Baumannator TCS Tuning Tips

General Tips

It is wise while learning to tune the TCS that you begin by making small changes and be clear about what the change you are making will do before you make it. It is unwise to change something to see what happens.

When tuning, save programs as different files as you go so you can always go back to an earlier calibration if you make a mistake.

Installation Instructions

To install the software (version 2a from 12-01 on), insert the disk into your 3.5" drive and double-click the my computer icon. Next double-click the 3.5" floppy drive. You should see one file on the disk named TCS2a.exe. Double-click the TCS2a.exe file, and an extraction window titled Baumannator TCS Software Installer should appear. Click finish in the extraction window. If you see a prompt asking "Create C:\TCS Directory?" click yes. The extraction process will begin. After the extraction process is complete you will see a prompt that says "Extraction completed"; Click OK. Now a window should open with an icon labeled TCS Tuning Software. Double-clicking this icon will start the TCS tuning software. A program group should also be created in the start menu called Baumannator TCS / TCS Tuning Software.

If you have an earlier software version (1k or 2a before 12-01) then it will not automatically create a program group or open a window with the icon to start the tuning software. The file on the disk will either be TCS1, TCS2 or TCS2a. Double clicking the file will open an extraction window, and you will need to click extract. Next reply OK to create the TCS directory. After the extraction process is complete you will need to double-click the my computer icon, double click the C: drive, and double-click the TCS Folder. Once in the TCS folder look for the green icon labeled trans1k or trans2a. Double-clicking this icon will start the TCS tuning Software.

Choosing your Initial File

The first screen that opens asks you to choose an existing calibration, or a new default calibration. The existing calibration option will bring up a list of 2 to 10 calibrations depending on software version. You can pick the calibration that most closely matches your vehicle and start tuning from there. The new default calibration is intended for experienced tuners who wish to completely build their own calibration. Beginning tuners should start with an existing calibration. If none of the existing calibration come close to your needs you can contact Baumann Electronic Controls, and we may have a closer match that we could e-mail to you.

After selecting one of the existing calibrations by double-clicking or highlighting(single-clicking) it and clicking open, you will be taken to the main tuning screen, and you will

be looking at the 1-2 upshift, and 2-1 downshift. By clicking the file menu (top left), and then clicking file comments you can read a description of the calibration you have selected. If after reading the comments you don't believe it will work for your application click cancel to close the file comments dialog box. Next click the file menu, then click open. This will re-open the file open window and allow you to select another one of the existing calibrations. Repeat this procedure of opening files and checking their comments until you find one close to your application.

Changing Basic Settings

Once you have selected an existing calibration, it is time to start customizing it to your application. **A wise first step is to change the name of the file before making any changes to it. This insures that you will always have that initial calibration to go back to if some of your changes don't work.** In order to do this click the file menu (top left) and select save as. When the save as dialog box opens type a file name (must be 8 characters or less) that will be meaningful to you and easy to remember later. Press enter or click OK.

Next click the options menu and select vehicle setup. Enter your gear ratio, tire height, and select your transmission type. Transmission gear ratios do not need to be entered, they are automatically matched to transmission type and displayed. The bottom left corner of the vehicle setup menu only applies to vehicles with Digital Transmission Range (DTR) sensors. The DTR sensor is used in all 1998 and later vehicles, and in some 1997 vehicles. If your vehicle does not use the DTR sensor be sure that neither of these boxes has an X in them. If they do simply click them with your mouse to remove the X. Once the settings are correct click OK to record the changes and close the window.

Now click the options menu again, but this time choose system setup. Don't worry about the Torque converter lockup clutch controls at this time. The base TPS setting in this window is at the bottom of the screen next to the exit button. **In order to operate properly this value must be set to .12 volts less than idle TPS voltage.** There are two ways to properly set the base TPS value. You can measure the TPS voltage at Idle with a multimeter and then subtract the .12 volts and enter this value in the base TPS window, or if you have a laptop connected to an installed TCS you can just click the set at idle button below the base TPS value. Doing this will automatically set the base TPS to the correct value if you follow the on screen prompts. Click exit to close the system setup menu.

Options on the Main Screen

It is now important to understand the shift point graphs. The numbers running up and down the left side of the graph are MPH. The numbers running left to right along the bottom of the graph are cell numbers that relate to TPS voltage. Specific voltages cannot be assigned to these cells since idle voltage and max TPS voltage varies from one application to another. The extreme left (cell 0) is idle as long as the base TPS (previous step) is set correctly. If your TPS will reach 4.6 volts or higher then the extreme right

(cell 18) is wide open throttle. To check the WOT cell value click in the check box under the shift point versus load in MPH graph labeled "track TPS with Graph". A red bar should come up at the bottom of the graph to indicate the current load reading. The cell the red bar is under is the one that the computer is currently making shift decisions based upon. With the key on and the engine off floor the accelerator and see how far the red bar goes across the bottom of the graph. Whatever cell the red bar reaches when the accelerator is floored is the WOT cell.

Now I'm going to describe some of the options available on the main screen. In the box at the top right corner of the screen labeled “Select Editing Mode” you see Upshift, Downshift, and Both. When you begin tuning the shift points these options will allow you to move only the upshift line, only the downshift line, or both lines at once. The most common tuning option is both, and this is what the program will default to at startup.

The next box you see is labeled “Select Item to Edit”. The options here allow you to select which shift point you are viewing/editing. The final item in the box is the line pressure curve. Selecting this option allows you to view the graph that controls the current on the EPC (Electronic Pressure Control) solenoid.

The bottom box is labeled “Edit Table Values”. This box displays the reading associated with the position on the graph that the box on the bottom scroll bar is currently under. You can also change the data in the table by deleting the numbers in these boxes and typing in new numbers. This is useful when a large change is necessary.

Under the edit table values box you will see a check box labeled “Write as secondary table”. When an X appears in this box clicking the write tables button will write the currently open file to the secondary table storage location in the Baumannator TCS. Under the graph you will also see the “Track TPS with Graph”check box that was mentioned earlier, and the “Enable System Monitor” check box. The “Enable System Monitor” check box turns on the system monitor which displays information at the bottom of the TCS tuning software window. The information displayed is MPH, Current Gear, Converter Clutch Status, TPS Voltage, Transmission Range, and Transmission Fluid Temperature. The system monitor can be useful for tuning and diagnosing wiring problems.

Working with Shift Points

Now we will begin discussing changing shift points. To change the shift points you move the upshift and/or downshift line up or down on the graph by pressing the up or down arrows on your keyboard. Holding the shift key while pushing the up and down arrows will cause the graph to move five values at a time. Raising the upshift will make the transmission shift later, and lowering the upshift will make the transmission shift sooner. If you raise the downshift it will make the transmission downshift sooner, and if you lower the downshift it will make the downshift occur later. This change must be made at each load point at which you want the different shift point to occur. The load point is changed by using the right and left arrow keys to change the position of the scroll box

along the bottom of the graph. Once again, if all settings are correct 0 is idle, and 18 is full throttle. Broken down more generally, cells 0-5 along the bottom of the graph are light throttle, cells 6-12 are moderate throttle, and cells 13-18 are heavy throttle. This is why that the farther to the right of the graph you go the higher the shift point gets. Moving to the right means more load, and a higher, more acceleration oriented shift point.

I**t is important to note that no two shift points, should ever touch or cross. This includes an upshift and downshift on the same graph, as well as upshifts or downshifts from two different graphs. If the shift points are set to the same value then the transmission will be told to shift to 2nd and 3rd at the same time. If the upshifts for two different gears cross then the transmission will shift out or order, i.e. 1St, 3rd, 2nd, 4th. If the upshift and downshift for one gear change cross, the transmission will be being told to downshift to a gear that it is already in. Lastly, If any upshift or downshift touches zero it will cause shifting problems for that gear.**

Another important note is that there is a delay between when the shift is command by the TCS, and when the valve body reacts. The more rapidly the engine is gaining RPM the greater this delay will be. At wide open throttle this delay is usually about 500 RPM. You will need to program your WOT shift point about 500 RPM below the target value.

Working with Line Pressure

Next we will explain adjusting line pressure. Even our least aggressive line pressure curve is safe for most applications. Decreasing line pressure should be done with extreme caution. **Improperly programmed line pressure is the quickest way to damage your transmission.** Line pressure tuning is best done with a line pressure gauge attached to the transmission so you can see the tuning changes impact on pressure. Because of variances in valve bodies and EPC solenoids it is impossible to say that a certain table value is equal to a certain pressure. The line pressure graph is EPC (Electronic Pressure Control) current vs. load. The graph represents the amount of current flowing through the EPC solenoid. At zero current the EPC solenoid puts out maximum pressure. At a table value of approximately 110 the EPC solenoid puts out minimum pressure. **In order to increase line pressure at any given load point, you must lower the EPC curve. Conversely to decrease line pressure you must raise the curve.** This is why the table value at WOT is zero, which gives maximum line pressure.

Converter Clutch Controls

To access the converter clutch controls click options at the top left of the screen and then click system setup. In order for the converter to lock most of the conditions in the box labeled “Torque Converter Lockup Clutch Controls” must be met. The first parameter is minimum speed to turn on. Above this speed the converter clutch will turn on if all the other turn on conditions are met. The next parameter to the right is minimum speed to stay on. If the converter clutch has turned on then once the vehicle speed falls below this setting the converter clutch will turn off. **The minimum turn on and minimum stay on**

speed should never be set to the same value. If they are set to the same value then the converter may attempt to turn on and off and the same time resulting in a shuddering rapid on off pulsing of the converter.

The next parameter to the right is minimum speed to stay on at closed throttle. Normally the converter clutch will turn off at closed throttle, but at higher speeds it is usually smoother to leave the converter locked at closed throttle and this parameter allows that point to be adjusted. This feature helps eliminate torque converter "busyness" at highway speeds. Adjusting this parameter too low could cause lugging of the engine at lower speeds.

The last box on the top row is "Minimum Gear for Clutch Engagement" and is simply the lowest gear that the converter clutch will be allowed in. It can be set from 1st to 4th, however in most transmissions the converter clutch is hydraulically locked out in 1st gear. This is normally set to 3rd or 4th gear because 2nd gear normally goes by too quickly to get clutch engagement.

The next two boxes labeled "TPS Voltage for Clutch to Turn on" has a minimum TPS voltage and a maximum TPS voltage. If the current TPS reading falls between these two values then this parameter is met, and if the vehicle speed is above the minimum speed to turn on, and you are at or above the minimum gear setting, then the converter will turn on. The conditions for the converter clutch to turn on must be met for approximately two seconds before the clutch will engage.

The last converter clutch setting labeled "TPS Voltage for Clutch to Stay on" also has a minimum and maximum TPS voltage value. Once the TPS voltage goes below the minimum stay on or above the maximum stay on the converter clutch will disengage. **It is important to note that the minimum stay on and turn on, and the maximum stay on and turn on should NEVER be set to the same value. Also, the minimum stay on voltage should always be lower than the minimum turn on voltage, and the maximum stay on voltage should always be higher than the maximum turn on voltage.**

E4OD Speed Sensor Settings

There are two types of speed sensor inputs used on factory E4OD applications. Early model vehicles (1989-1991) used a vehicle speed sensor on the transmission. If this is the case for your vehicle choose "**Vehicle Speed Sensor (at Speedo. Cable):**" in the options, vehicle setup window and enter the correct speedometer drive and driven gear teeth.

On later model vehicles most 1992 and up) an electronic speedometer was used. If this is the case for your vehicle choose "**Electronic Speedometer (PSOM) Output**" in the options, vehicle setup window.