

NEMESIS - TCS

Win-TC 2C Software manual v1.11 onwards Nemesis-TCS / 2C Traction Control System

IMPORTANT – To be read by ALL installers and owners

Diagnostic light (Ducati models)

The Nemesis TCS directly controls the ignition coils on your bike. If you have a standard, re-flashed or DP ECU on your bike the internal diagnostics will think there is a problem with the coils and activate the diagnostic light on your dashboard. There is no way to avoid this.

Terms of use

The presence of the Nemesis-TCS does not take away the responsibility of the rider to operate the bike correctly within their own abilities, the track conditions and the laws of physics.

The system is designed to achieve greater on-track performance by the use of power modulation during wheel slip events, but in no way should it be considered possible for the system to recover from every conceivable loss of grip. The onus for safety always rests with the rider to stay within his or her own abilities, and to ensure that the 'on-bike' equipment is programmed, setup correctly, and an appropriate TC level selected for the skill of the rider, the bike and the track conditions.

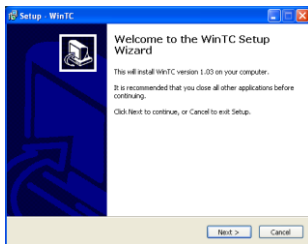
This equipment is intended for racing or track day performance use only and where exhaust emission controls are not applicable.

By installing and using the Nemesis-TCS you automatically indemnify Competition Systems Ltd, our suppliers and our authorised dealers from all first party or third party loss or damages. Normal components warranty is not affected.

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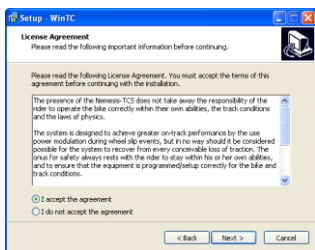
Author – Mick Boasman

2.01 Win-TC installation

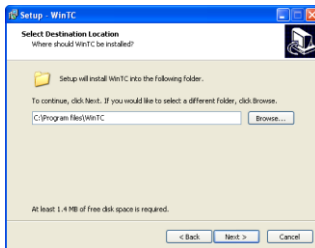


The Win-TC application software is provided in CD format and will Autorun when inserted into your PC. This software may be used on XP / XP-Pro / Vista / Windows 2007

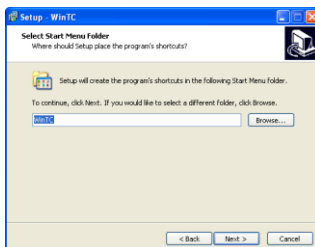
Press **Next** to continue



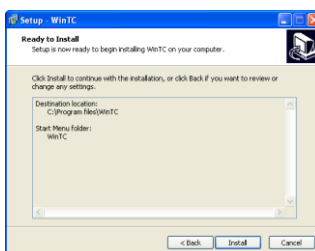
Press '**I accept the agreement**' only if you agree to abide by the terms of use and limitations of liability. Then press Next



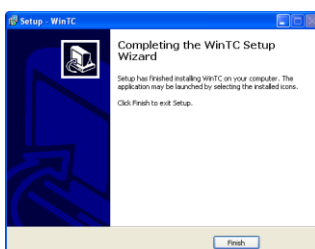
Choose to install in the default folder or any other folder of your choice. Then press **Next**



Use the default group name, or choose your own. Then press **Next**



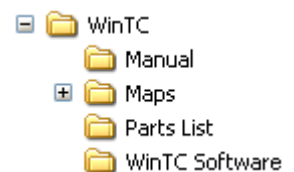
Press **install** to begin the installation



Installation completed.

Press Finish to complete the installation. You will now find a new program group called WinTC and also a new desktop icon.

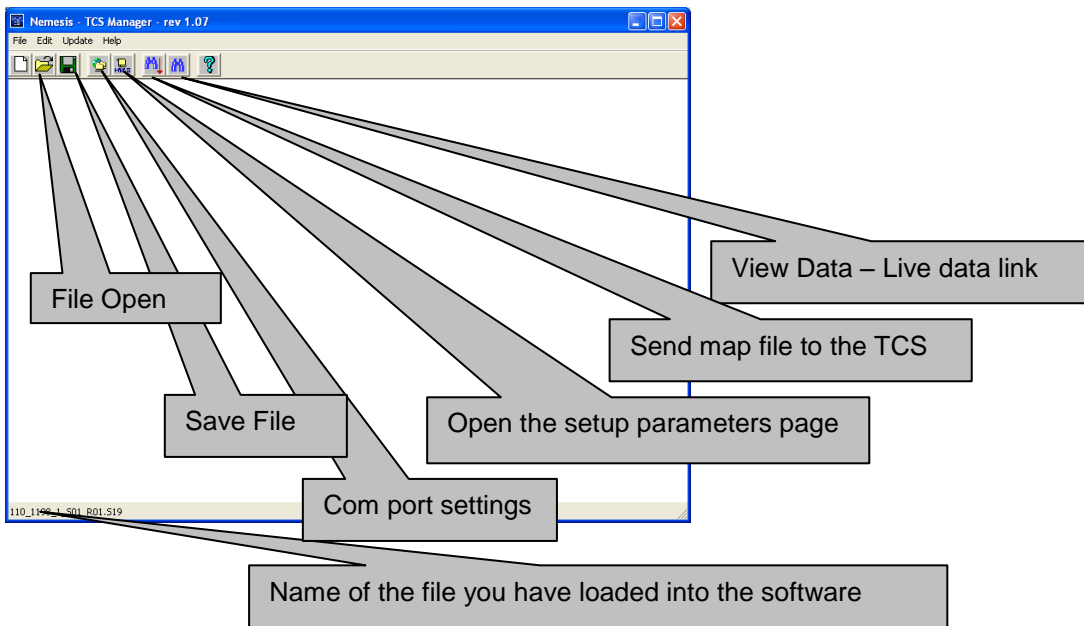
Within the new folder structure you can also find manuals, parts lists and of course the Slip map library



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3.01 - Win-TC (TCS Manger) overview

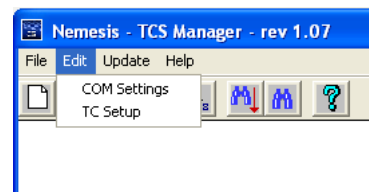


3.02 USB Interface – Driver installation / Com port

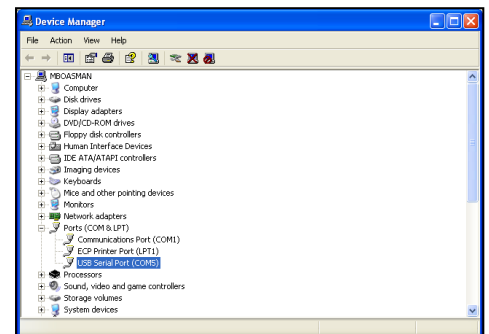
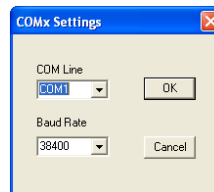
The **WinTC-USB** interface cable is a dedicated device for PC communication between the **Win-TC** software and the TCS hardware on the bike. Note that communication is only possible with the bike ignition switched on.

Plug in the **WinTC-USB** to any available USB port on your PC, it will say '**new hardware found**' and start installing the software drivers for this device. If your PC does not find a correct driver for this part it can be found on the **Win-TC** CD under the 'Drivers' folder.

When the device is installed correctly you should open the **System / Device manager** in the **Control panel** and see which COM Port number has been applied to this new device. In the example shown to the right the USB Serial Port has been given the number 1 so the Win-TC software should be set as follows:



Select **Edit** from the upper menu followed by **COM settings**.



Set the **COM line** to the correct number.
 Do not change the **Baud Rate**

Note – The Win-TC software only permits the use of Com port 1>22. If your WinTC-USB adaptor is given a Com port number higher than this you should use the advanced settings of your Com Port hardware manager to apply a different number.

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3.03 Win-TC / Pit speed limiter

The pit speed limiter can be activated by shorting together the 2 wires of the connector called PIT on the chassis-wiring loom supplied in your kit. Any type of 'normally open' switch can be used, or the dedicated switch CSP1041 shown below.

From the upper menu select **Edit**, followed by **TC Setup** to locate the Pit limiter settings.

The Pit lane speed limiter uses the following parameters:


- Enable PIT Limiting. Tick the box to activate the pit limit system.
- Speed limit (km/h) – At this speed the TCS will start to cut cylinders which will be felt as a misfire.
- dSpeed range (km/h) – This value is added to the Speed Limit to create an upper boundary. If the bike reaches Speed limit + dSpeed range (eg: 60+6 = 66km/h) the majority of coil signals are cut. Between these 2 levels the cut becomes progressively more severe.

The Pit limiter option is active whenever the bike front speed is between 30 and 100km/h.

The user must push and hold the Pit limiter switch for the system to remain active.

When the Pit limiter is active all blue LEDs are active on the TC-Pod for the duration that the button is held down.

If the button is held down for longer than 20 seconds it is presumed that the input or switch is damaged and a diagnostic message will appear on the Pod display. To save your changes, proceed as follows.

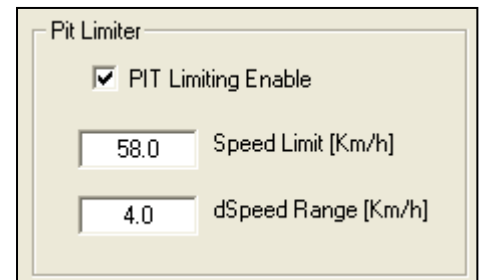
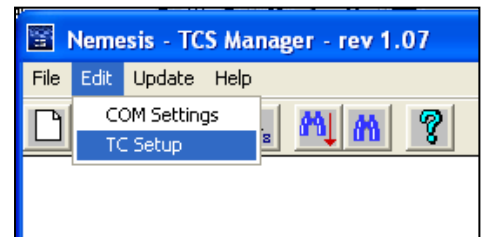
- Press **OK** to save your changes.
- Select File then **Save** from the upper menu, apply a new file name using the sequence suggested in section 3.08.
- Press this button  to update the TCS module with your new map file.
- This process will take approx 6 seconds.
- During the transmission process and for 4 seconds afterwards the TC-Pod will flash an Error 5 and the bike cannot be started. This is perfectly normal.

The switch status (OFF or ON) can be viewed in real time within the **WinTC View Data** window, see section 5.01.

Pit limiter switch input – Connector C

The pit limiter switch CSP1041 may be mounted to any convenient place accessible by the rider.

This item is an optional extra and not supplied as part of the kit.



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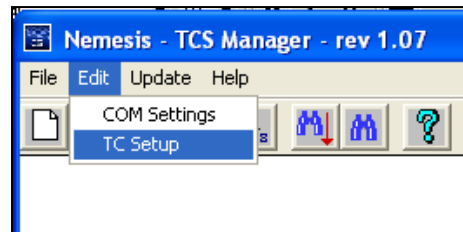
Author – Mick Boasman

3.04 Win-TC / Wheel speed

The Nemesis-TCS uses a Hall sensor fitted to the front and rear wheel speed to obtain wheel speed data via a dedicated trigger disk with 10 teeth. Under no circumstances must this be modified in any way.

From the upper menu select **Edit**, followed by **TC Setup** to locate the wheel speed settings.

Rear Speed - All Ducati in recent years have a very good quality Hall sensor fitted to the rear wheel which we link up to within the chassis loom in your kit. This signal remains linked to the ECU and is not affected by linking also to the TCS. For other bikes we provide a new rear speed sensor and bracket



Front speed – As part of your bike kit you will receive a new sensor, mounting bracket and a set of trigger teeth for using on the front wheel. These components should not be modified in any way, nor should any other pick-up devices or speed triggers be used on this wheel. Any attempt to modify this or use alternative pick-ups may seriously affect the system integrity.

Front speed

- Teeth per revolution – Define the number of pick up teeth for one wheel revolution.
- Circumference – See note below.

Rear speed

- Teeth per revolution – Define the number of pick up teeth for one wheel revolution.
- Circumference – See note below.

Circumference – These values are pre-defined by us in order to provide you with an accurately matched set of speed data when the bike is banked over.

It should also be noted that we do not guarantee the speed to be correct, as we are more concerned with the relative speed of the front and rear wheels.

IMPORTANT – The tyre circumference you see here may not be exactly what you expect based on any static measurements you make. The value here is the rolling circumference when the bike is leaned over and under load.

The actual measured speed does not need to be very accurate; it only needs to be comparable with the rear wheel speed so that the front speed is 0.5% lower at the middle of the corner before the throttle is applied.

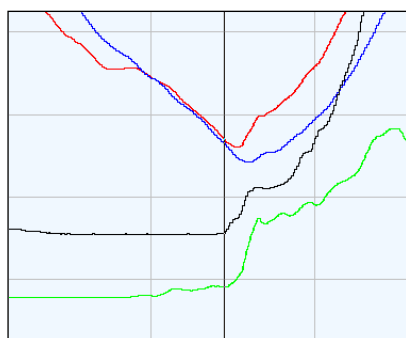
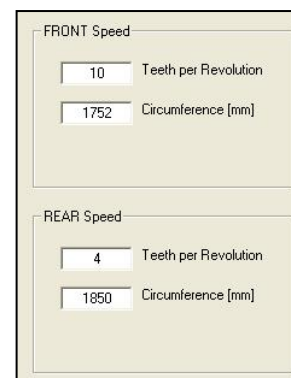
Unless you use a data logger to measure this information using the 'CAN stream' we provide, your best solution for making adjustments yourself is to follow these rules, or use values provided by us and our dealers. Remember to try different map levels first.

Problem TCS activity is insufficient at the middle of the corner when throttle is applied.

Solution..... Reduce the front speed calibration in 0.5% steps until you achieve the results you want. Example : 1850mm reduced by 0.5% = 1841 (1850 x 0.995 = 1841 rounded up)

Problem TCS activity is excessive at the middle of the corner when throttle is applied.

Solution..... Increase the front speed calibration in 0.5% steps until you achieve the results you want.



Red trace – Rear wheel speed
Blue trace – Front wheel speed
Black trace – Throttle position
Green trace - Calculated slip

This race bike data shows the correct calibrated offset between front and rear on the approach to the apex of the corner.

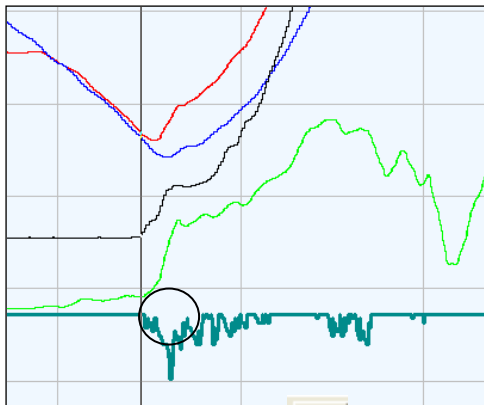
At the point where the throttle is applied the system is already registering 0.5% slip and it reacts accordingly to this and the subsequent rise in slip as the throttle is applied.

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3.04 Wheel speed - Continued

The sudden rise in measured slip is correct and also necessary in order to achieve propulsion out of the corner. It can also be seen as a gradual increase as the bike accelerates and lifts up out of the corner.




This same piece of data is shown along with a bold graph showing the TCS system response (power reduction) as an example of correct operation.

This data is interesting because you can see a significant correction in the circled area, yet the wheel slip is far lower at this point than later on when the bike powers out of the corner.

This is the result of the sensors telling the TCS that the bike is in the middle of the corner and therefore banked over, so a far greater response should be applied. To save your changes, proceed as follows.

- Press **OK** to save your changes.
- Select File then **Save** from the upper menu, apply a new file name using the sequence suggested in section 3.08.

- Press this button  to update the TCS module with your new map file.
- This process will take approx 6 seconds.
- During the transmission process and for 4 seconds afterwards the TC-Pod will flash an Error 5 and the bike cannot be started. This is perfectly normal.

Note that in the majority of cases it is not necessary to adjust this yourself as we have already defined these parameters for a wide variety of tyre makes, models and sizes.

The wheel speed from front and rear can be viewed in real time within the **WinTC View Data** window, see section 5.01.

3.05 Win-TC / Throttle

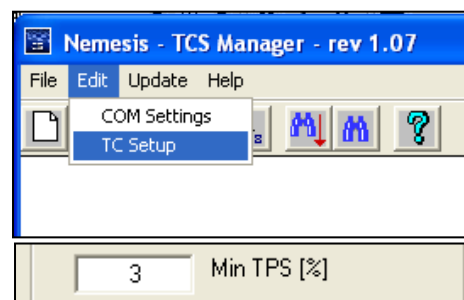
The throttle input is used along with Speed and RPM thresholds to define when the TCS system should, and should not be active.

The RPM and Speed thresholds are fixed within your pre-loaded TCS map and are dependent on the type of bike. No adjustment is necessary.


From the upper menu select **Edit**, followed by **TC Setup** to locate the throttle setting.

For the majority of users we apply a default value for throttle activation as part of the map for your bike and adjustment is not necessary. However, users of Win-TC are able to define this parameter to fix the threshold slightly above the closed throttle value.

Firstly the value of closed throttle should be viewed using the **View Data** window, See section 5.01. The Throttle activation point should then be adjusted to 2% above the closed throttle value.



To save your changes, proceed as follows.

- Press **OK** to save your changes.
- Select File then Save from the upper menu, apply a new file name using the sequence suggest in section 3.08.
- Press this button .
- This process will take approx 6 seconds.
- During the transmission process and for 4 seconds afterwards the TC-Pod will flash an Error 5 and the bike cannot be started. This is perfectly normal.

Analogue throttle information is picked up directly from the sensor and pre-defined within the TCS map. Typically the traction control activation point is preset at approx 3deg of throttle.

We apply default calibrations for the throttle based on average data from your model of bike.

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3.06 Win-TC / Quick shifter

The TCS system is able to use any external quick shifter system that is able to provide a 'short to ground' output signal, or a signal that is normally closed with ground but goes open circuit when pressed.

From the upper menu select **Edit**, followed by **TC Setup** to locate the throttle setting.

Within the Win-TC software you can choose to have

- Cut only
- Retard only
- Cut and retard

Cut / Retard time

If **Cut** mode is selected the ignition is cut for duration chosen by the user.

- 1) 40msec
- 2) 45msec
- 3) 50msec
- 4) 55msec
- 5) 60msec
- 6) 65msec
- 7) 70msec
- 8) 75msec

The cut starts as soon as the signal is seen from the shifter system. Further shifts are inhibited for 300msec after the end of the preceding shift.

Ignition Retard

If **Retard** only mode is chosen the ignition continues to fire the coils but with a retard applied, as chosen by the user. The duration for the retard is defined by the Cut / Retard time above

- 1) No retard
- 2) 5deg retard
- 3) 10deg retard
- 4) 15deg retard
- 5) 20deg retard
- 6) 30deg retard
- 7) 40deg retard
- 8) 50deg retard

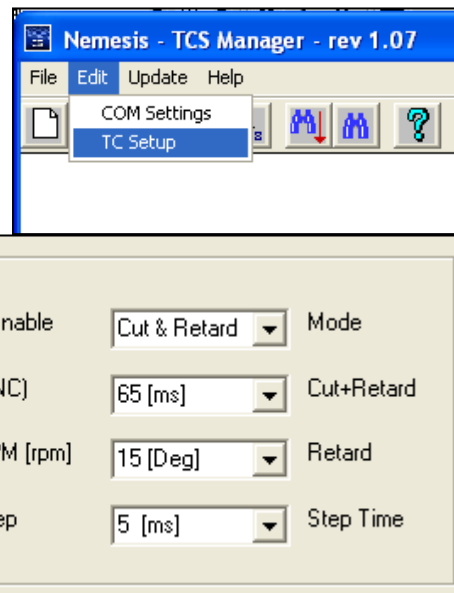
Retard return slope – Step time

The retard return slope defines how fast the ignition returns to normal timing after a 'Retard' event and is defined in this table. This ramp allows a gradual return to full power rather than a rapid return which is beneficial especially in the wet. The **Step time** is how long each return step is held for. And the Step value is how many degrees of ignition advance per step

- 1) No ramp return
- 2) 5msec
- 3) 10msec
- 4) 15msec
- 5) 20msec
- 6) 25msec

Notes

- The default setting is:
 - Ignition Cut – 65msec.
 - Retard – 15deg.
 - 5 degree every 10msec 'return to normal' slope.
- The use of a large retard can cause post combustion in the exhaust leading to banging.
- One 720 degree engine rotation at 11000rpm = 10.9msec.



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3.06 Shift / continued

The shift input can be programmed for use with the following type of switch:

- Switch that is 'normally closed' and opens the circuit when the shift level is pressed such as the Ducati Corse load-sensing lever.
- Switch that is 'normally open' and closes the circuit when the shift level is pressed such as the Nemesis shifters.

The quick shifter status can be viewed in real time within the **WinTC View Data** window, see section 5.01. To save your changes, proceed as follows.

- Press **OK** to save your changes.
- Select File then Save from the upper menu, apply a new file name using the sequence suggest in section 3.08.
- Press this button to update the TCS module with your new map file.
- This process will take approx 6 seconds.
- During the transmission process and for 4 seconds afterwards the TC-Pod will flash an Error 5 and the bike cannot be started. This is perfectly normal.

3.07 Shift / examples.

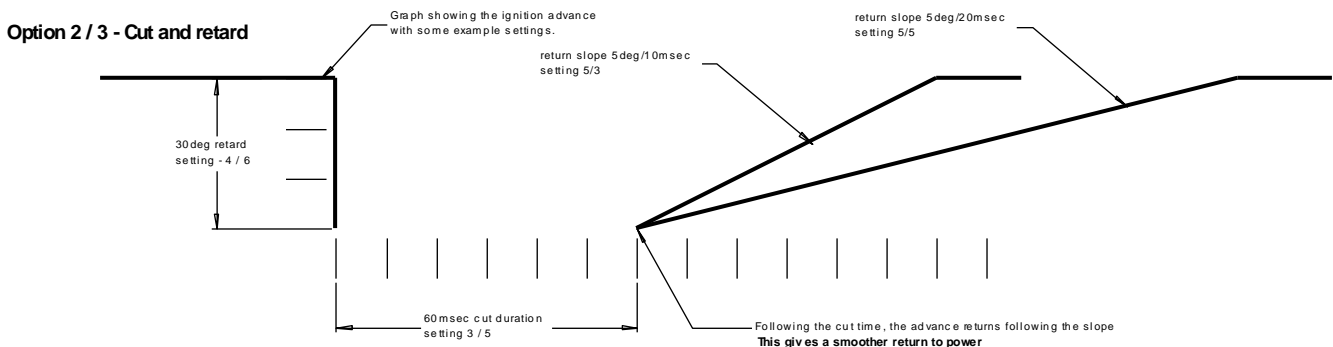
In this example I have chosen a cut and retard.

The ignition is removed for 60msec.

When the ignition is re-activated there is a 'retard' of 30deg to make the power come back in at a lower level, and then a slope to return the power back to normal levels.

This stops the bike breaking traction after a shift by applying all of the power very quickly.

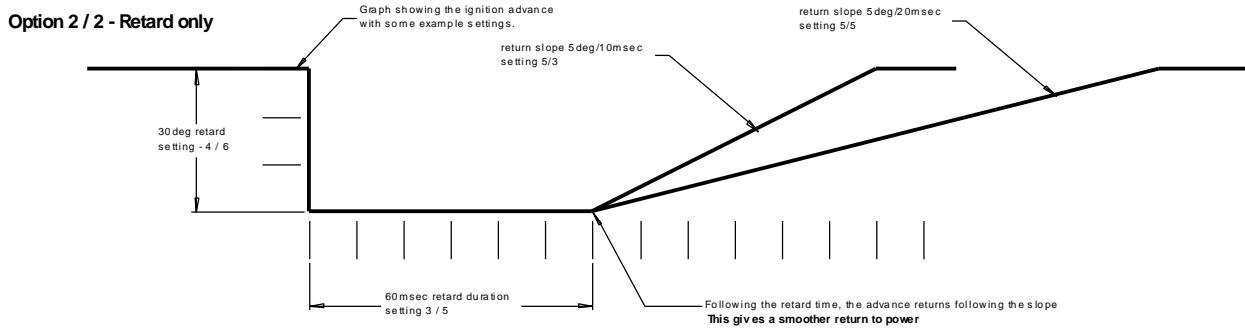
Note that the following diagrams shows a sloped return, in reality these are steps.



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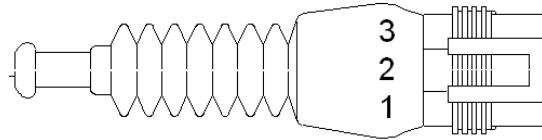
In the following example I have chosen retard only



There is no cut, just a time period with the ignition retarded by 30deg, then the slope back. This option can make a softer gear change.

Shift connector.

1	Battery +	red
2	ground	black
3	signal	white



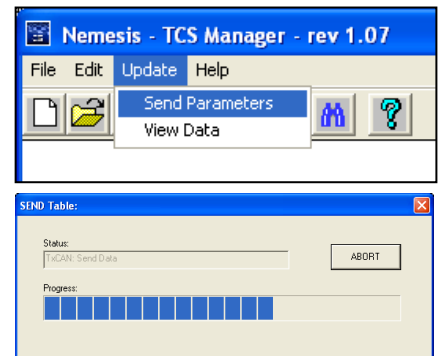
3.08 Win-TC / Files

From the upper menu select **File / Open** and select the .s19 file that you wish to work on. Make any changes that you need as per the previous pages.

Use the **Save** command to save these files. It is advised that you do not change any element of the existing file naming sequence as this helps us to identify later on what has been used as a base setting. You are of course free to add extra name characters preceding the .s19

To transmit a new map file to the TC module.

- Turn on bike power.
- Connect the WinTC-USB adaptor between your PC and Bike.
- Wait until the TC-Pod has completed the start up sequence.
- Press the Send Parameters option, or this button
- A progress bar will appear and indicate when the transmission is completed.
- During the transmission process and for 4 seconds afterwards the TC-Pod will flash an Error 5 and the bike cannot be started. This is perfectly normal.



File names

Firmware	Bike	Bike position	Specification	Release
110	848	1	S01	R01

Example file name : **110_848_1_S01_R01.S19**

Example file name modified by the user **110_848_1_S01_R01_U01.S19**

In this example the user has added U01 (User revision 01) revision to one of our base files.

Firmware..... Embedded software version of the TC Module.
 Bike..... Bike model.
 Bike position Position and orientation of the TC Module on the bike.
 Specification bike (tyre, or other variation) in specification.
 Release..... Slip map update level, incremented if we make changes.

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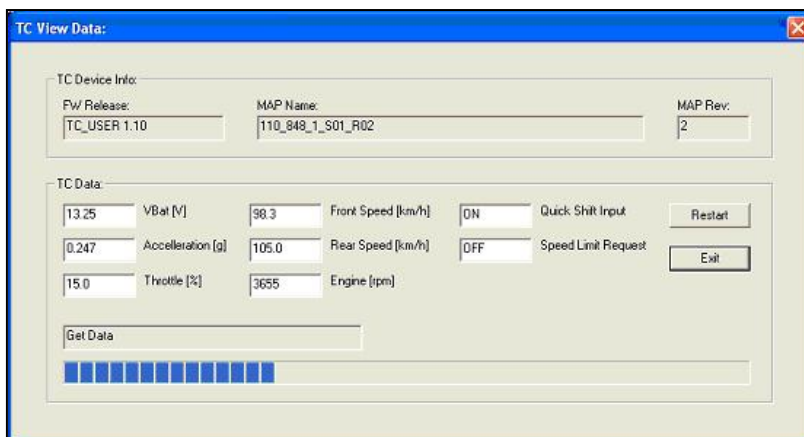
4.01 CAN data stream (data logger)

The Nemesis-TCS has a dedicated CAN bus containing many of the external and internal traction control functions. This data can be integrated with chassis data in order to have a comprehensive set of bike data and can be invaluable during bike setup

For more information on data logging products, contact your dealer.

5.01 TC View Data

From the upper menu select this icon  to open the following window.



This window provides real time data from the primary system inputs and allows you to check that the installation has been done correctly.

FW Release Internal firmware release of the TC module.
MAP Name Name of the map as loaded by you or your dealer.
MAP Rev..... Incremental counter relating to the map release.

TC Data

Vbat Internal monitor of system voltage (may be up to 200mV different from the battery).
Position Internal position sensor with value offset specific to the bike installation.
Throttle Internally calibrated throttle angle, should be between minus 2 and plus 2.5 with the throttle closed. If not, contact your dealer. The max value can be anywhere between 90 and 110 and is mostly not important.
Front speed..... Value in Kmh – minimum measurable value is 11km/h.
Rear speed Value in Kmh – minimum measurable value is 11km/h.
Quick shift Turns from HIGH to LOW or LOW to HIGH depending on the type of shifter.
Speed limit Pit limiter switch status OFF or ON.

The bar graph at the bottom of the screen moves continually when the system is transmitting data to WinTC.

6.01 Spark Advance map

The Nemesis-TCS uses variable amounts ignition retard as the initial response to slip control therefore the ignition map within the ECU can play an important role in the amount of power reduction achieved at each slip response level. Any change to your ECU advance mapping can have a significant affect on the TCS response and control.