temp. After your MAX temp you are at full flow.

PLEASE NOTE: YOUR CMGS is pre-configured to inject based on EGT only and display EGT. 2nd stage turns on at 1200 F. You can integrate boost into this or change the turn on point if you wish. See instructions below if you wish to make changes. Its ready to go out of the box, install and play! We recommend that you install it as is and drive it before you make changes. From there you can dial in boost or change temp ranges.



STEP 1: GO INTO CONFIGURATION MODE.

REMEMBER: only do this if you want to make changes to the base configuration as this is already setup. We recommend you install as is and then fine tune if you need.

Look at the picture to the left to get used to the CMGS. We must go into configuration mode to set the unit up. Its only necessary to do this once unless you decide to make changes later. With the CMGS powered on set the MIN knob and the MAX knob all the way to the left. When you do this CMGS will count down from 5 to 0. Once you get to 0 you will be in configuration mode. Now you must understand the lay out of CMGS and how things work. The flow bars across the top tell you what the current parameter is, the MIN knob will allow you to change the value of the current parameter and the MAX knob will allow you to advance to the next Parameter. To know what parameter you are on count the bars across the top.

PLEASE NOTE: There are more than 10 parameters you can change, once you go past the 10th parameter it will wrap around. You will notice when you are on the first 10 bars the FAULT light blinks slow. Once you go past the first 10 bars the FAULT light flashes fast. That is how you get to the 11th parameter and beyond. This will be discussed later.



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Did you make an error? Not sure what you messed up? To restore your CMGS back to stock to allow you to restart, just turn the MIN and MAX all the way to the right, power off and then power on. Wait 10 seconds and you are back to default and can re-setup the unit.



EXAMPLE:

In the picture to the left you would be able to set the 3rd parameter. We know this because the 3rd LED is lit up and the fault light is flashing slow. If the Fault light was flashing fast this would be your 13th PARAM. If we were going to change the 4th parameter we would take the MAX knob and turn to the right until the 4th bar is lit up and then we would turn the MIN knob until the value we wanted shows up on the screen. **IMPORTANT:** Once you set a value move to the next param with your max knob and immediately turn the min all the way to the left **BEFORE** the value shows up on the screen. You have about 1 second from the time you turn to the next param before it shows up.

STEP 2: SET YOUR DISPLAY MODE:

Assuming you are in Configuration mode as shown on page 1, the first LED should be lit up and the fault light should be blinking slow.

The value to set the CMGS to is next to the designation below. To set the value, just turn the MIN knob until the 3 digit center display shows the same as below. By default it will show "000" boost. Most likely you will set it to "002" for EGT. Once done, turn the MAX dial until the 2nd bar is lit up.

BOOST 000

PUMP OUTPUT 001

EGT 002

FLOW 003 (NOTE: Flow will display across the top bars in run mode, so you may not want to set it to flow)

STEP 3: SET YOUR INJECTION MODE:

You are going to want to choose between EGT only or EGT and Boost. Designate and Values are below. If you set it to EGT and boost the CMGS will not turn on until you meet a MINIMUM boost and a MINIMUM EGT value. So this is a very important consideration. Turn the MIN knob until it displays the value you want below, 001 or 002.

EGT ONLY: "001"

EGT AND BOOST "002"

STEP 4: SET YOUR EGT MULTIPLIER AND FLOW BAR VALUES

This step makes your gauge display the actual EGT rather than just a voltage value. This step is required as well. Turn the max knob quickly until you have 5 bars lit up. Once the screen comes back turn the MIN knob until the center display says "40". Now move the MAX knob until 7 bars are lit up.

What does this do? The voltage going into the CMGS is 0-5 volts. 5 volts is 2000F, and its linear in between that and 0. This will multiply the voltage by 40 to get the EGT value to show up on the screen instead of voltage.

By default the flow bars on the CMGS will be setup so each bar is 50 CC/M. You will need to change this. Designations and values are below:

50 CC/M per bar 000

100 CC/M per bar 001

200 CC/M per bar 002

Since there are 10 bars across the top if you leave it at 50, it will show only 500 CC/M of flow. Most customers will change this value to 100. That way you will see 100 CC/M of flow. In reality the kit can flow as much as 1300 CC/M, but if you change it to 200, you will not see the first stage for a bit since it only flows a max of around 300 CC/M. So for most of us 100 CC/M per bar is a good choice. Use the MIN knob to set this value. Once you have done this see step 5.

STEP 5: THIS DEPENDS ON WHAT YOU DID IN STEP 3 (INJECTION MODE)

If you set your cmgs to inject based on EGT only, you will skip this as you will set the MIN EGT and MAX EGT at run time. If are injecting based on boost and EGT you will need to set these in the configuration.

Move your MAX dial until bar #9 is lit up (fault light will be flashing slow).. If you cannot choose bar #9 that means you have the CMGS setup to inject based on EGT only. This configuration is only available when you set the CMGS injection mode to boost AND EGT. Set this value to the MINIMUM EGT you want the CMGS to turn on. This will turn the first stage on. If you cruise at 500F, you can set this to 50. Make sure that you have this set high enough that it it does not turn on at IDLE. If you set it to 72 for example, that would be 720F.

Move your MAX dial until bar #10 is let up. This is the MAX EGT value. Typically this is set where you need to cool your EGT as its beginning to get very hot. Typically this is set from 1200 to 1400 F. If you want it set at 1250 F for example, turn the MINIMUM knob until it says 125.

OPTIONAL FINE TUNING: You have the ability to set the percentage of weight you want to give to the boost vs EGT for this 2D map. What does this mean to you? You can set the EGT weight from 1 to 100%. By default its set to 50%. This means that any change in boost or EGT has the same weight and will affect the flow equally. The higher of a percentage you set the more of an effect EGT will have vs boost. For example, set the number to 75% and EGT will have 3 times the effect on the flow rate than boost. Going the opposite direction will give boost more weight. The CMGS will look at this when it calculates the flow rate. Most will leave it at 50%, if that Is what you want, you can skip the detail below.

Move your MAX dial one more position until bar #11 is setup. The fault light will blink FAST and you will see 1 bar lit up. This is the percentage of the 2 D boost/EGT map you want you assign to the EGT vs boost. Setting this number higher gives more weight to the EGT, setting it lower will give more weight to boost. Turn the MIN dial until you reach your desired percentage.

STEP 6: TURN ON YOUR SECOND STAGE:

In order to turn on your second stage you need to move the MAXIMUM knob 2 more positions until the 13th LED is lit (3 LEDs lit and the fault light flashing fast).

Designate and value are below. Default value is “000”. You need to change this.

“001” Enable 2nd stage using pump duty cycle

“002” Enable 2nd stage based on Boost

“003” Enable 2nd stage based on EGT

Most of us will choose “003”. We want the 2nd stage to turn on based on EGT. If you wish to customize this to your liking you can choose one of the others but that is beyond the scope of this document. Turn the MINIMUM knob until the screen says “003”. Once this is done turn the MAX dial until the 14th bar is lit up (4 bars lit up and fault light flashing fast).

STEP 7: SET THE TURN ON POINT FOR THE 2ND STAGE:

Turn the minimum dial until your screen shows the EGT temp that you want your second stage to turn on. Its important to note as usual you need to multiply by 10. For example if you set this to 120, it will turn on at 1200F. Both stages are progressive, however if you set your MAX EGT to the same temperature as the 2nd stage turn on point, the 2nd stage will not be progressive. If you set the MAX EGT higher than 2nd stage turn on point the 2nd stage will be progressive. Please note: if you chose to inject based ONLY on EGT, you can set the MIN and MAX EGT At run time. We will show you this later in the install document.

STEP 8: SET YOUR 2ND STAGE FLAGS:

These values are important to set. Its not important for you to understand what they are, but they must be changed from default to set this up correct.

Turn the MAX dial one more position until the 15 Bar is litup (5 bars and fault light flashing fast). Turn the MIN dial until the value reaches the MAX either 200 or 250.

Turn the MAX dial one more position until the 16 Bar is litup (6 bars and fault light flashing fast). Turn the MIN dial until the value reaches the MAX either 200 or 250. Yes, this is correct you set 15 & 16 to the same number.

STEP 9: SET YOUR OUTPUT WIRE TO TURN ON

Move the Max dial 1 more position until 17 bars are lit up (7 bars lit and fault light flashing fast). By default this will be set to “001”. You need to turn the MIN dial until it says “000” in the 3 digit center display. Its very important to do this part correct.

STEP 10 SAVE YOUR SETTINGS

This is the most important part. If you don't save your work you will lose everything! This saves to flash memory. Turn the MAX dial to the right until it will not turn any more. Then turn the MIN dial to the right until it will not turn any more.

Now you are setup. If you set your system to inject based on boost and EGT, when you turn the MIN dial you will set your MIN boost and MAX dial will set your MAX boost. If you set to inject based on EGT only, turning the MIN/MAX dials will Set the Turn on and MAX temp. you can set these values at run time.

MAKING CHANGES TO YOUR SETTINGS:

Once you set your system up as above it burns the configuration to memory. The CMGS will remember every time you turn it on. If you decide to make changes to any configuration its simple, set the MIN and MAX to 1 and it will go into configuration mode once it counts down to 0. From there use the MAX knob to move to the configuration you want to change and then use your MIN knob to set the value. After you make that change turn the MAX knob all the way to the right and then do the same with the MIN knob. Do this for each change you want to make.

TIPS AND TRICKS:

PUMP

Your kit ships with a high pressure 200-250 PSI pump. It is set at 200 PSI from the factory and we don't suggest to adjust unless you need more flow. If so, you can adjust the hex key on the front ¼ turn for more pressure. Follow the diagram exactly. Do NOT ground the pump to the chasis. Pump is connected to the controller.

INJECTORS

Your kit ships with 4 injectors. Injectors are marked with a size designation.

The largest injector (760 CC) is used for diesels with 400+ WHP on the 2nd stage.
The 380 CC/M injector is used for diesels with more than 400 WHP on the 2nd stage.

The 180 CC injector is used on the first stage for diesels with less than 400 HP
The 250 CC injector is used on the first stage for diesels with More than 400 HP

If you get quenching or too much fluid (usually feels like a slight loss of power) you can move to one of the smaller injectors or set the Maximum Duty cycle lower through the configuration setup.

You must drill and tap a standard 1/8th NPT to install the injectors.

WIRING:

We supply color coded wiring to assist you with your install. Notice the difference between the 16 and 22 gauge wires. The 16 gauge is larger than the 22 gauge, note with diagram when installing.

FLOW SENSOR.

Your flow sensor is critical to install correct. Look at the diagram. The filter connects into the checkvalve and the check valve connects to your flow sensor. All 3 have arrows on them and all arrows point toward the injector. Installing any of these backwards can damage the system and will keep it from working.

BOOST LINE:

5 feet of hard plastic line and a tee are provided to get your boost. If you are injecting based on EGT only, you don't need to connect the boost source unless you want to view the Boost. You can set the system up to display boost but inject on EGT only if that's your wish.

LOW LEVEL FLUID SWITCH

The low level fluid switch is provided in the kit, however you do not connect to the CMGS for this kit. Install this in the bottom of your tank and use this as a ground to an external LED. We do not provide an LED but you can

CMGS CONTROLLER BASICS:

Setting the MIN/MAX value

If you set your CMGS to inject based on EGT only you can set the Turn on EGT and MAX EGT at run time by just turning the MIN or MAX knob. If you are injecting based on boost and EGT you will need to go into config mode to set the MIN/MAX EGT, however you can adjust boost MIN/MAX at run time.

WARNING: LOOK AT YOUR EGT GAUGE AND SEE WHERE YOUR EGTS ARE DURING IDLE. YOU DO NOT WANT YOUR CMGS TO INJECT AT IDLE. MAKE SURE THE FIRST STAGE TURNS ON DURING CRUISE AND NOT AT IDLE.

Turn Off the CMGS:

If for any reason you don't want the CMGS to inject you can set the MIN dial higher than the MAX dial. You will still get a "001" flash if your EGT is above your 2nd stage turn on point, but you will notice your flow bars will not light up.

TROUBLESHOOTING:

Situation: I have reached my MIN EGT setting and my system does not have any flow bars, what do I do?
Answer: If your injecting based on EGT and Boost you must reach your MIN boost and egt before it turns on.

To troubleshoot further see flow sensor troubleshooting below.

Situation: I have installed my kit but I don't get any bars on the flow sensor lighting up on my first stage or my 2nd stage. What do I do?
Answer: You must determine if the problem is hardware related, install related or something else.

- 1) remove the checkvalve from the flow sensor as well as the fitting on the other side. Your flow sensor should be connected electrically to the CMGS but not have any fittings connected to it. Make sure the key to the truck is on and that power is getting to the CMGS. Blow into the CMGS inlet port and look at the gauge. Your flow bars should light up.

If flow bars light up your problem is related to your install or your cable is bad. If flow bars do not light up, when you blow into the flow sensor does the flow sensor make a whistling noise? If not the flow sensor is jammed. You will need to contact coolingmist.

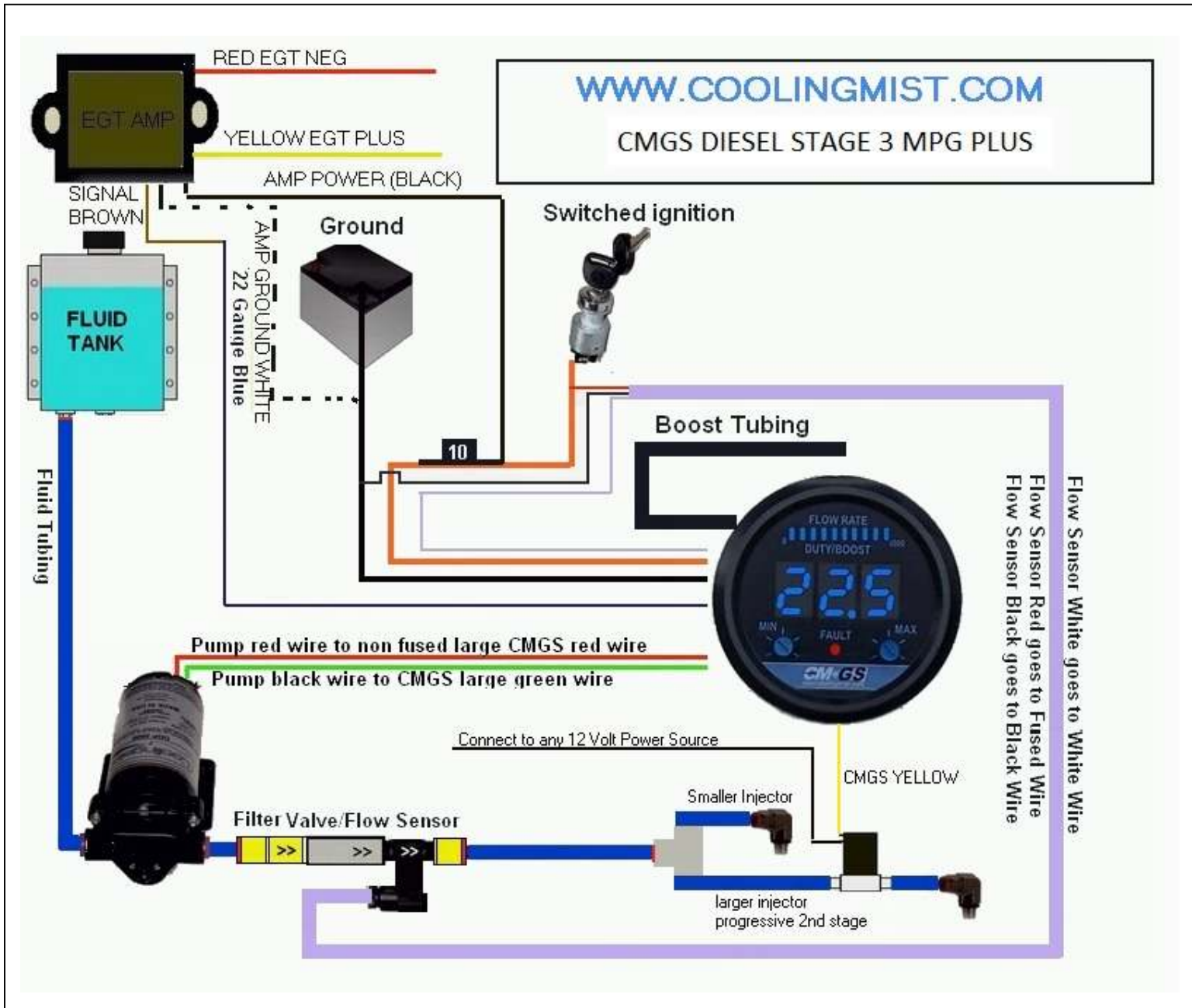
Testing your flow sensor cable:

With the key to the truck on, use a volt meter to get the voltage from the white wire coming off the flow sensor. The voltage should be around 6.X volts. If your white wire is not showing voltage the cable is likely bad. Contact Coolingmist for support.

Situation: I have been using my kit for a while but my flow sensor no longer reports flow on the first stage but does on the 2nd stage!
Answer: your first stage injector is clogged.

The CMGS Stage 3 diesel MPG plus kit has 2 filters, one before the flow sensor and the other inside the injector. Its unlikely that the injector has clogged from the inside, however its possible over a period of time for build up to clog the outside of the smaller injector. Unscrew the injector and clean. You can clean with a mineral spirit and even use a small needle to clean the orifice.

DIAGRAM: CMGS DIESEL STAGE 3 MPG PLUS



NOTE: Not all wires will be used. The small green, small black and small orange wire are not used.

CONTACT INFO AND TECH SUPPORT

If you need help setting your CMGS up for your application you can contact us via phone or email. We are available for tech support M-F from 10 AM to 6 PM EDT. Our phone is 888—667 3479. You can email us at info@coolingmist.com.

If you need us to configure this for you, look at this document for the steps 1-10 and let us know what you want us to set each of them at and we will set them for you at no charge!

DISCLAIMER:

When installing or using this kit on your vehicle you must make all precautions to understand what you are doing. Coolingmist warranties this kit to be free of defects for a period of 1 year from date of purchase. Coolingmists liability is limited to replacing the defective part within the kit. Coolingmist will not be responsible for any damage to the vehicle as a result of improper installation or a defective part within any of our kits or products. It is the customers responsibility to make sure each part is functioning properly.