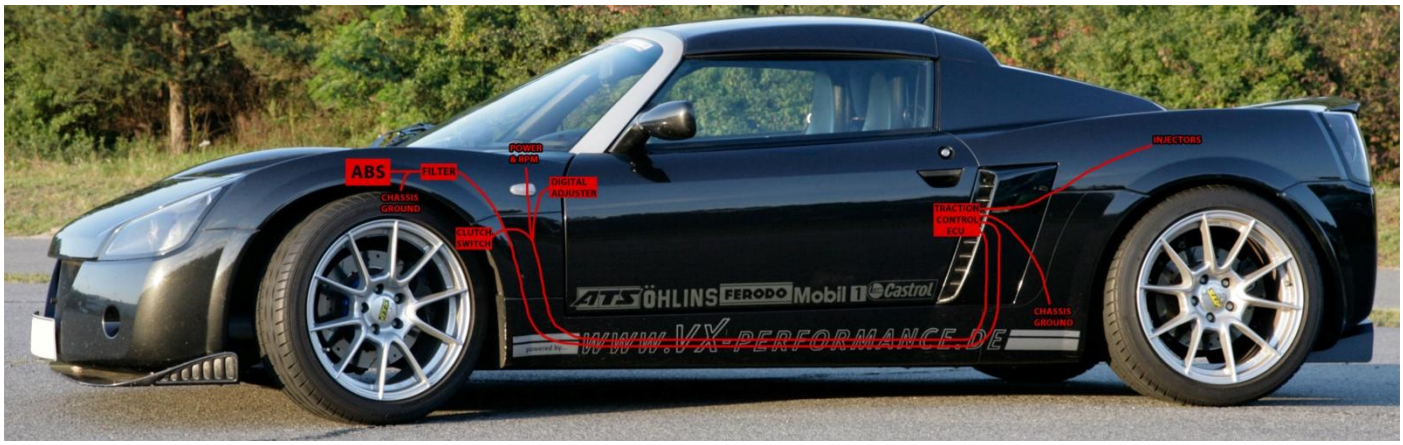
Mounting a Racelogic Traction Control into a Vauxhall VX220

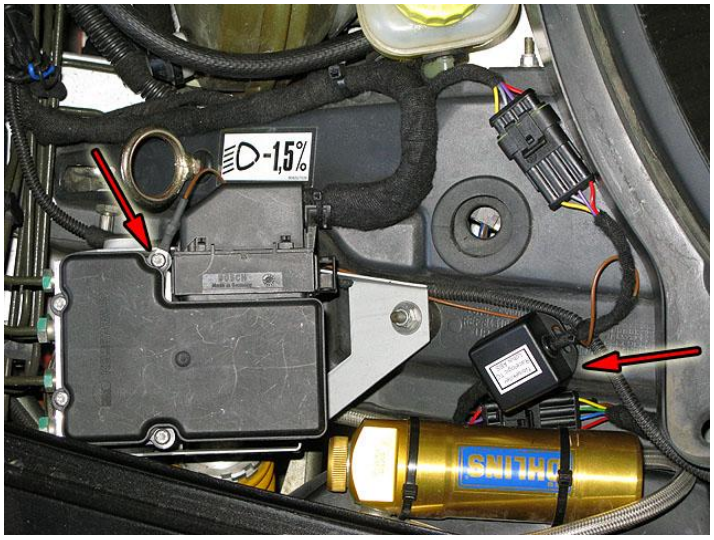
Rev. 2.4, March 20th, 2011 - corrected ground connection ABS ECU

DISCLAIMER: IF YOU FOLLOW THESE GUIDELINES, YOU DO THAT ON YOUR OWN RISK!
I am not responsible for ANYTHING resulting from one following these procedures!
Mounting hardware of this complexity has to be done by a professional.

1 - Where is what?



1.1 - ABS

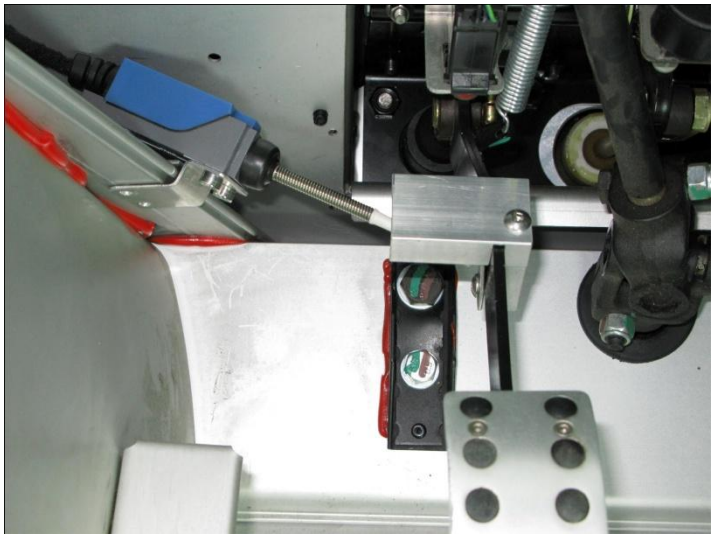


Wires to connect:

yellow = FL → WSPA1/A4 on RL TC ECU
grey = FR → WSPA2/A5 on RL TC ECU
red = RR → WSPA3/A6 on RL TC ECU
violet = RL → WSPA4/A7 on RL TC ECU

Things to remember:
Keep wires shielded as far as possible. Unplug ABS ECU while working on the cables. **You will have to add a filter here**, see end of document for details!

1.2 - Clutch Switch



Here you have to think of something by yourself in a creative manner. Sorry, this is not an easy task. The picture on the left gives you some idea how I solved this problem. There may be many ways to do so, but one of them for sure is not OK:

DO NOT use the original switch up the pedal. It makes contact way too early for FTS. You will need another switch, best way keep it adjustable in make/break position.

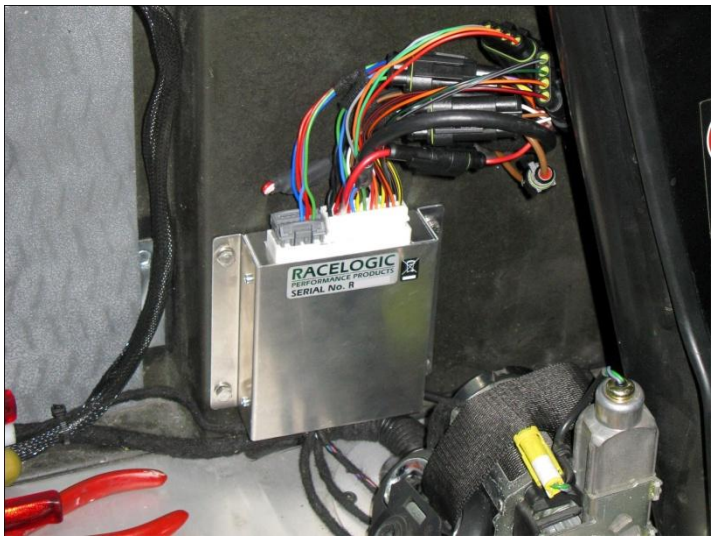
1.3 - Digital Adjuster

The Digital Adjuster and the LED should be mounted somewhere in the drivers range.

You have to wire 8 lines here:

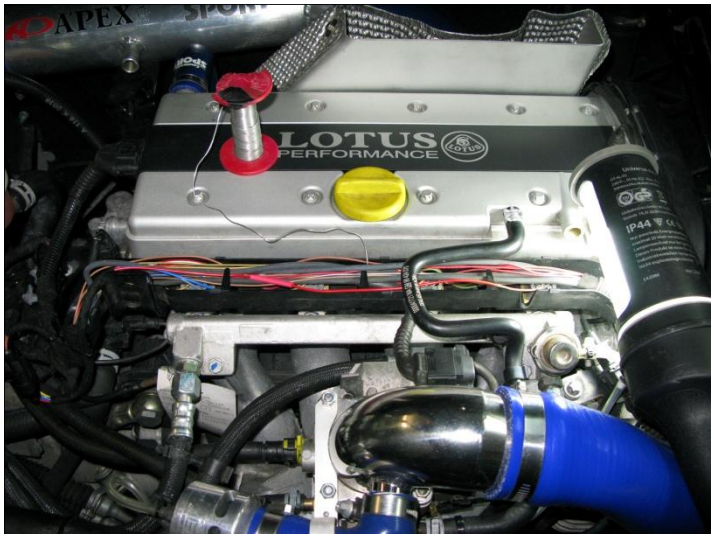
blue - RxD from RS232C interface Pin B5
red - TxD from RS232C interface Pin B6
green - interface GND Pin B7
green - DA POT line to TC ECU Pin A3
blue - DA GND line to TC ECU Pin A16
red - DA power line to 12V from VIGN
red - LED+ to TC ECU Pin B15
blue - LED- to TC ECU Pin B14

1.4 - Racelogic Traction Control ECU



The TC ECU should reside in an area where no moisture may exist and the cable length to both ABS and Engine are not too long. I emphasize you to mount it behind the left seat. Cable harnesses have to be extended, only the shielded ABS harness is sufficient in length IF YOU ORDER the long cables from Racelogic. They offer special long cables for mid/rear engined cars. So tell them you want the long cable trees when placing the order.

1.5 Engine / Injector Valves

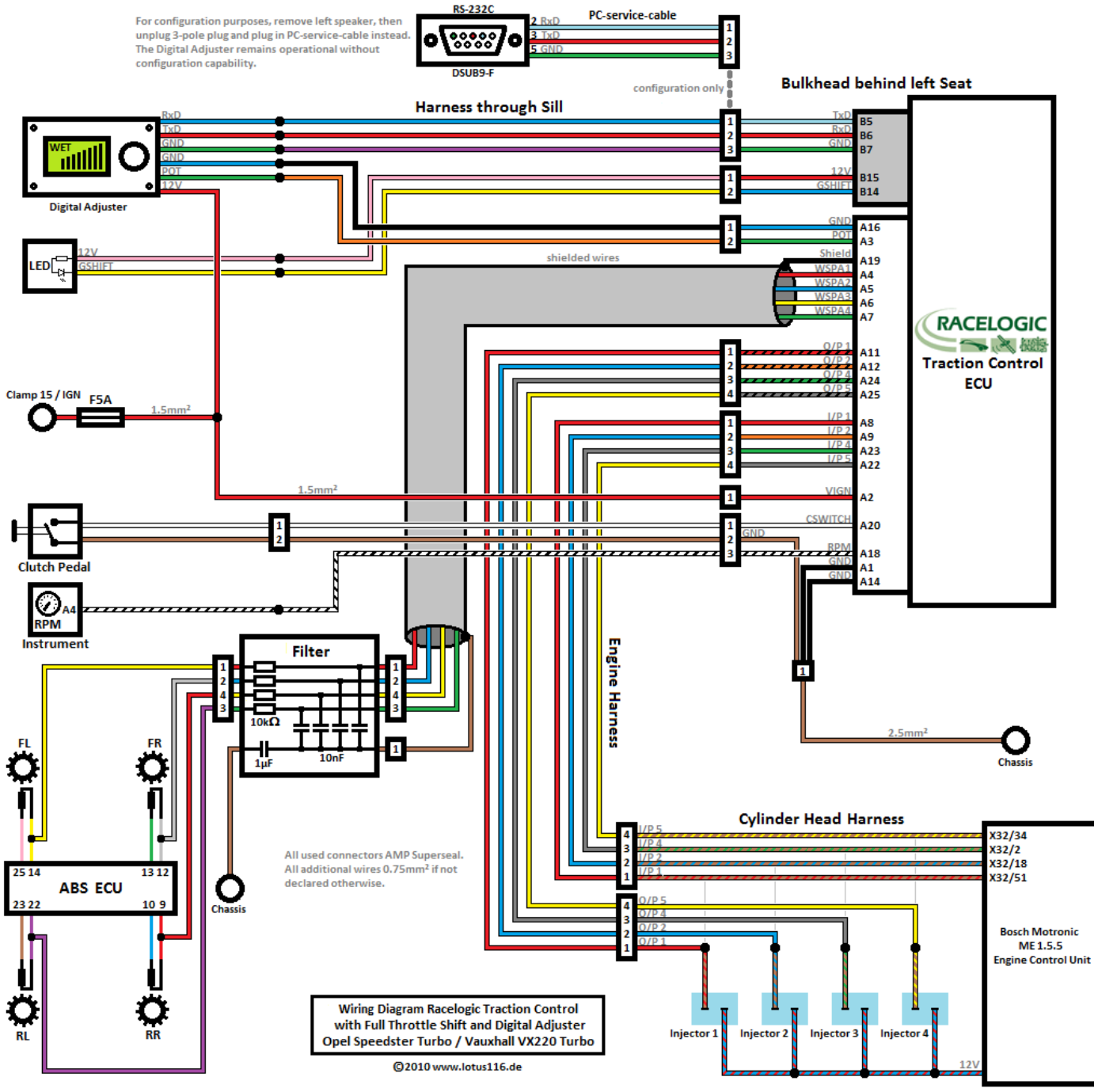


You have to cut & break 8 lines out of here:
brown/yellow:
from Injector to TC ECU Pin A25
from Engine ECU to TC ECU Pin A22
brown /green:
from Injector to TC ECU Pin A24
from Engine ECU to TC ECU Pin A23
brown /blue:
from Injector to TC ECU Pin A12
from Engine ECU to TC ECU Pin A9
brown /red:
from Injector to TC ECU Pin A11
from Engine ECU to TC ECU Pin A8

2 - The Schematic / Wiring Diagram

This is the exact wiring diagram I used for my own car. Works like a charm.

2.1 - Overview



You see a filter network near the ABS ECU which I will discuss below. This is a necessary add-on when mounting the Racelogic Traction Control into cars similar to the Lotus Elise.

2.2 - Filter - why is it necessary?

This one is a tricky bit! Mid engine cars like the Lotus Elise which is the base of the Opel Speedster / Vauxhall VX220 share a delicate fact which poses some issues: the ABS ECU sits in front, the engine in the back. So where ever you place the Traction Control ECU, you will have some long wires routed through the car. Because of low impedance needs with the injection valves I decided to place the TC near the engine compartment. As a result the wire loom to the wheel speed sensors / ABS ECU is some 3 meters long. In addition, the wheel speed inputs of the TC are obviously very high impedance, which is good in terms of non intrusive data acquisition but may be bad if you have long lines connected to because that makes some good antennas for any kind of noises and oscillations. So taking no further precautions against electromagnetic interference, mounting the TC as described in the TC manual, you will probably have massive noise problems driving low speeds:

Problem is: the TC only may evaluate the real driving speed from the four wheel speed sensors, it simply has no other reference. If only one of them reads bad (noisy) impulse sequences the TC will think there may be slip and possibly start to kick in even if it is not necessary at all. In the original configuration you will encounter spontaneous power drops / injection glitches / cuts driving in first gear. At higher speeds the noises go away because the passive (inductive) wheel speed sensors deliver higher signal amplitudes stronger than the noises and the TC can read them accurately.

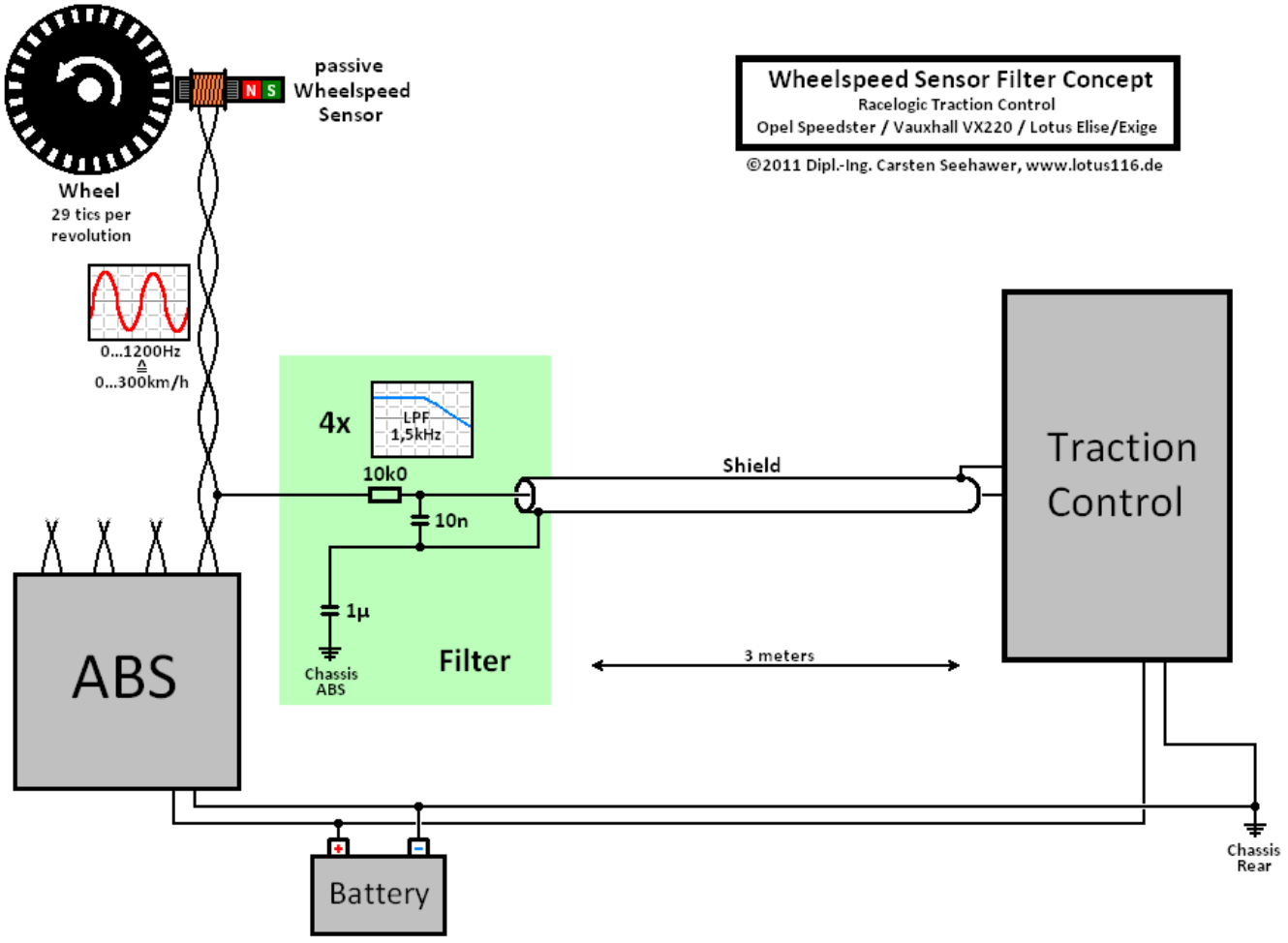
So if you encounter the engine cogging in first gear (you possibly will!), log the wheel speeds as shown above. And if you see signal spikes, you have to add a signal filter between ABS ECU and the shielded wires going to the TC ECU.

2.3 - Filter - Priciple

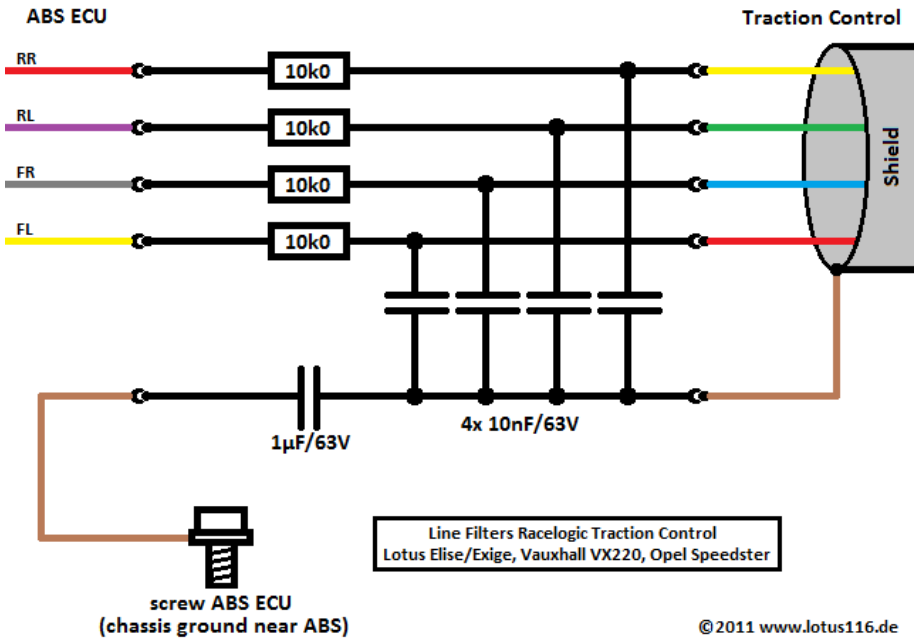
Basically we have here a passive inductive wheel speed sensor that detects gaps inside an iron disc in the wheel hub connected to the wheel. With every revolution of the wheel 29 gaps fly by the sensor modulating the magnetic field inducing some 14 voltage impulses per meter the wheel rolls as a result. Being a passive inductive sensor, signal strength depends on the wheel speed. The lower the wheel speed is, the lower the signal amplitude and the lower the signal to noise ratio because noises tend to be wheel independent. So at lowest speeds you will have the problem of telling the wheel speed signals from noises on the signal lines. That is a basic problem the ABS itself has to handle without any modifications and it may get much worse if you fiddle with the cables.

If you connect a long high impedance wire to the wheel speed signal lines you will probably catch up much more noise from different sources like the injection and ignition systems. This will pose more problems to evaluate the real wheel speed to the ABS and the Traction Control either. ABS plausibility failures may occur and the Traction Control will trigger engine cuts measuring slip where's still plenty of grip.

So it is necessary to electrically calm down the connections between the wheel sensors and the Traction Control, decouple ABS and TC and filter possible noise figures. The solution shown below does all this in a nearly perfect manner, delivering perfect wheel signals down below 10km/h:

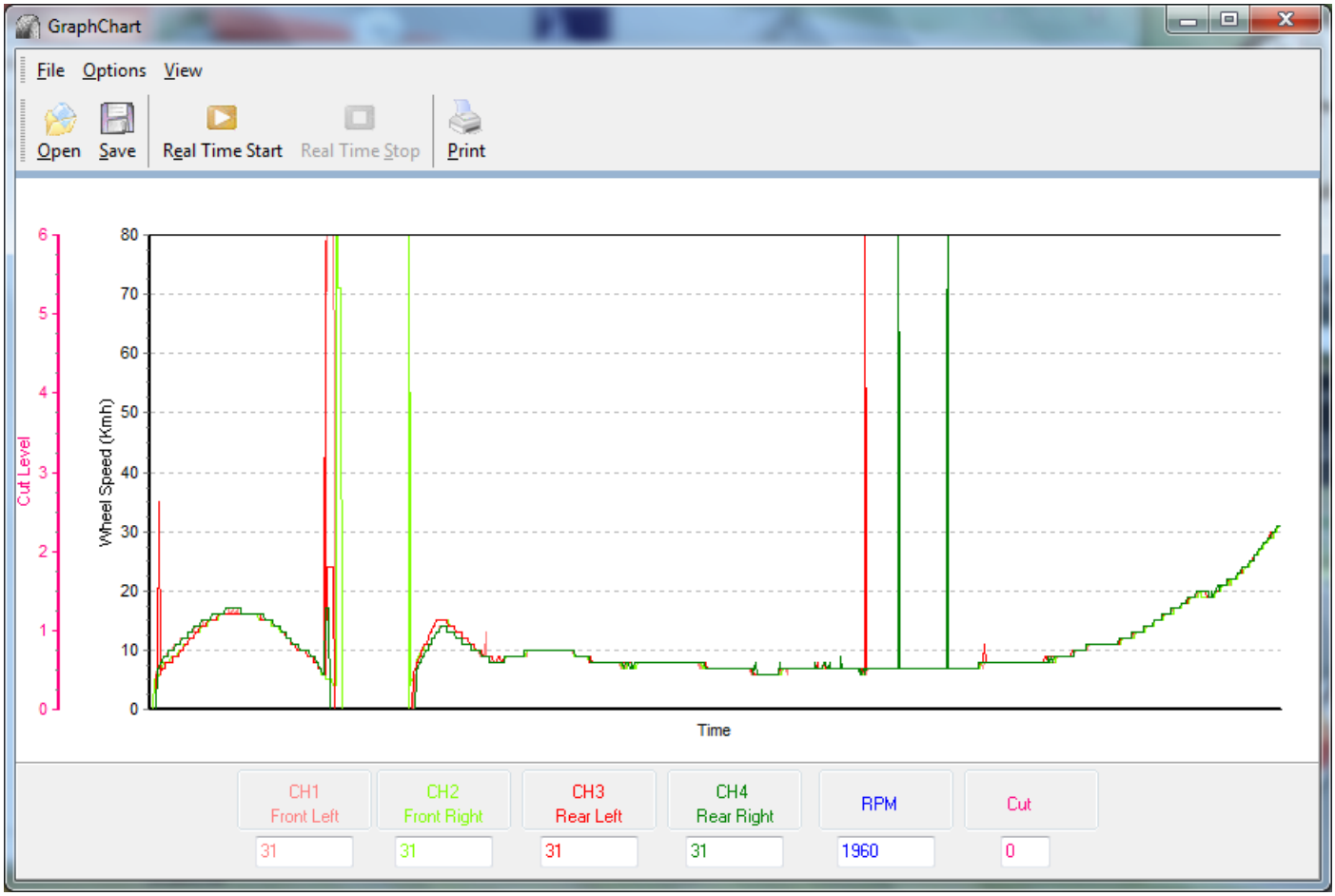


2.4 - The Filter Schematic

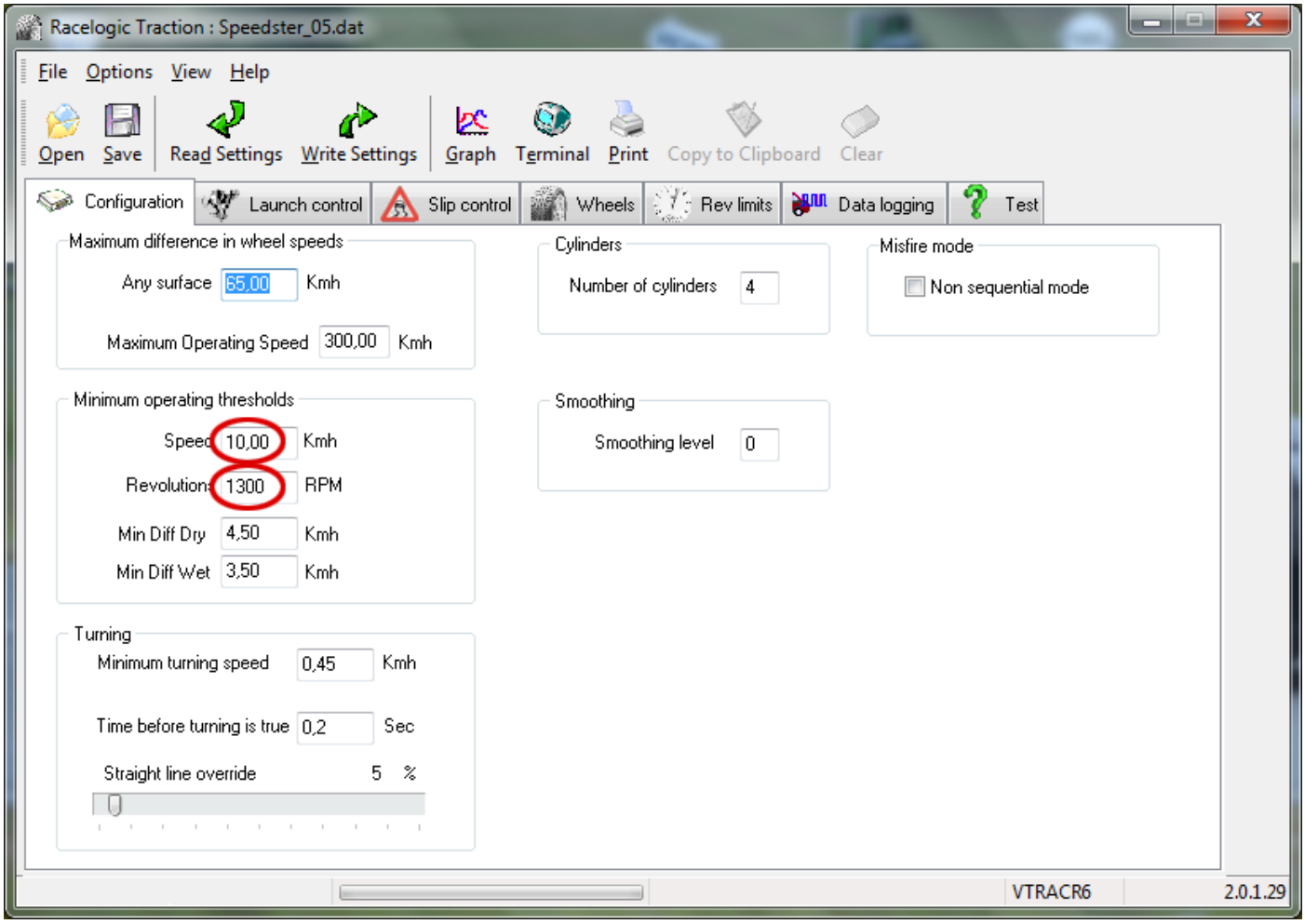


This line filter consists of four low pass filters with a corner frequency of about 1.5 kHz. There is also a AC-coupled grounding for the end of the shielding here which stops the shielding from oscillations that possibly couple in on the 3 meters length.

With this filter you eliminate ALL SPIKES from 10km/h on up!



After mounting the filter you may set the TC configuration to very aggressive values:



This will give you slip protection even at lowest speeds!

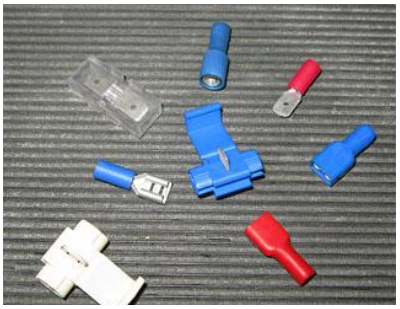
This shows the prototype of the filter:

From my experience, you WILL have to fix noise issues this way. Btw. the ABS ECU sometimes also switches to failure if you do not follow these guidelines, also getting no clean signal from the sensors anymore. So be adviced!

3 - Tools, cables, connectors, tape, shrink tubing, zip ties, solder iron...

Some of the tools I would emphasize you to use:

Do NOT use some of those:



Happy wiring!

(it's really worth the hard work)