

Hybrid Assistant Report

Info	
Car model	Camry
VIN	JTNBB46K073-----
Odometer	322
Generated at	02/08/2018 11:15:16
Version	HA:236 HR:67

Index

- [Trip summary](#)
- [Device info](#)
- [SOC Statistics](#)
- [High Voltage Battery Statistics](#)
- [High Voltage Battery Health](#)
- [Temperature](#)
- [Trip](#)
- [Engine](#)
- [PSD](#)
- [Fuel Trims](#)
- [BSFC Statistics](#)
- [Braking](#)
- [Car Driving](#)
- [Glide Evaluation](#)
- [Driver Evaluation](#)
- [Notes](#)

[Trip summary](#)

Time	
Start	02/08/2018 10:00:35
Finish	02/08/2018 10:11:24

Trip					
	Total	EV	%	No Fuel	%
Distance	0.03 km	0.03 km	100%	0.03 km	100%
Time	10:48	4:49	44%	4:52	45%
Moving	0:01	0:01	100%	0:01	100%

Speed	
Average	0 km/h
Moving Average	3 km/h
EV Average	0 km/h
Max	3 km/h

--

Environment	
Start SOC	60.39%
End SOC	50.20%
Avg Ambient Temperature	0°C
Altitude Delta	0

Fuel	
Consumption	770.180 L/100km
Usage	0.193 L

Trip summary values are detailed by Time, Moving and EV.
Time is the total trip time.
Moving stats regards only the fraction of time while the car was not standing still.
EV stats are accounted only when the petrol engine is stopped.
No Fuel sums EV driving with the petrol engine running without fuel like coasting at high speed or driving down a slope.

Device info

Phone	
Manufacturer	LGE
Model	LG-M257
Product	lv517_crk_us
Android SDK	24
Hostname	LG Harmony VSY
Screen	720x1193
Scale	2

OBD	
Connection type	Bluetooth
Model	Vgate iCar 1/G-EZTB-OBDDROID Goliton POWER2
MAC Address	00:1D:A5:1D:9A:30
Name	ELM327 v1.5
Manufacturer	OBDII to RS232 Interpreter
Firmware	?

Requests per second	
Average	8
Start	9
End	13
Delta	4
Min	2
Max	13

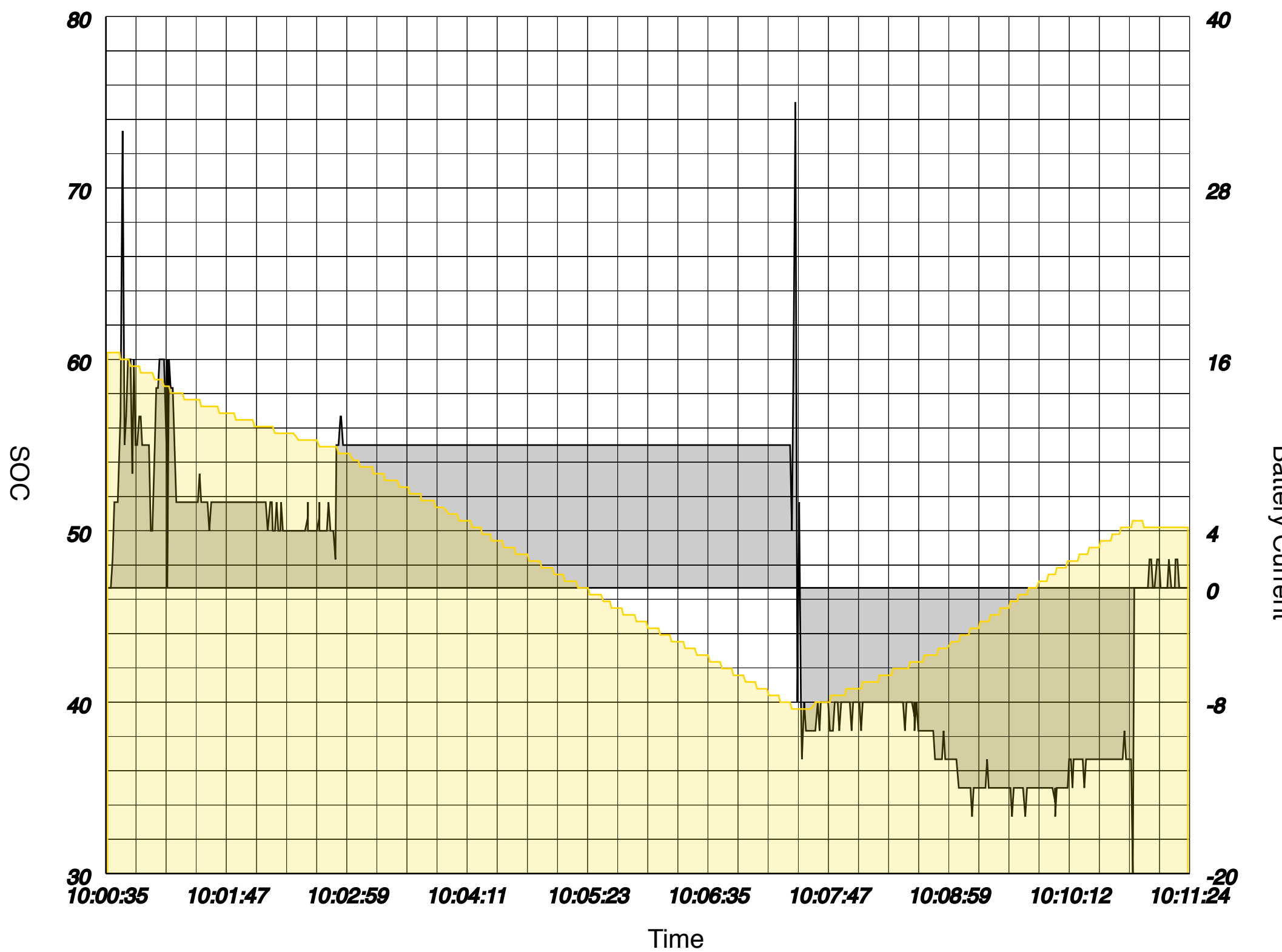
Sampling	
Start time	02/08/2018 10:00:35
End time	02/08/2018 10:11:24
Duration	10:48
Samples	1227

Average	0.53 sec
Standard deviation	0.09 sec
Disconnections	0
Corrupted frames	0/9,066

Information about phone and OBD adapter.
The sampling average is the time taken for reading all sensors, in seconds: the lowest, the fastest Hybrid Assistant will run.
Speed is mainly affected by OBD adapter and by other apps running on the phone.

SOC Statistics

SOC



SOC

Battery Current

SOC	
Average	48.63%
Start	60.39%
End	50.20%
Delta	-10.20%
Min	39.61%
Max	60.39%
Standard deviation	5.87%

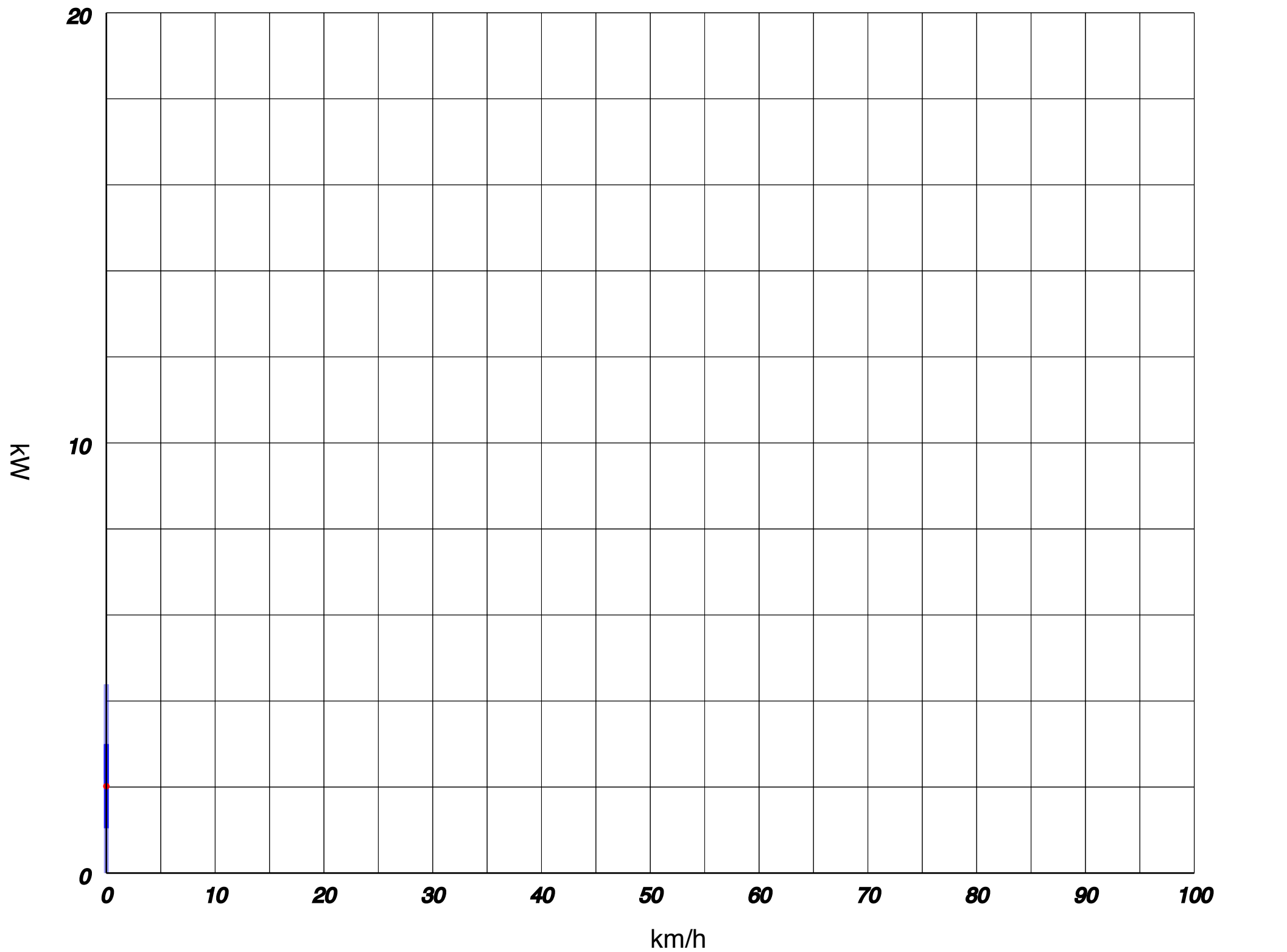
Variations	
Difference from optimum	-11.37%
SOC gained from brakings	0.00%
SOC gained from coasting	0.00%
Total SOC gained	0.00%
SOC charged by ICE	10.98%

Levels		
	Current	Voltage
Avg	2.27 A	270.28 V
Min	-20.00 A	250.00 V
Max	34.00 A	288.00 V

Power			
	Power	Charge Limit	Discharge Limit
Avg	0.485 kW	-20.727 kW	25.500 kW
Start	0.000 kW	-17.500 kW	25.500 kW
End	0.000 kW	-22.000 kW	25.500 kW
Min	-5.760 kW	-24.000 kW	25.500 kW
Max	11.256 kW	-5.500 kW	25.500 kW

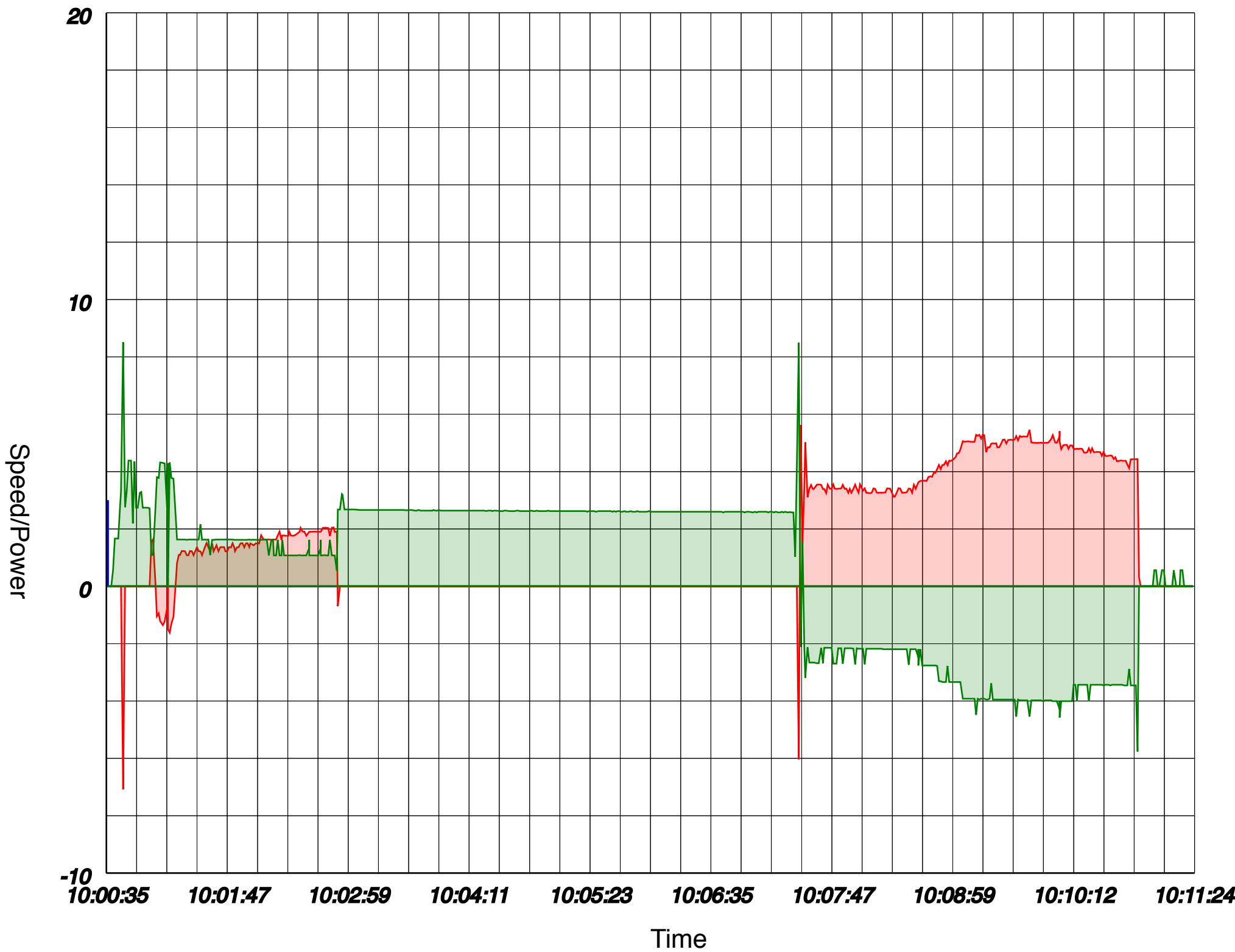
Energy	
Total energy from the battery	0.275 kWh
Total energy to the battery	0.178 kWh
Battery energy balance	-0.097 kWh
Average services consumption	2.541 kW

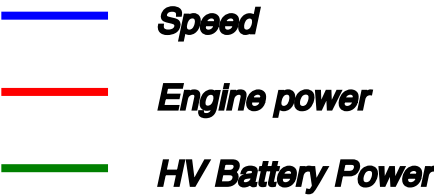
Average Power Usage



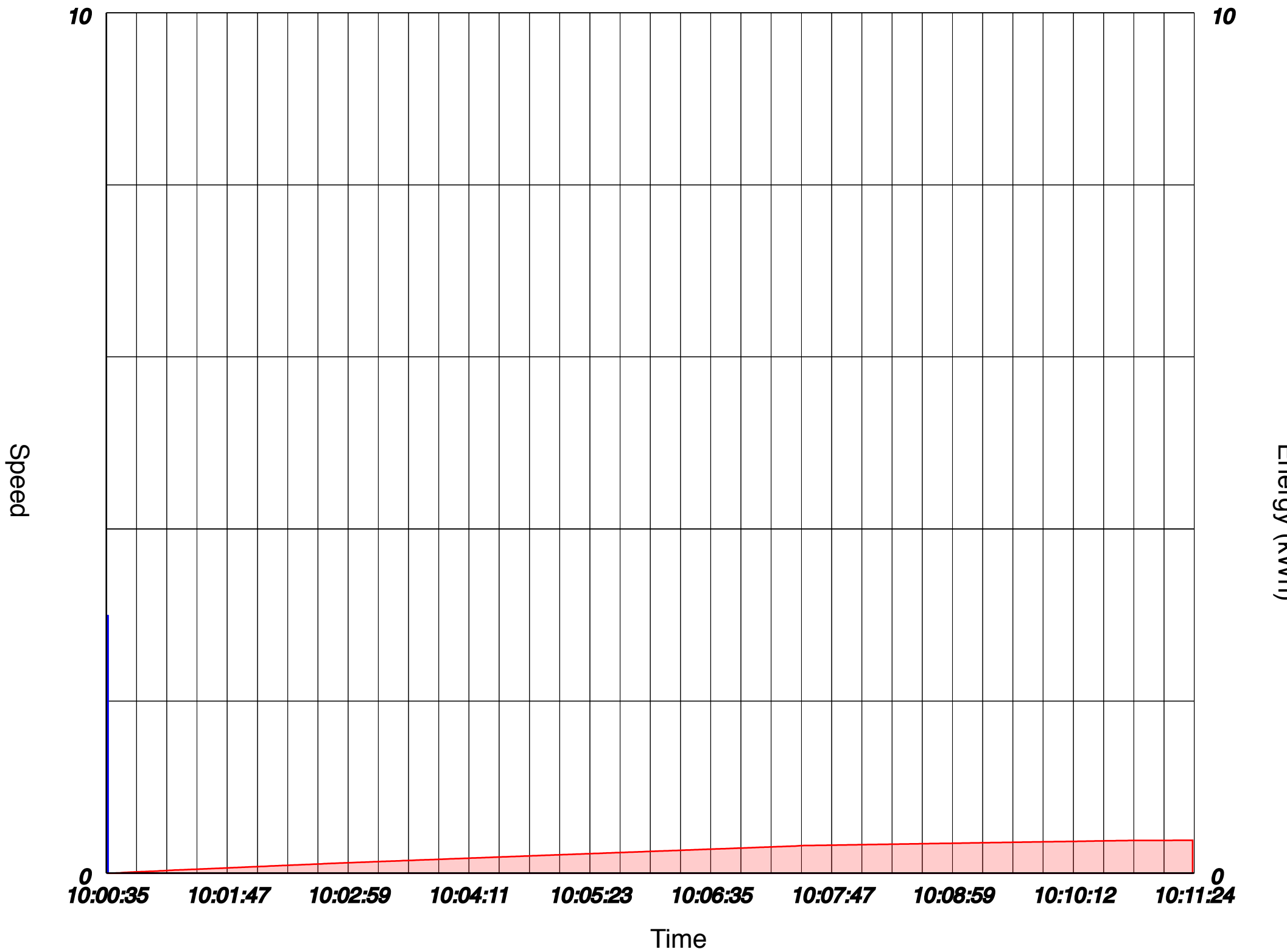
Plot of power required to keep a given speed.
Values are collected only when a constant speed is maintained long enough to have a consistent reading, so a trip with many different speeds may not gather enough data to plot.
Since required energy is heavily influenced by road slope, you should drive on a plain road to have a correct reading.

Power Distribution





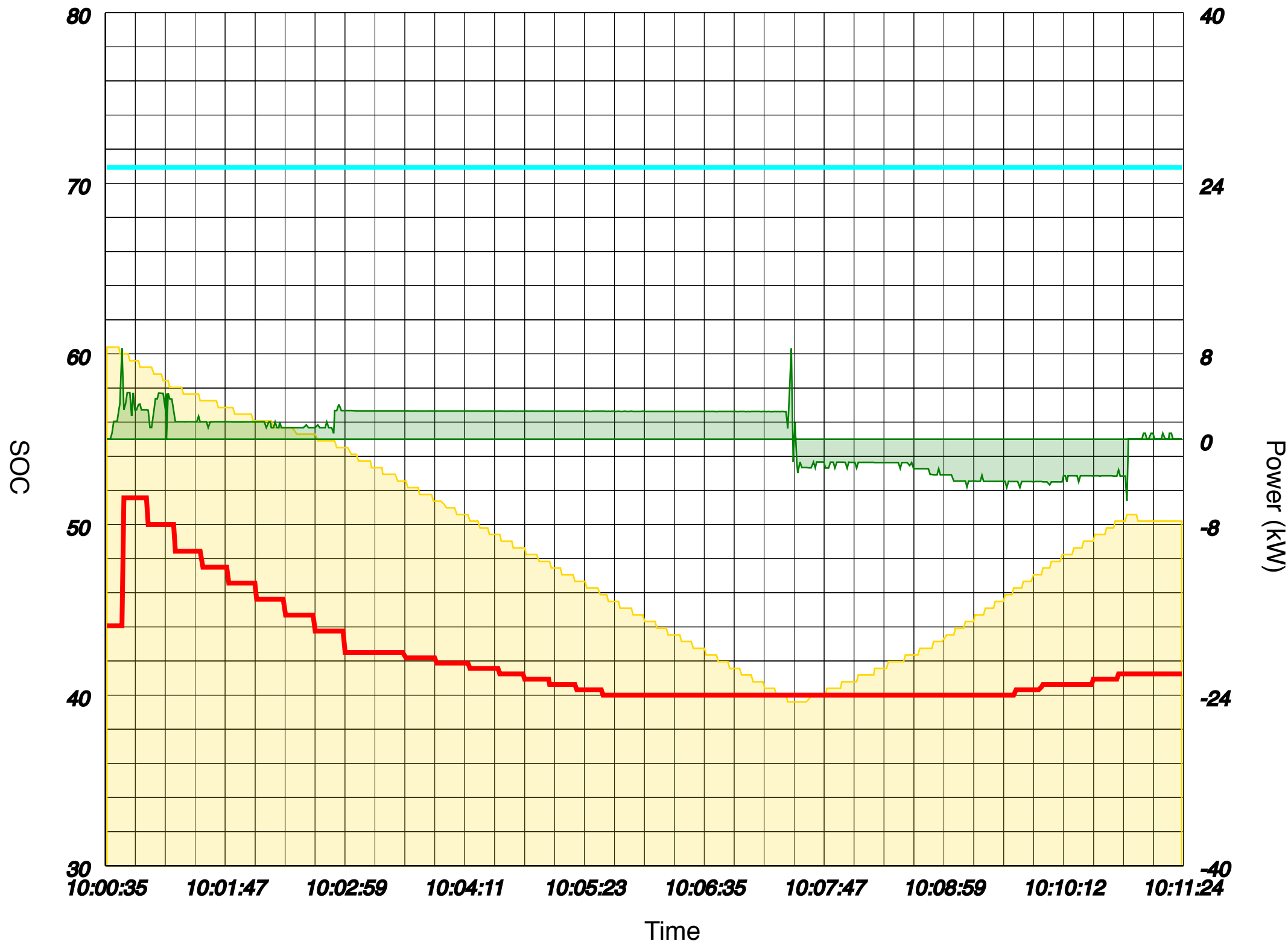
Energy Balance

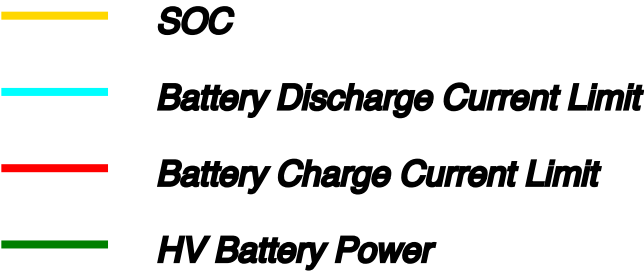


Speed

Energy

CCL and DCL





Charge and discharge kW limits for the battery.
These values may change with battery level and temperature.
When the battery is nearly full, charge limit is reduced.
On low temperatures, charge and discharge limits are reduced to preserve battery life.

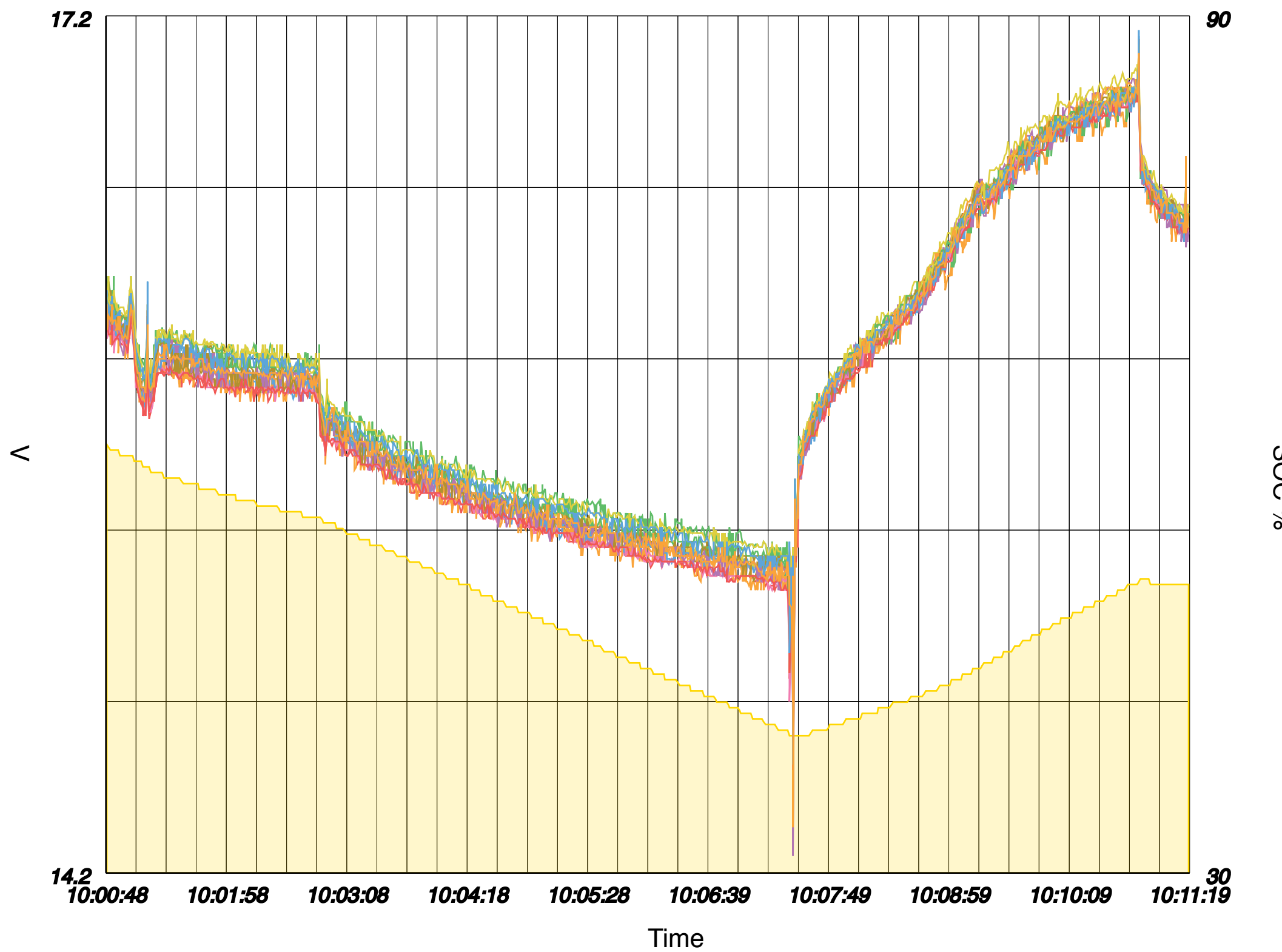
High Voltage Battery Health

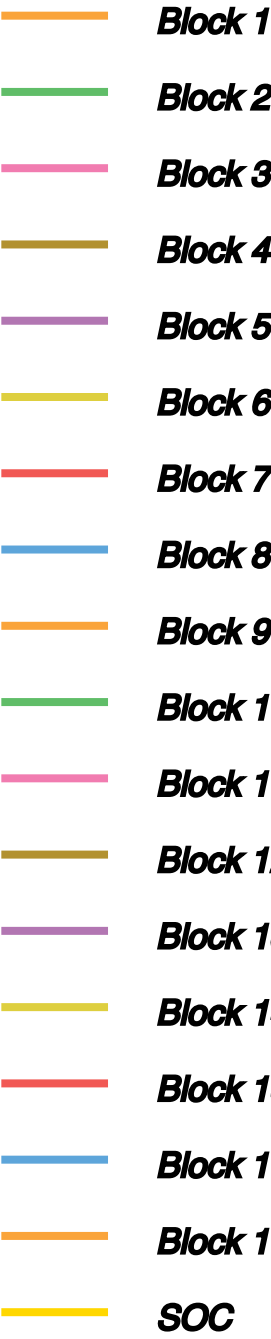
Be sure to follow the guideline for [HV Check](#) as specified on the official website.

Note: Statistics from this paragraph are limited to the HV Check time span, not the whole trip

HV Battery	
Number of Blocks	17
Number of samples	1179
Average sample time	0.54
Start time	02/08/2018 10:00:48
End time	02/08/2018 10:11:19
Duration	10:31

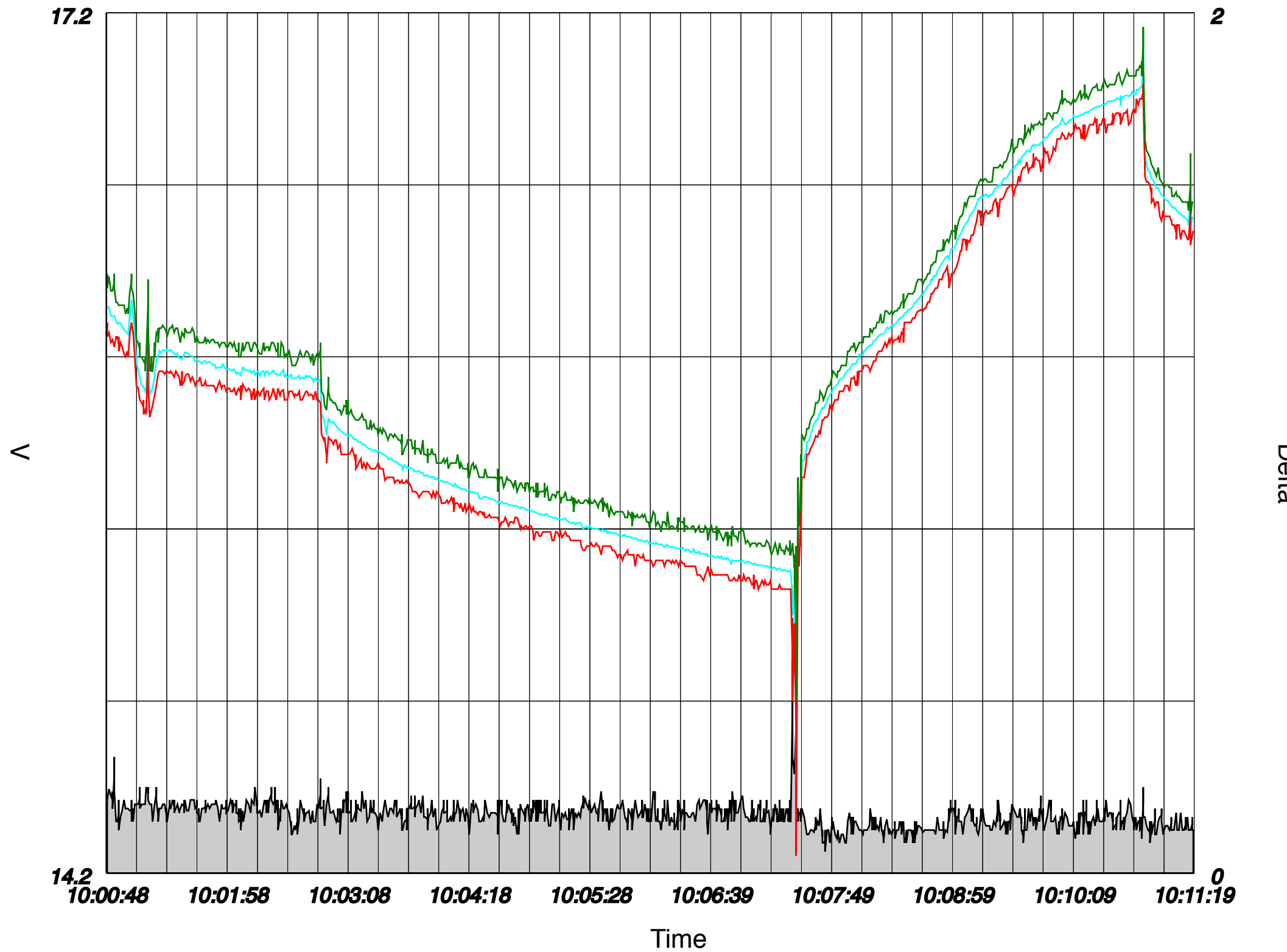
Block values

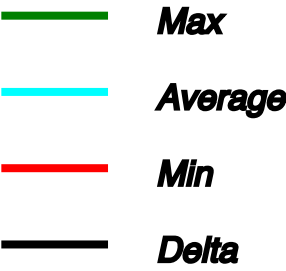




Voltage value of each battery block.
A block behaving differently from the others may indicate a degraded element.

Voltage Delta





Min, max and average voltage values are plotted.

Average value should be halfway between min and max; a bias over one value may indicate an unbalanced battery.

Voltage delta between highest and lowest block is also plotted on the bottom of the chart.

Blocks stats						
Block	Min	Max	% Time @ Min V	Avg Bias	Max Bias	Avg Local Delta
1	14.48	16.95	0.34	0.09	0.32	0.11
2	14.63	17.10	0.00	0.03	0.17	0.16
3	14.51	17.07	0.08	0.11	0.42	0.14
4	14.61	17.10	0.00	0.05	0.32	0.09
5	14.39	17.07	0.08	0.06	0.41	0.07
6	14.36	17.12	0.08	0.03	0.44	0.12
7	14.61	17.07	0.34	0.12	0.46	0.13
8	14.67	17.13	0.00	0.08	0.40	0.08
9	14.44	17.10	0.00	0.08	0.36	0.09
10	14.61	17.07	0.00	0.05	0.19	0.11
11	14.70	17.12	0.42	0.11	0.54	0.11
12	14.80	17.12	0.00	0.07	0.44	0.08
13	14.26	17.07	0.08	0.08	0.54	0.09

14	14.46	17.10	0.00	0.02	0.34	0.15
15	14.56	17.07	0.08	0.11	0.44	0.16
16	14.58	17.15	0.00	0.05	0.37	0.10
17	14.36	17.07	0.00	0.07	0.44	0.05

Statistics for each battery block.

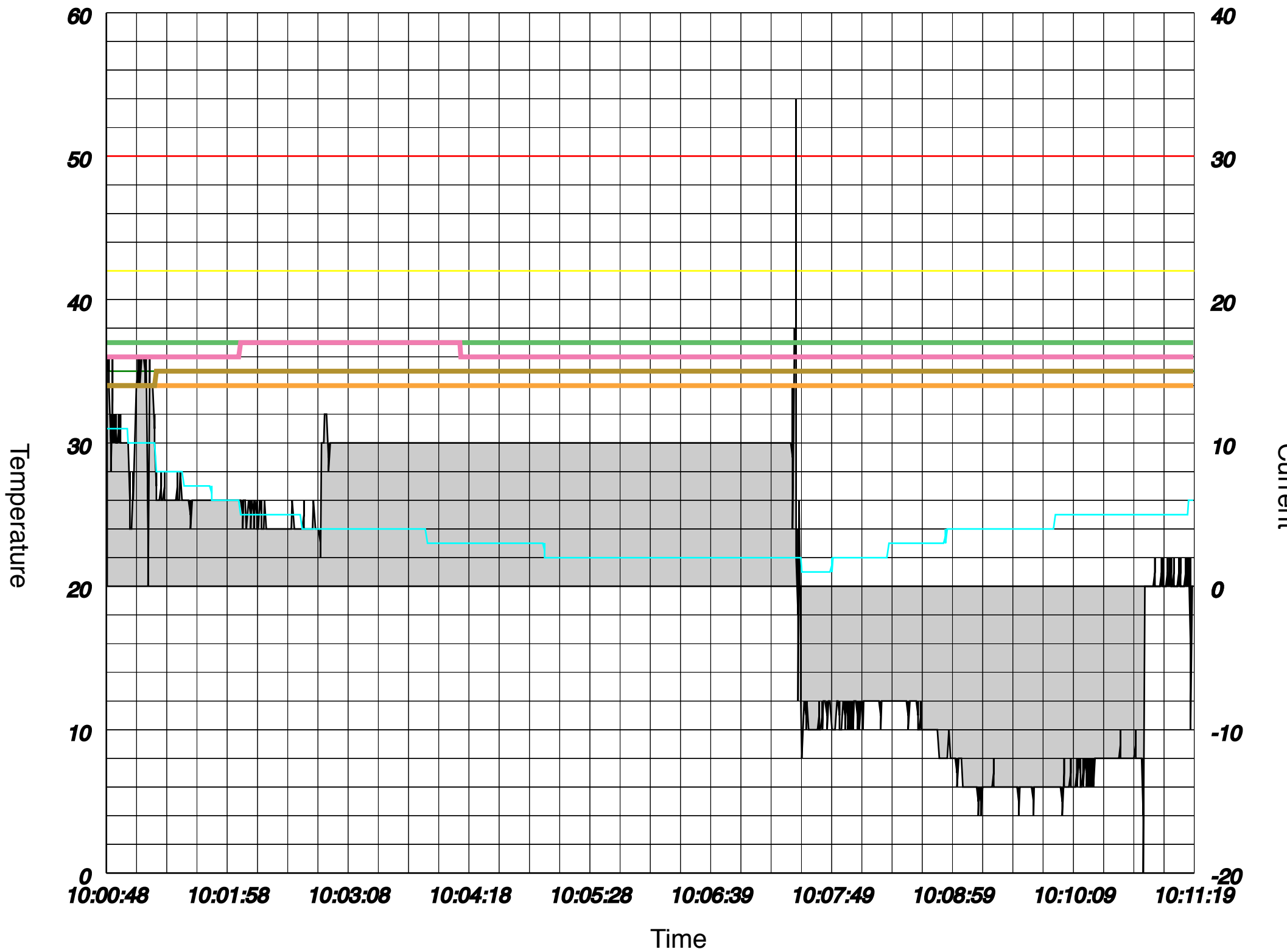
- Min: minimum observed value.
- Max: maximum observed value.
- % Time @ Min V: time percentage the given block was the lowest of the battery; high values may indicate a weak block.
- Bias: difference from the highest block.
- Local Delta: how much a block differs from its immediate neighbours.

Global stats	
Minimum observed battery voltage	247 V
Maximum observed battery voltage	290 V
Minimum observed block voltage	14.26 V
Maximum observed block voltage	17.15 V
Maximum Delta	0.54 V
Average Delta	0.13 V
Minimum observed current	-20.00 A
Maximum observed current	34.00 A
Minimum observed SOC	39.6%
Maximum observed SOC	60.0%
Delta SOC	20.4%
Energy	1.00Ah
Estimated Capacity	4.91Ah

Delta Thresholds	
Threshold	Consecutive Samples
0.2	5
0.45	1
0.7	0
0.95	0
1.2	0

Maximum delta value between highest and lowest block is the most important parameter for battery health: high delta values suggests a weary battery.
Delta values are significant only when repeated over a long time: the table counts consecutive samples where delta value is over the indicated threshold.
Low counts are not an indication of a fault while high counts may be.

HV Battery Temperature





Sensor 1

Sensor 2

Sensor 3

Sensor 4

Battery Inhaling Temperature

Battery Current

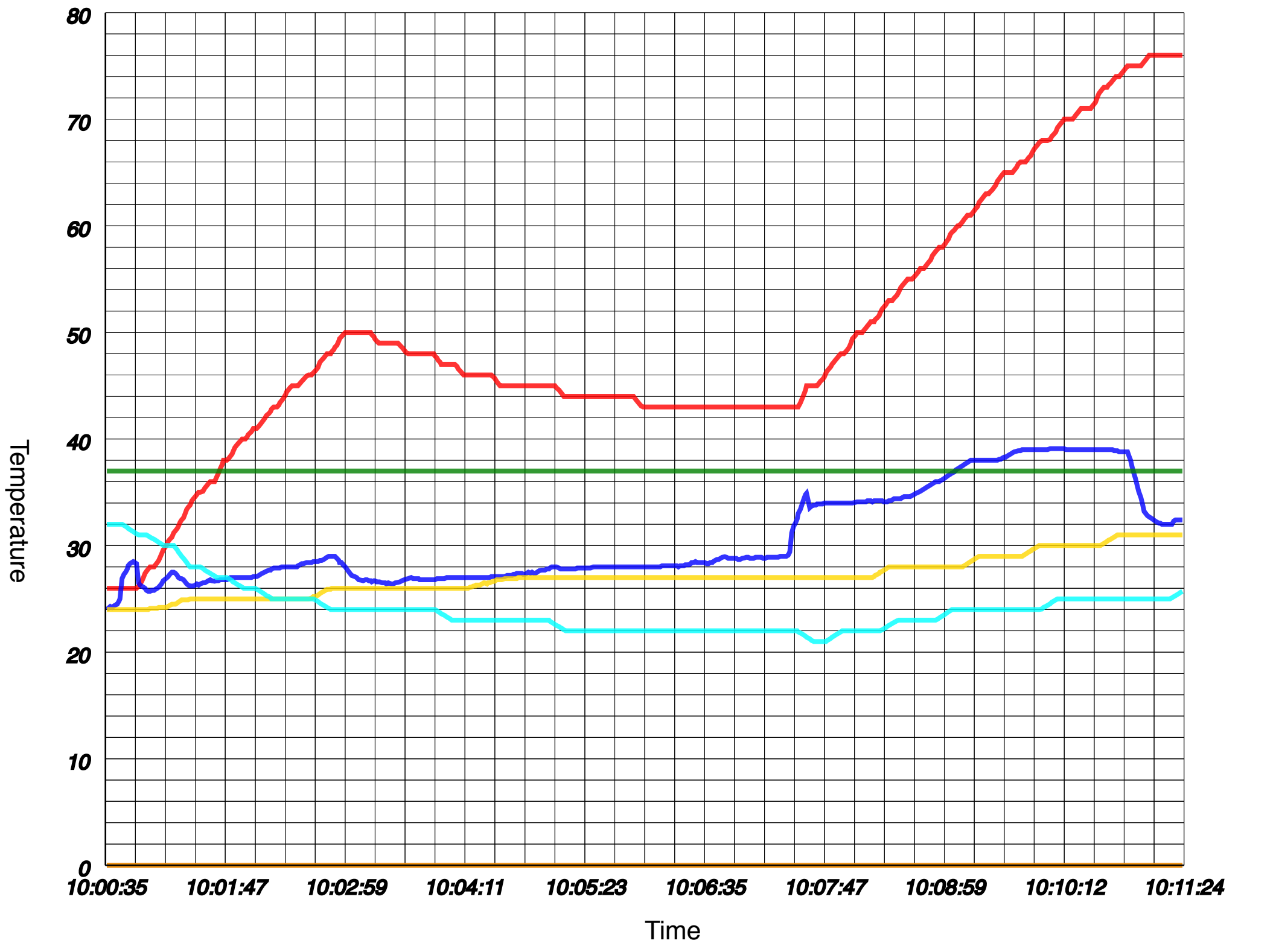
Critical

EV disable

Fan start

Temperature

Powertrain Temperature



- Engine Coolant Temperature
- Inverter Temperature
- Battery Temperature
- MG Temperature
- Battery Inhaling Temperature
- Room Temperature
- Ambient Temperature

Temperature					
	Ambient	Room	Coolant	Inverter	MG
Avg	0°C	0°C	49°C	30°C	27°C
Min	0°C	0°C	26°C	24°C	24°C
Max	0°C	0°C	76°C	47°C	31°C

Time to reach given temperature	
Coolant Temperature	Time
40°C	1:07 sec
50°C	2:10 sec
60°C	8:18 sec
65°C	8:46 sec
70°C	9:22 sec

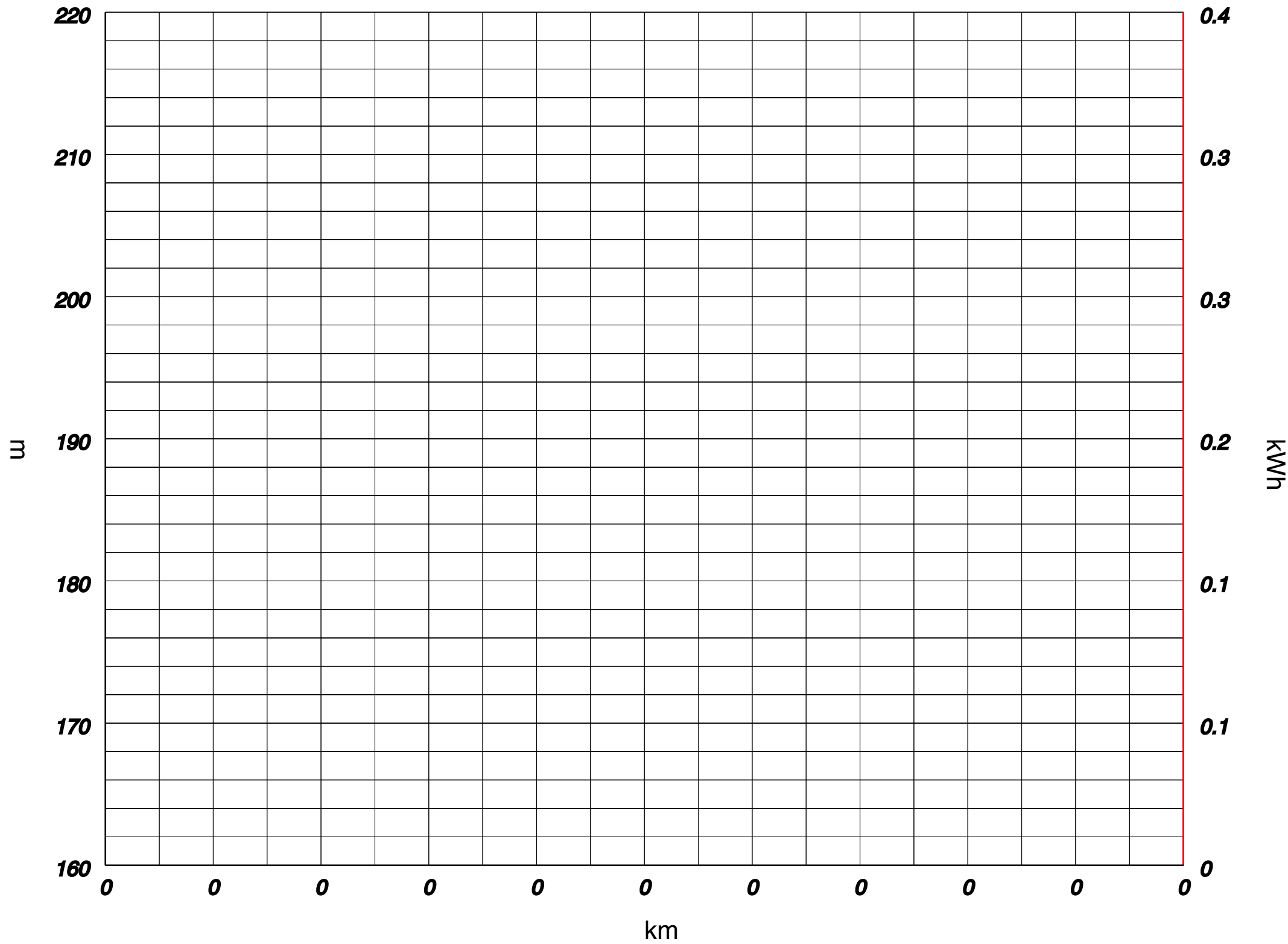
HV Battery Temperature Sensors					
Sensor	In	1	2	3	4
% Max	-	0%	100%	18%	0%
Max	32°C	34°C	37°C	37°C	35°C
Avg	24°C	34°C	37°C	36°C	34°C

Min	21°C	34°C	37°C	36°C	34°C
-----	------	------	------	------	------

Temperatures for each car component.
Engine coolant temperature is the water temperature, while inverter and MG is the actual component temperature.
For inverters and MGs, only the most significant value among all components is shown.
HV Battery has multiple sensors: usually the inner ones are higher that the outer ones. % Max shows time percentage the specified sensor was the highest of the pack.

Trip

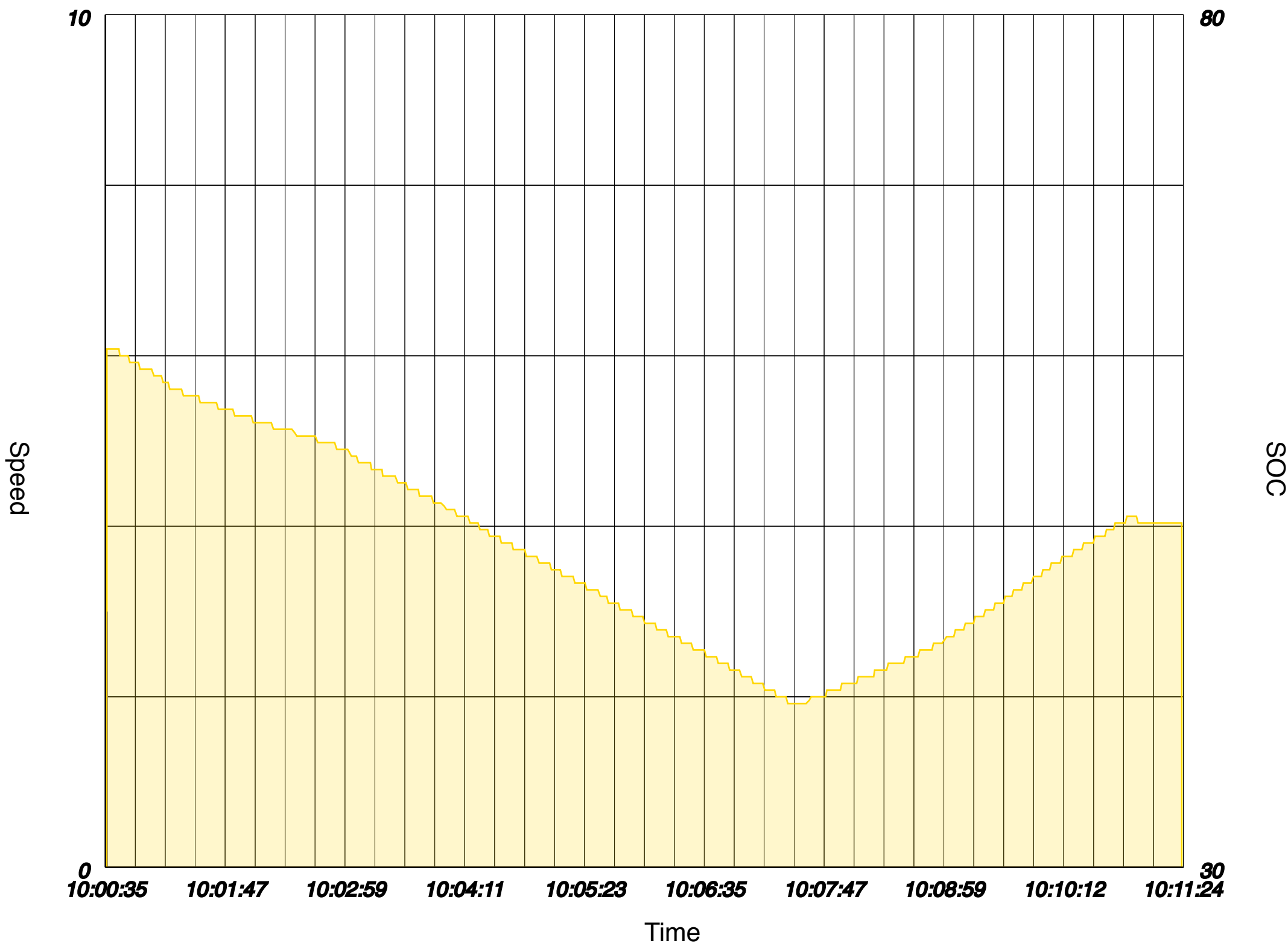
Elevation Profile



Altitude	
Avg	194
Start	194
End	194
Min	194

Max	194
Upward	0
Downward	0
Altitude Delta	0

Speed



Speed

SOC

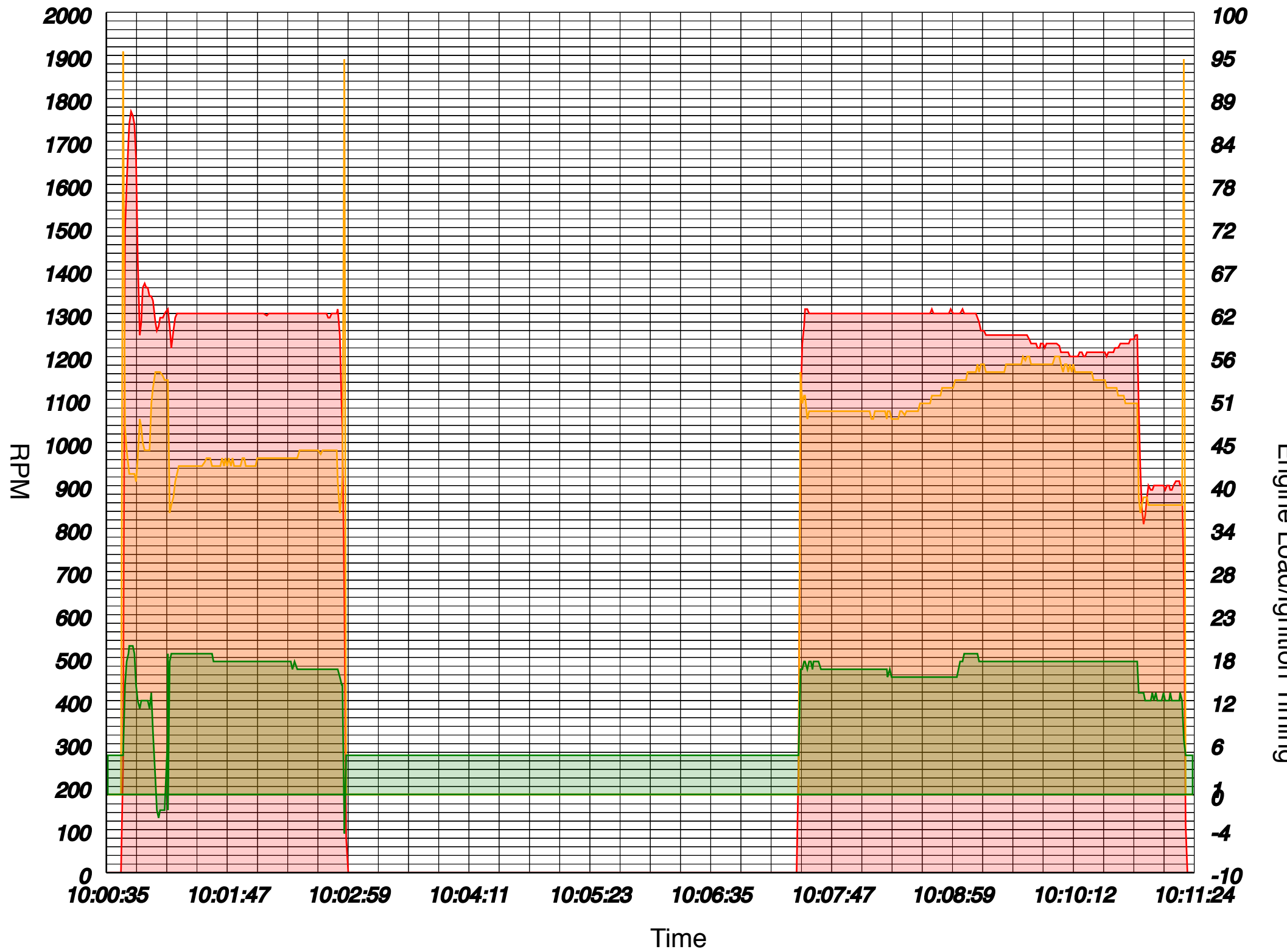
Speed	
Average	0 km/h
Moving Average	3 km/h
EV Average	0 km/h
Max	3 km/h

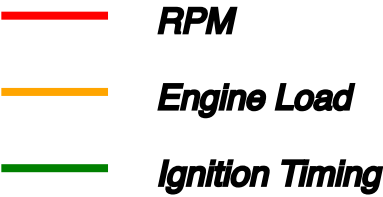
Engine

	RPM	Load	Power	Timing
Avg	1,242	48%	3.116kW	11°
Max	1,770	95%	5.624kW	19°
Min	-	-	-	-5°

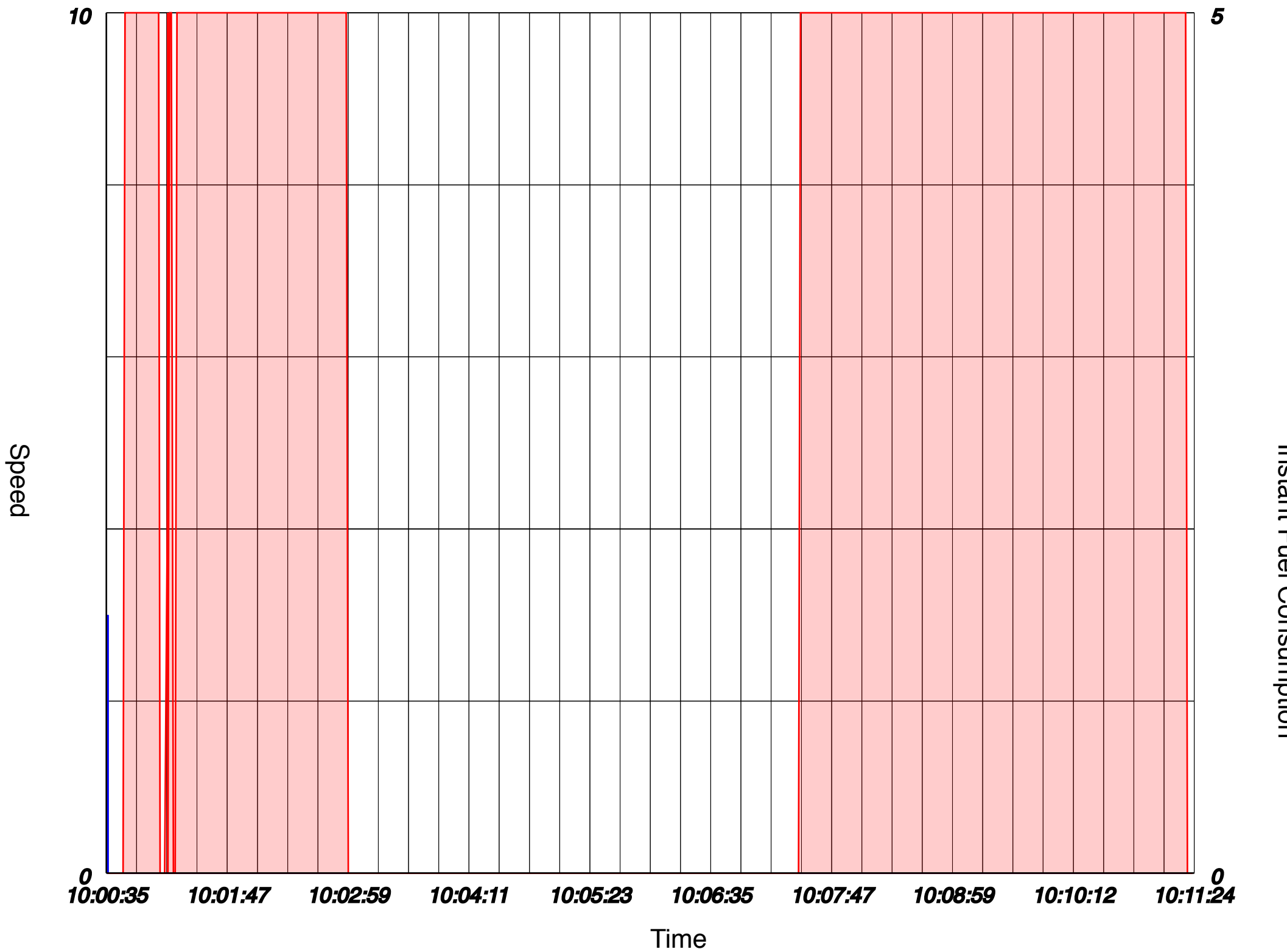
Ignitions	
Total	2
Inefficients	0


RPM





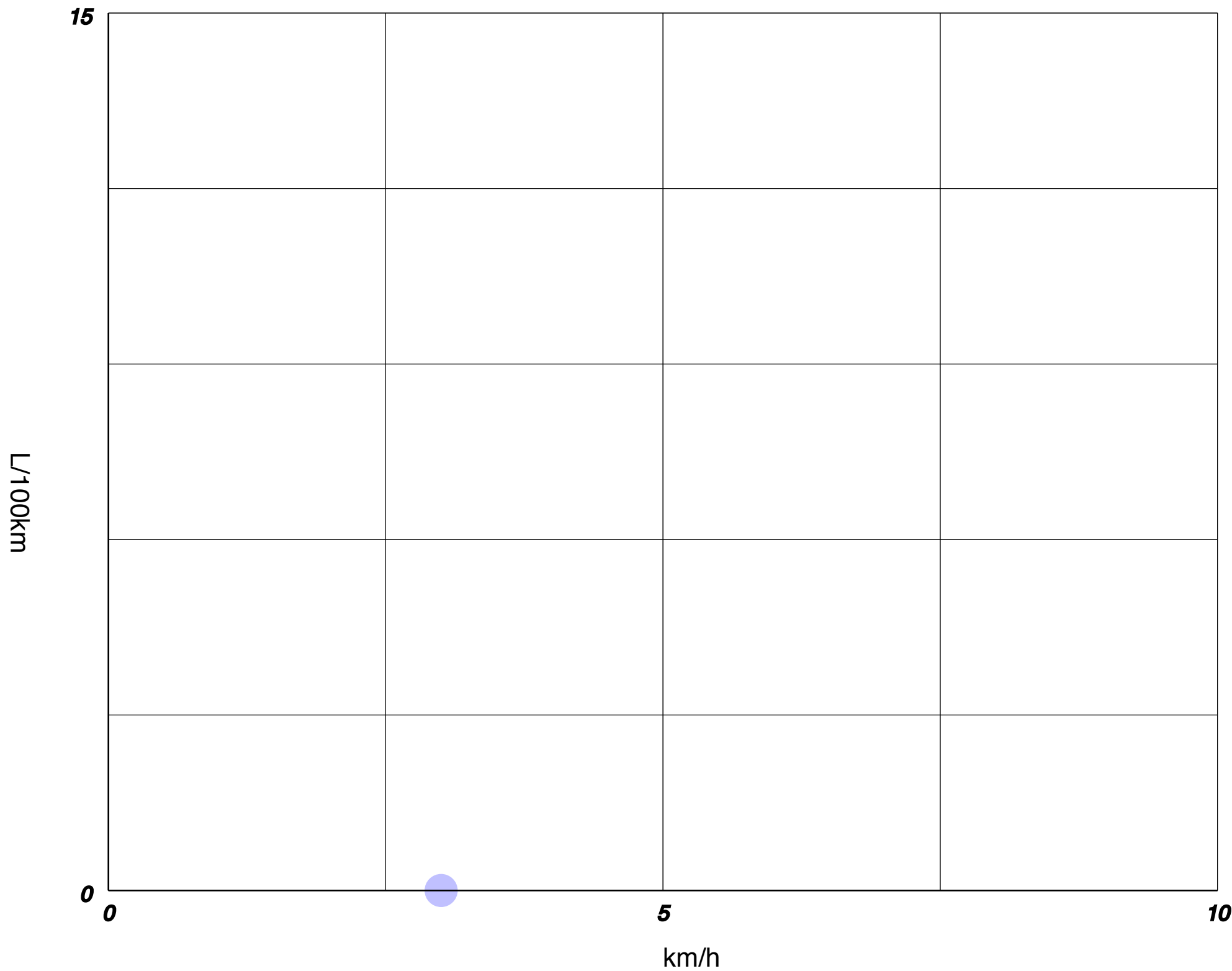
Instant Fuel Consumption



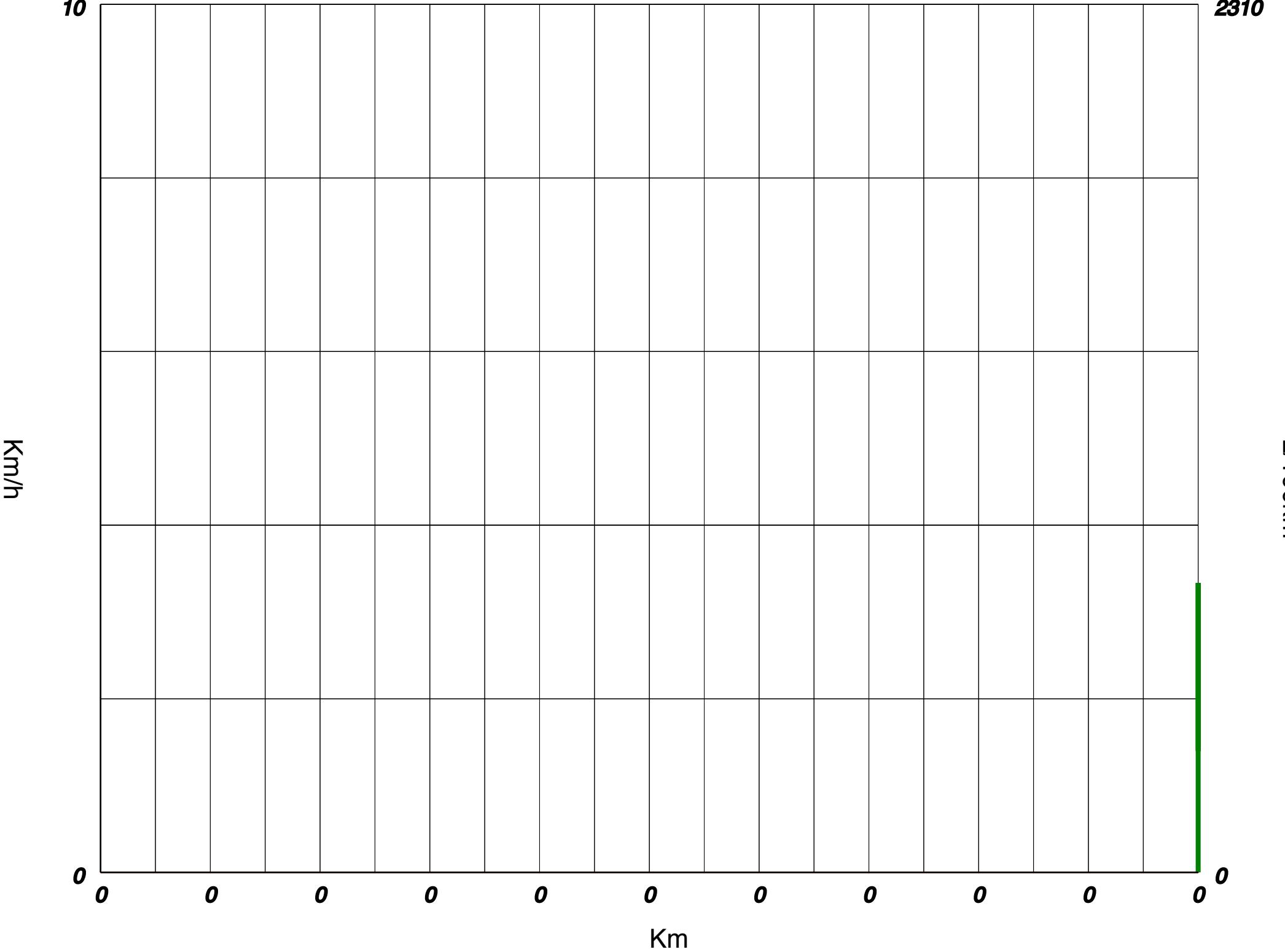
 *Speed*

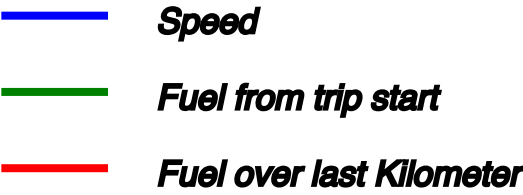
 *Instant Fuel Consumption*

Consumption Map



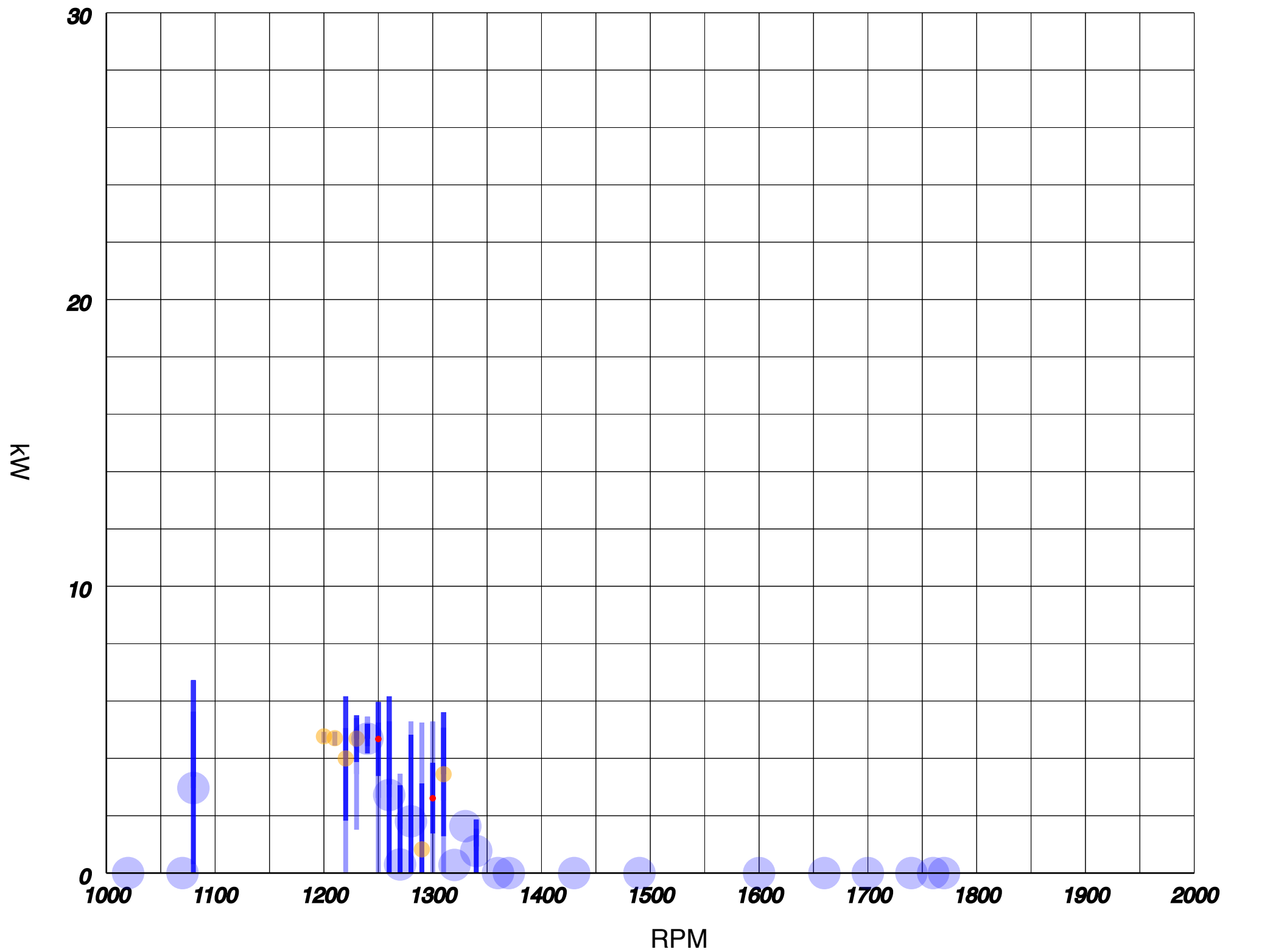
Fuel usage over distance



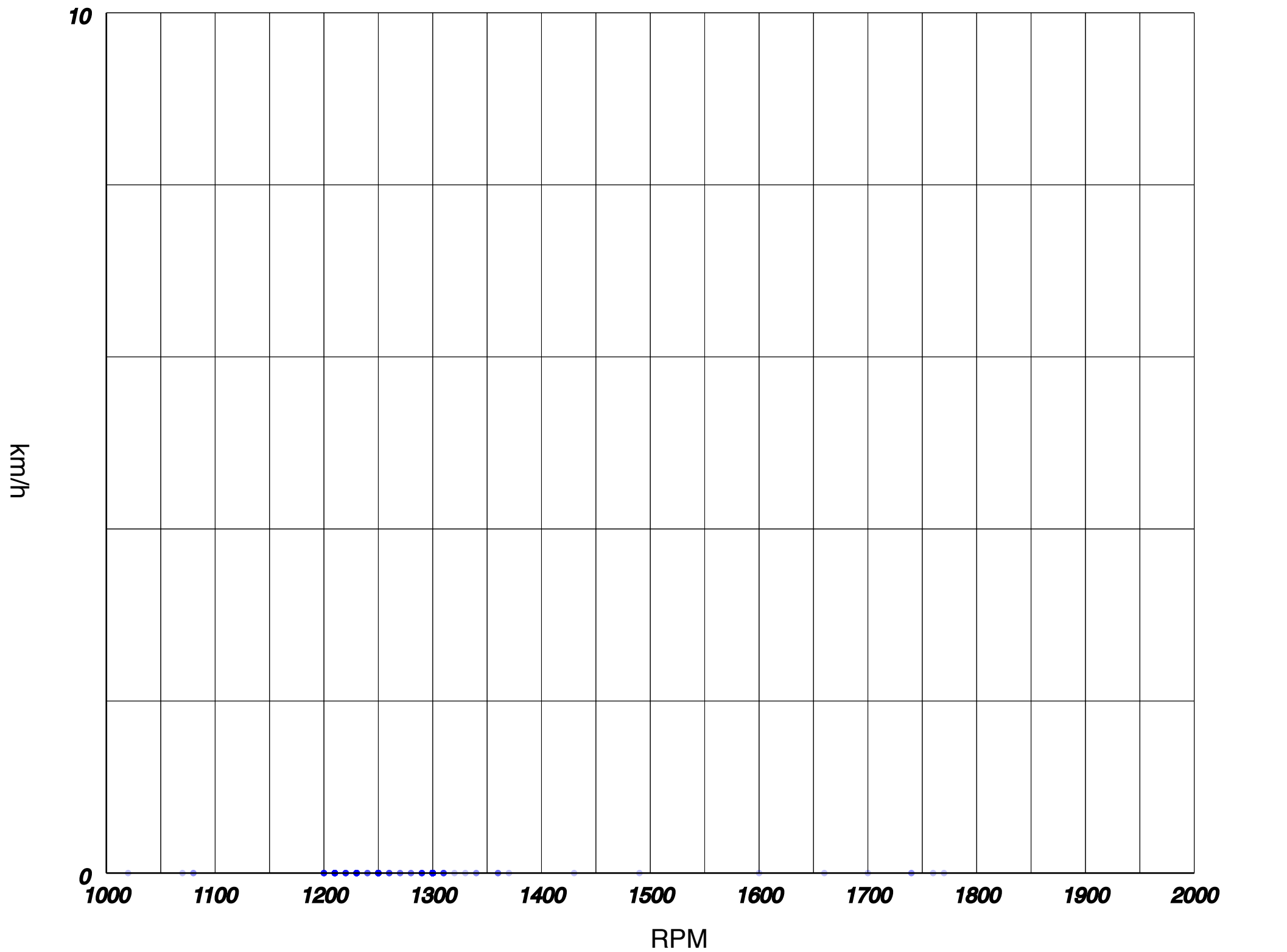


Energy	
Energy from the petrol engine	0.28 kWh
Energy Consumption	1,516.80 kWh/100km
Fuel Consumption	770.180 L/100km
Fuel Usage	0.193 L

Power Map



RPM Scatter Chart



Engine		
State	%	Longest Time
ICE Running	56%	3:49 sec
ICE Spinning	2%	0:07 sec
ICE Off	46%	4:31 sec

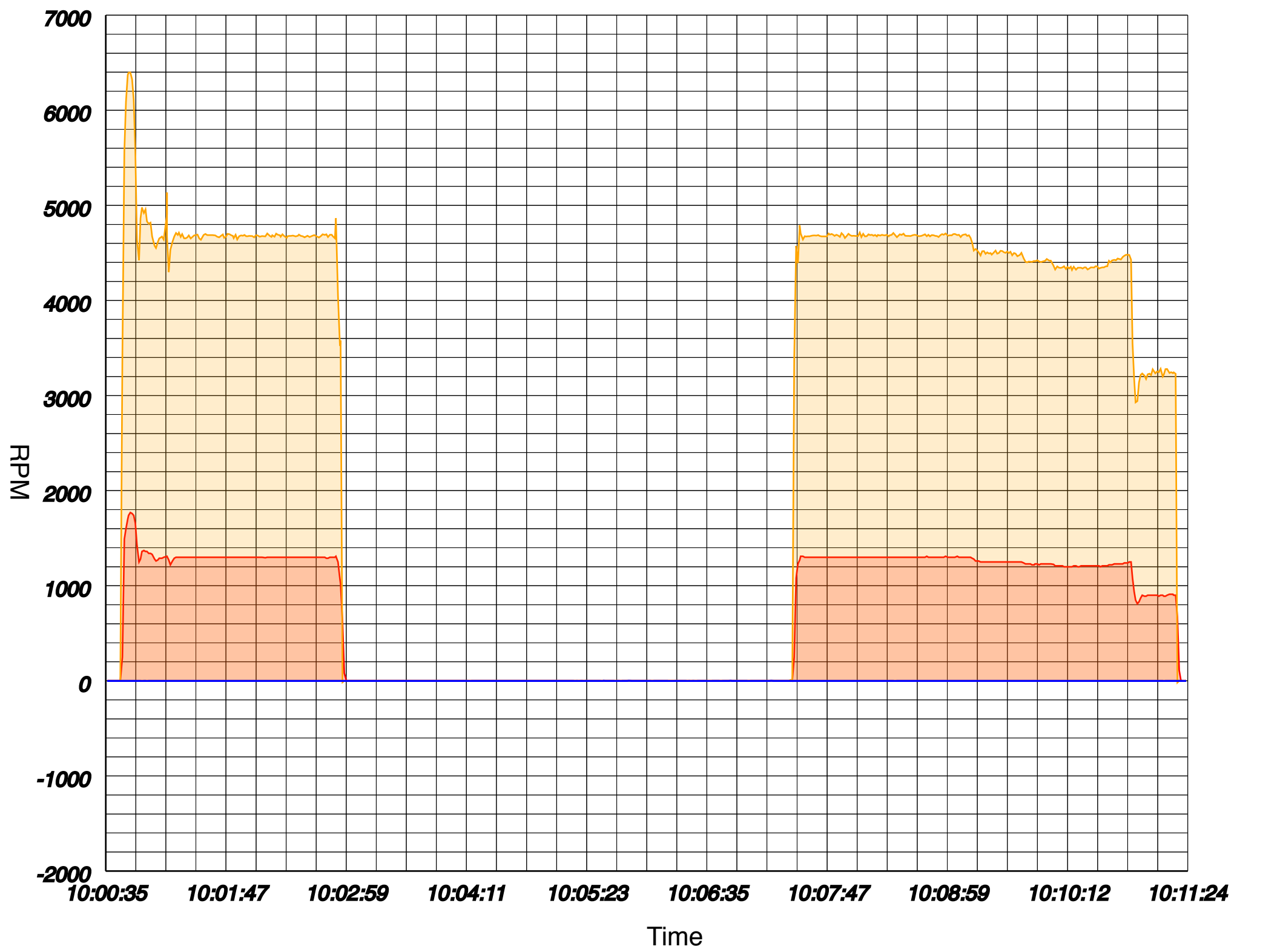
EV Statistics	
Trip Length	0.03 km
EV Range	0.03 km
Excessive EV events	0

EV States		
State	%	Longest Time
EV	44%	4:31 sec
EV traction	0%	0:01 sec
Excessive EV	0%	0:00 sec

PSD

	ICE	MG1 RPM	MG2 RPM	MG1 Torque	MG2 Torque
Avg	1,242	4,459	0	-7Nm	-6Nm
Max	1,770	6,398	2	5Nm	38Nm
Min	0	-19	-2	-17Nm	-27Nm

RPM

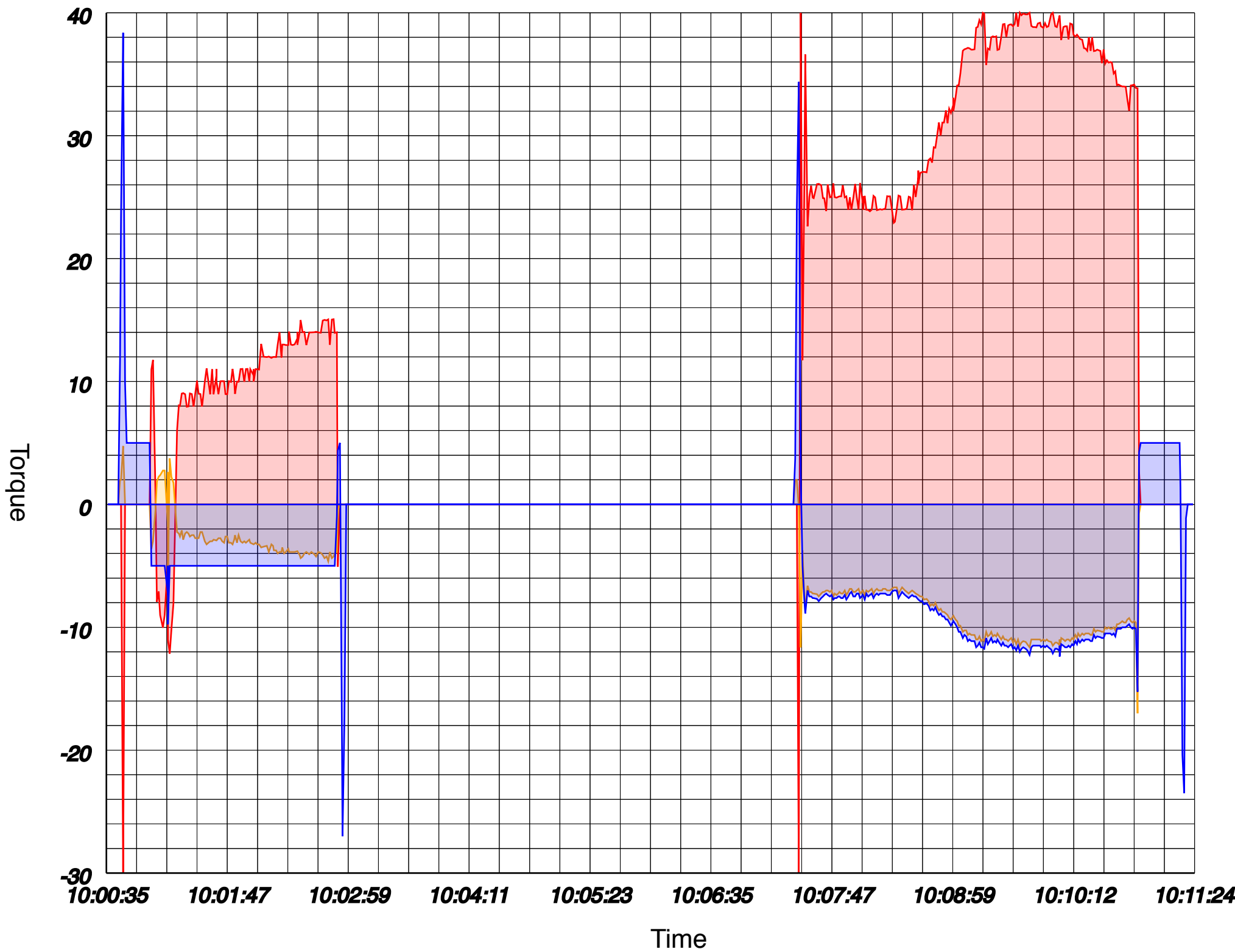


RPM

MG1 RPM

MG2 RPM

Torque

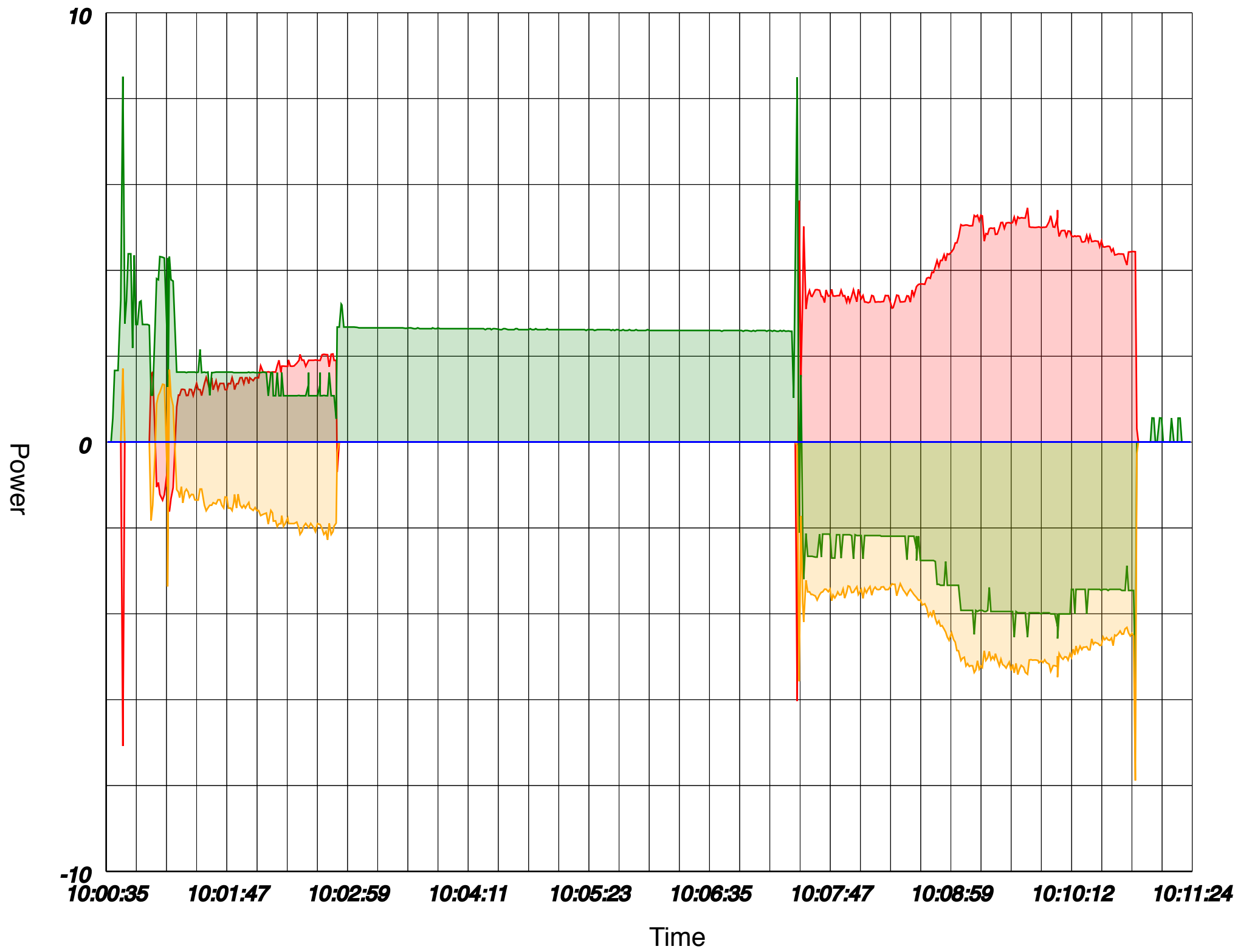


 *Engine Torque*

 *MG1 Torque*

 *MG2 Torque*

Power



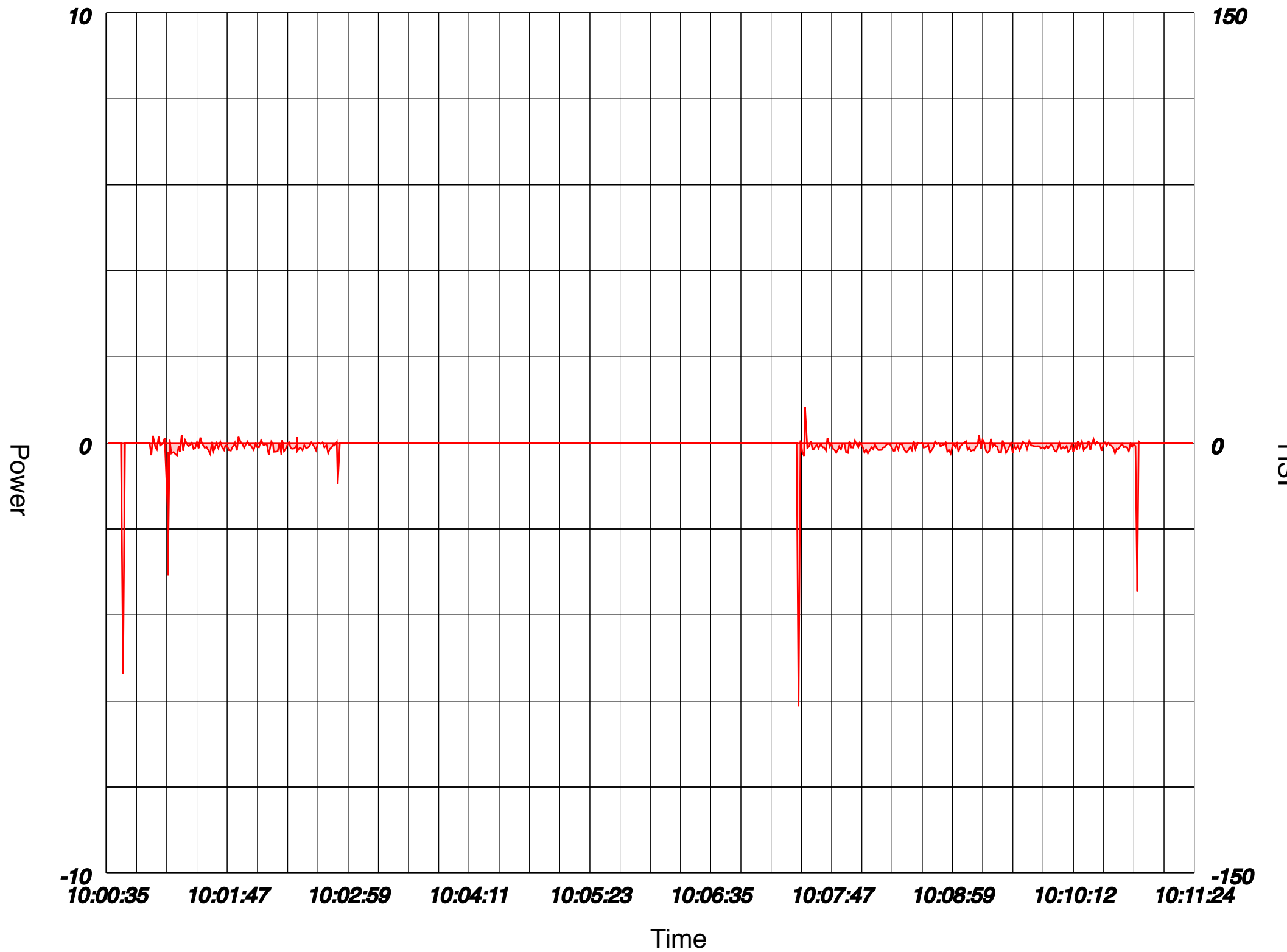
 *Engine power*

 *HV Battery Power*

 *MG1 Power*

 *MG2 Power*

Combined power

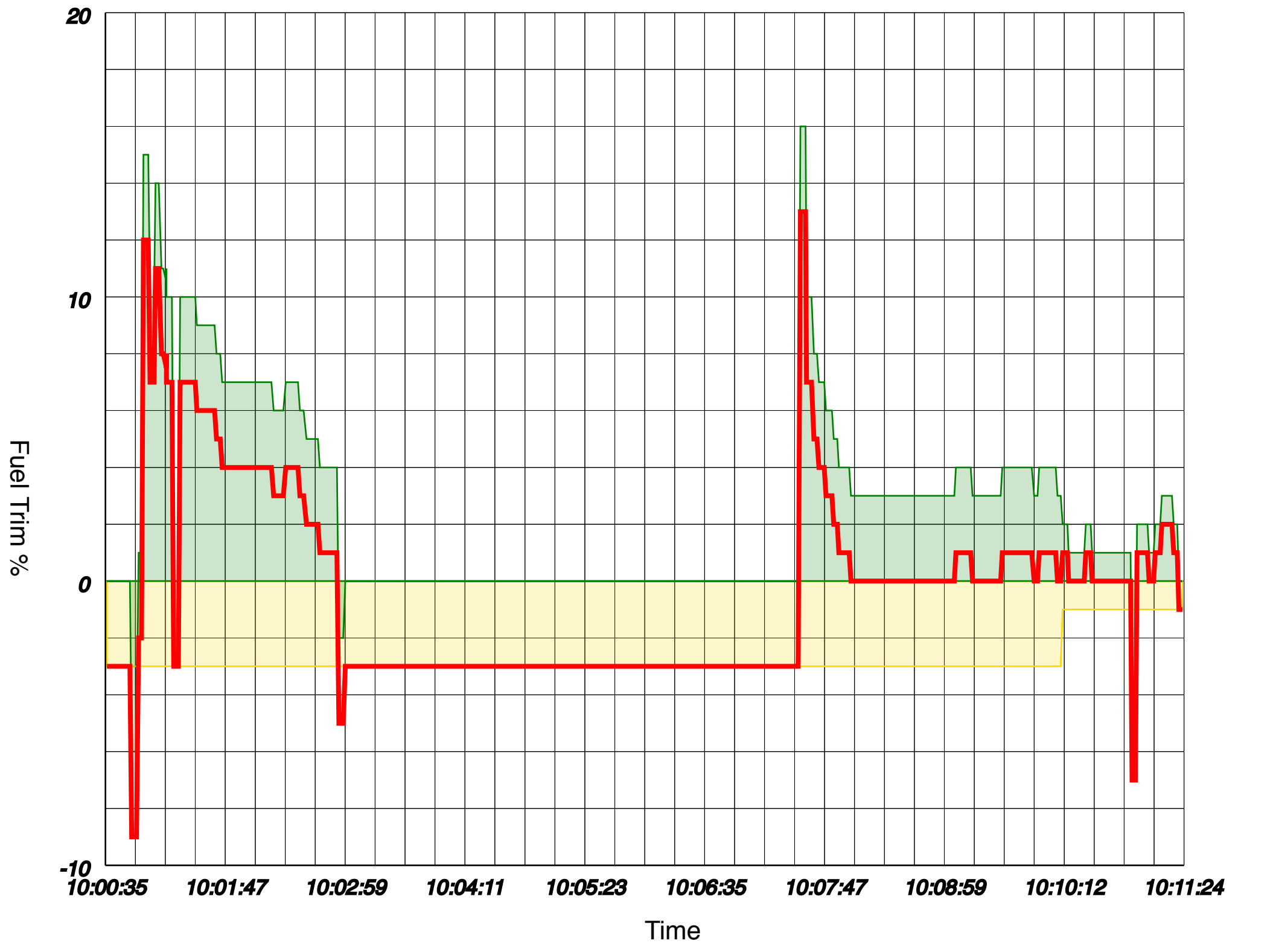


Combined power

Hybrid System Indicator

Fuel Trims

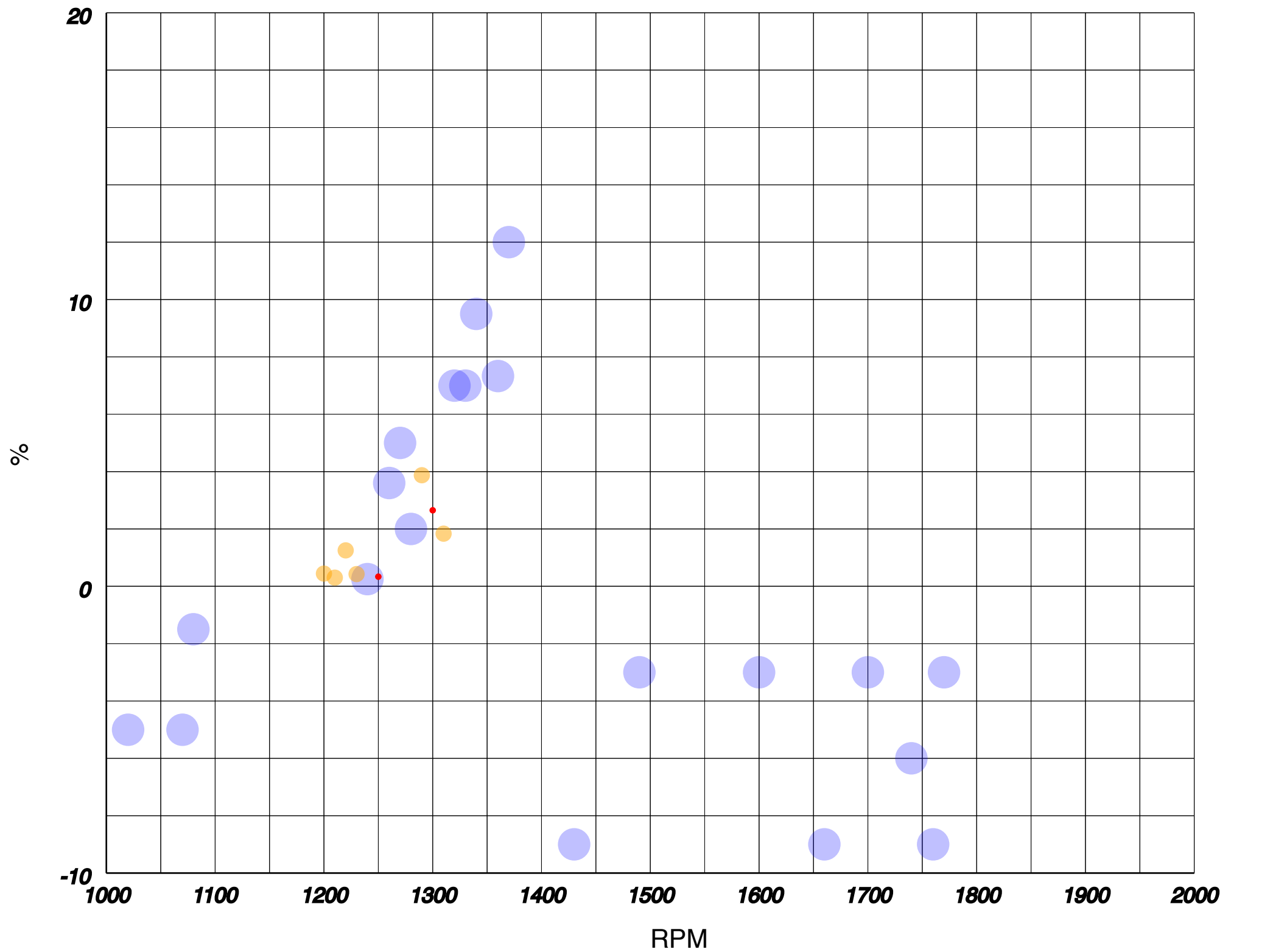
Fuel Trim





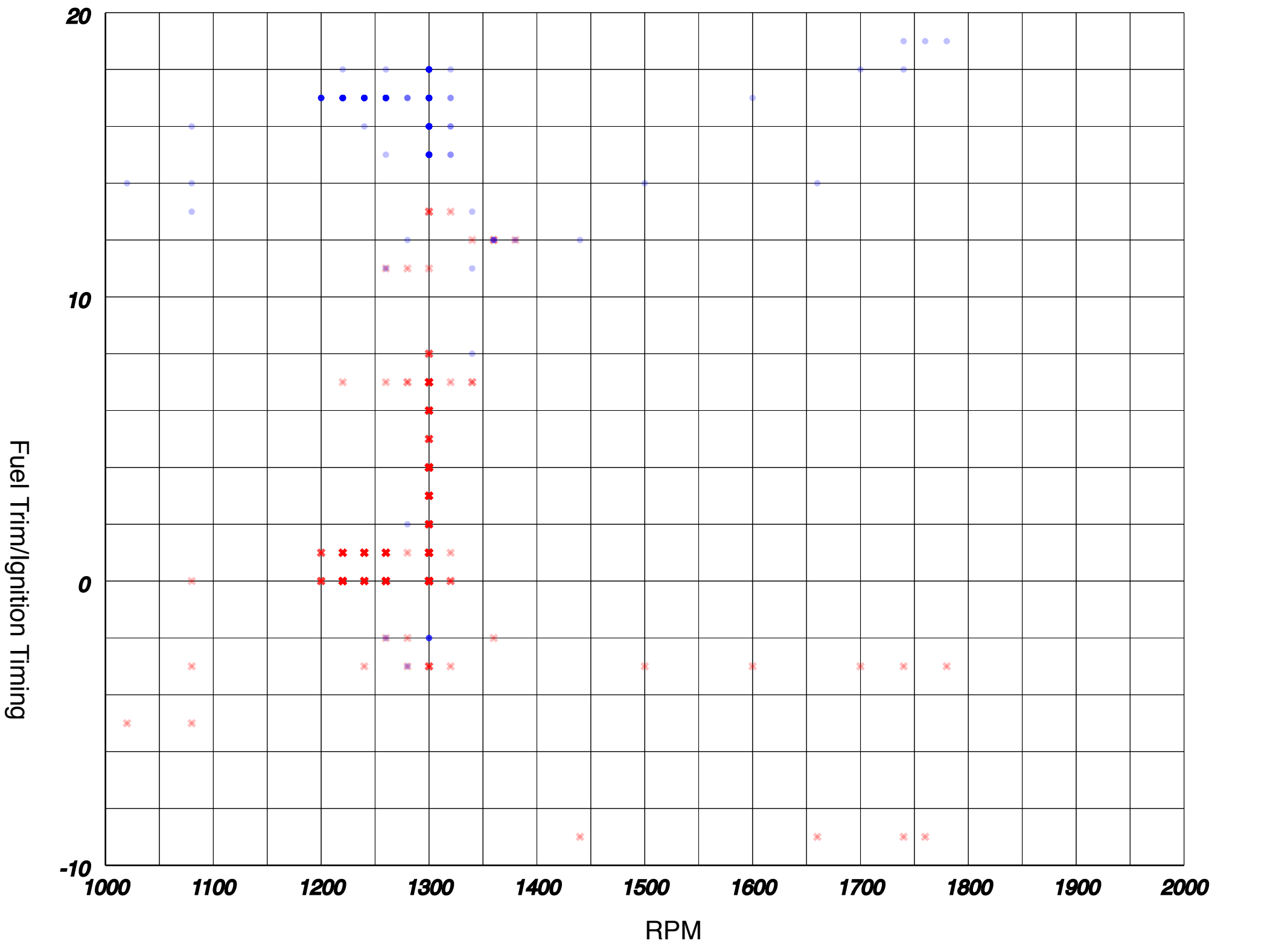
[Fuel Trims](#) are the percentage of change in fuel over time. The engine control unit keeps proper air:fuel ratio by fine-tuning the amount of fuel going into the engine.

Fuel Trim Map



For each RPM value of the petrol engine, the applied Fuel Trim plotted as a dot.
This map can be used to verify LGP-operating engines working condition.

RPM/Fuel Trim/Ignition Timing



Ignition Timing

Effective Fuel Trim

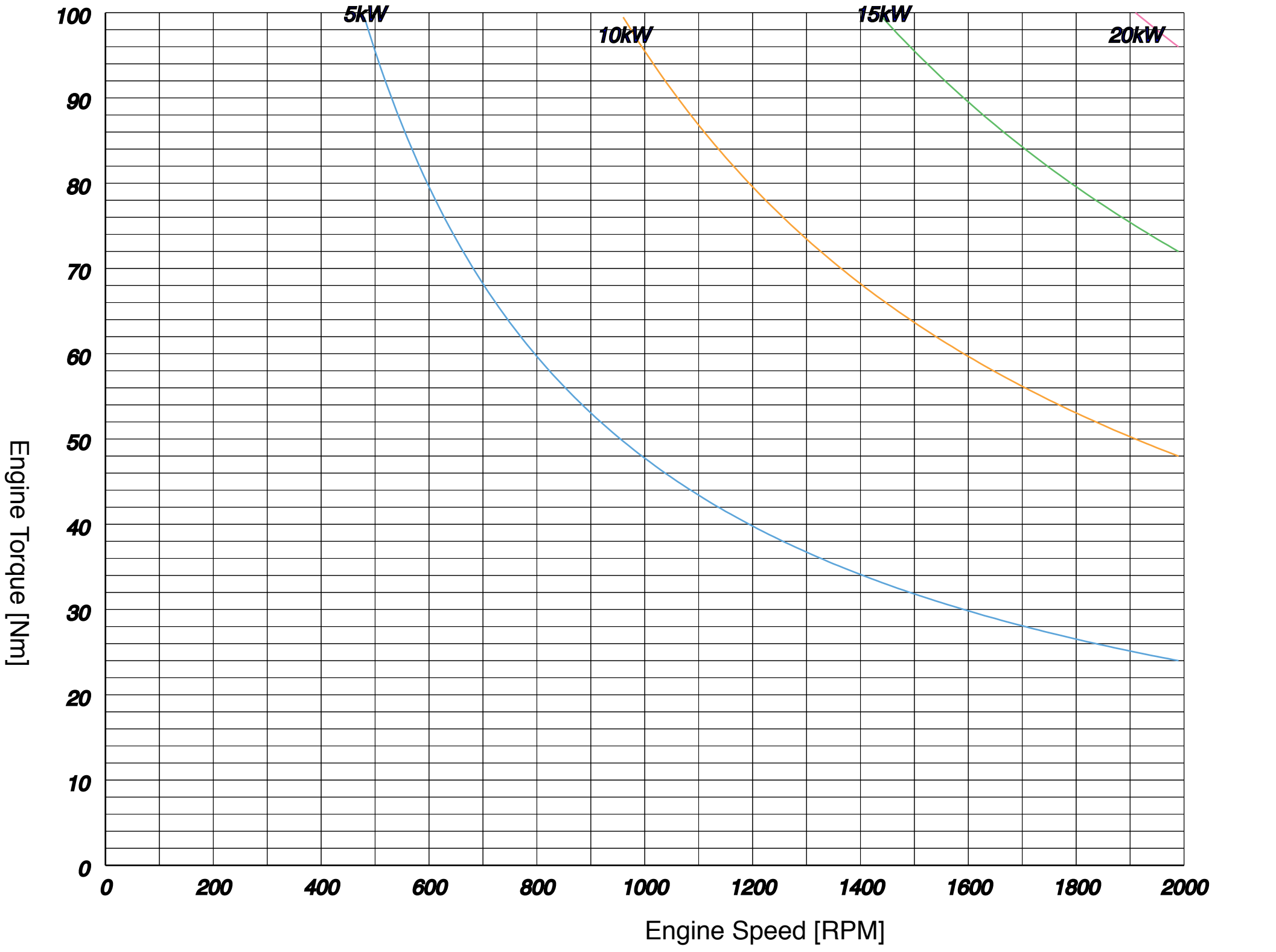
Fuel Trim and Ignition Timings are plotted at various RPM values.
This map can be used to verify LGP-operating engines working condition.

Fuel Trim			
	Short Term	Long Term	Effective
Avg	2%	-3%	-0%
Min	-6%	-3%	-9%
Max	16%	-1%	13%

BSFC Statistics

Brake specific fuel consumption ([BSFC](#)) is a measure of the fuel efficiency of an engine that burns fuel And produces rotational Power.

BSFC





Engine Off

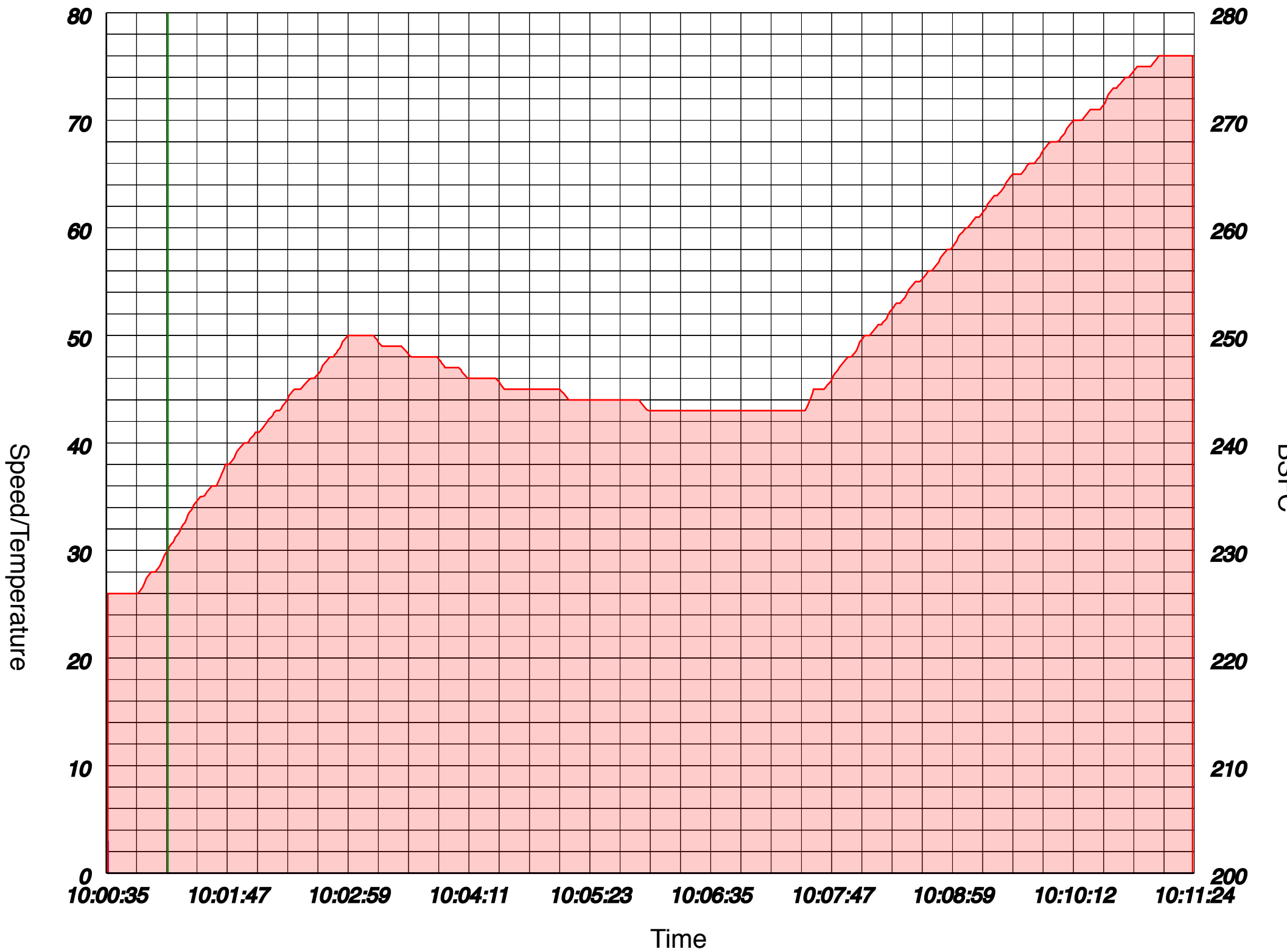
Low Efficiency

Medium Efficiency

High Efficiency

Best Efficiency

BSFC Absolute Value



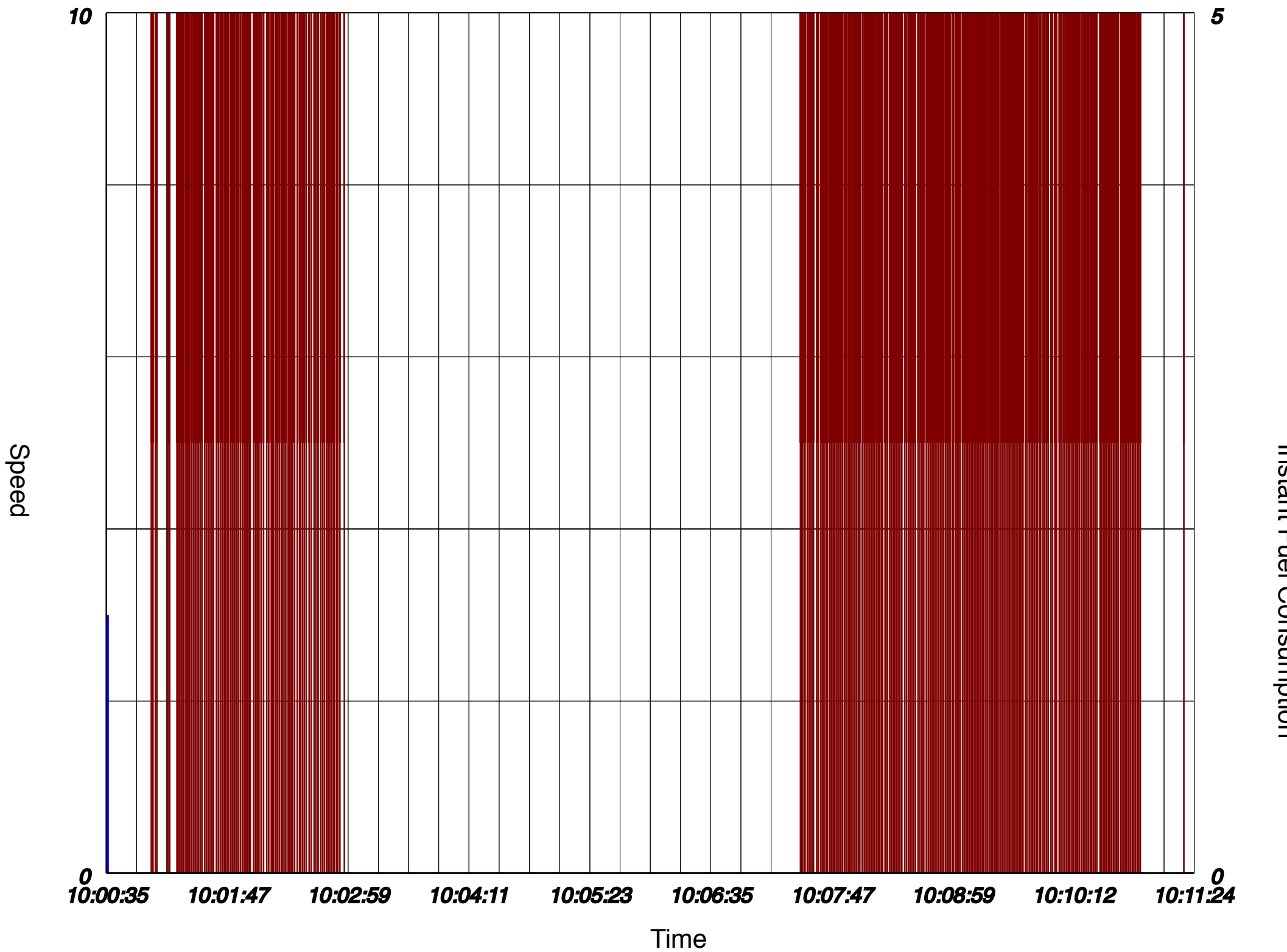
 ***Speed***

 ***Engine Coolant Temperature***

 ***BSFC***

The average BSFC value is plotted with a colored dot.
Range of BSFC excursion is plotted with a green line, so the shorter the line is, the more precise the BSFC value.

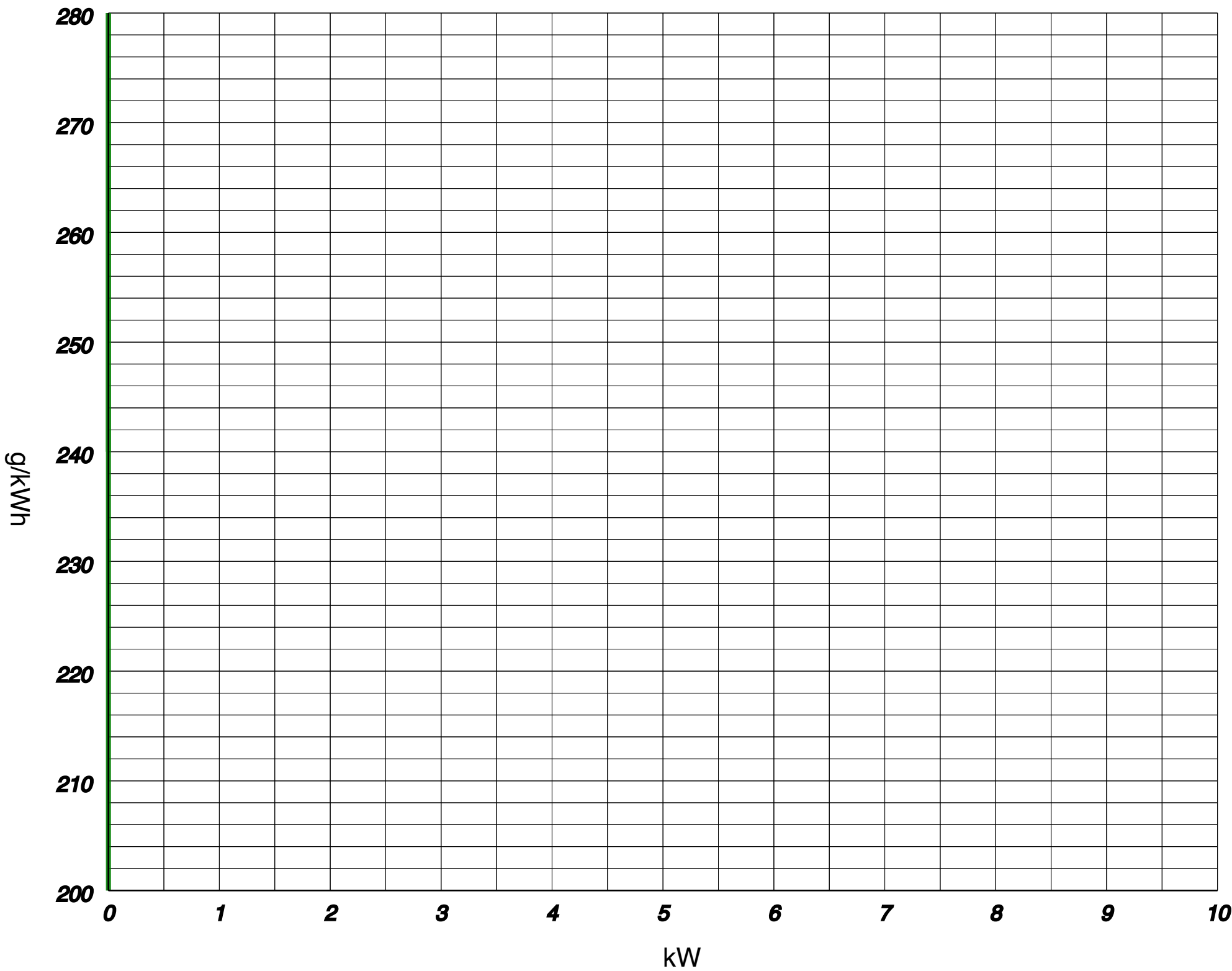
Instant BSFC/Fuel Consumption



 *Speed*

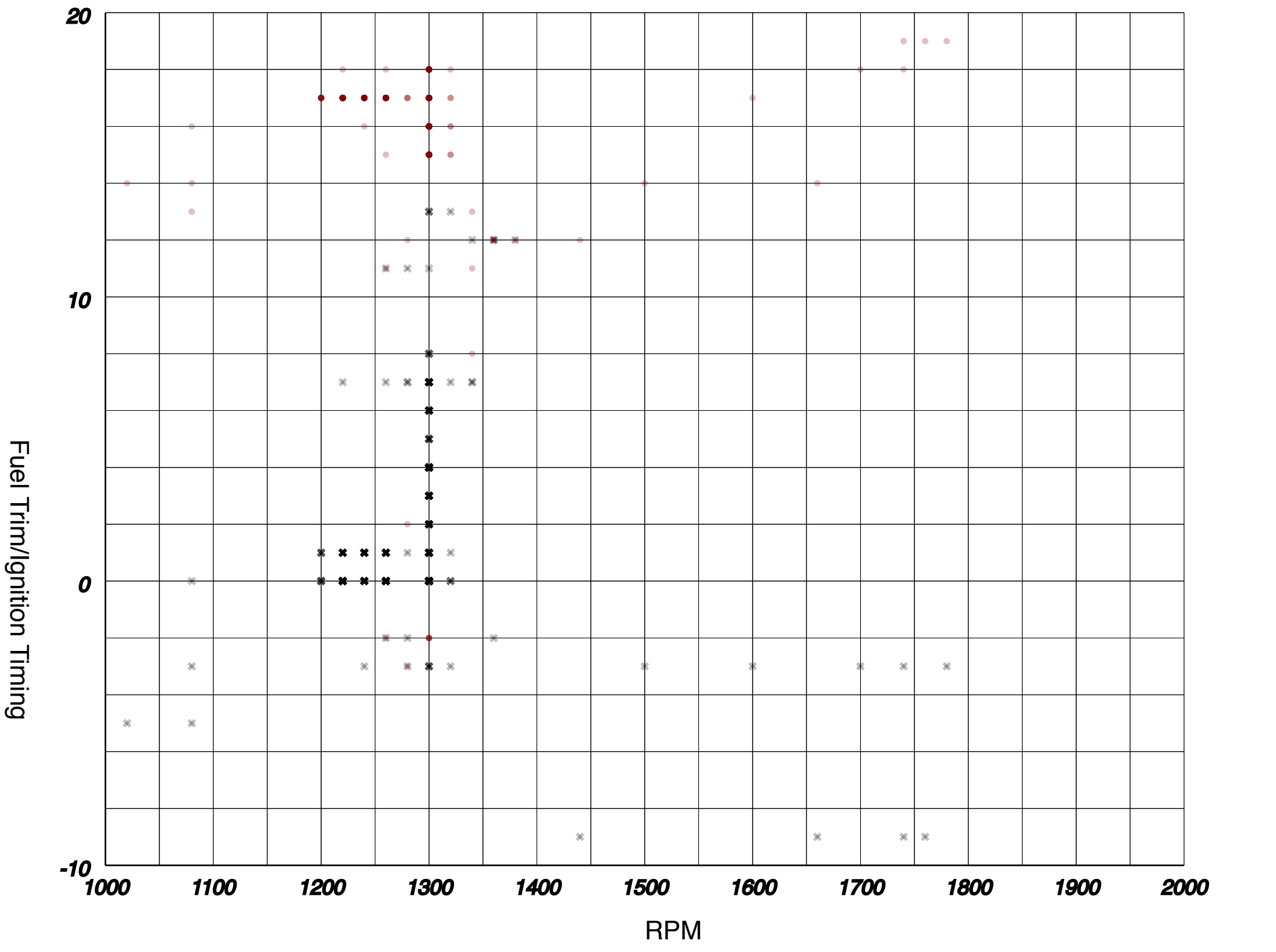
 *BSFC*

BSFC for kW



For each kW range of the petrol engine, the produced BSFC value is plotted as a dot. Light colored range depicts full value excursion, while darker color plots standard deviation from average. Values are collected only when engine is at working temperature.

RPM/Fuel Trim/Ignition Timing/BSFC



BSFC

Effective Fuel Trim

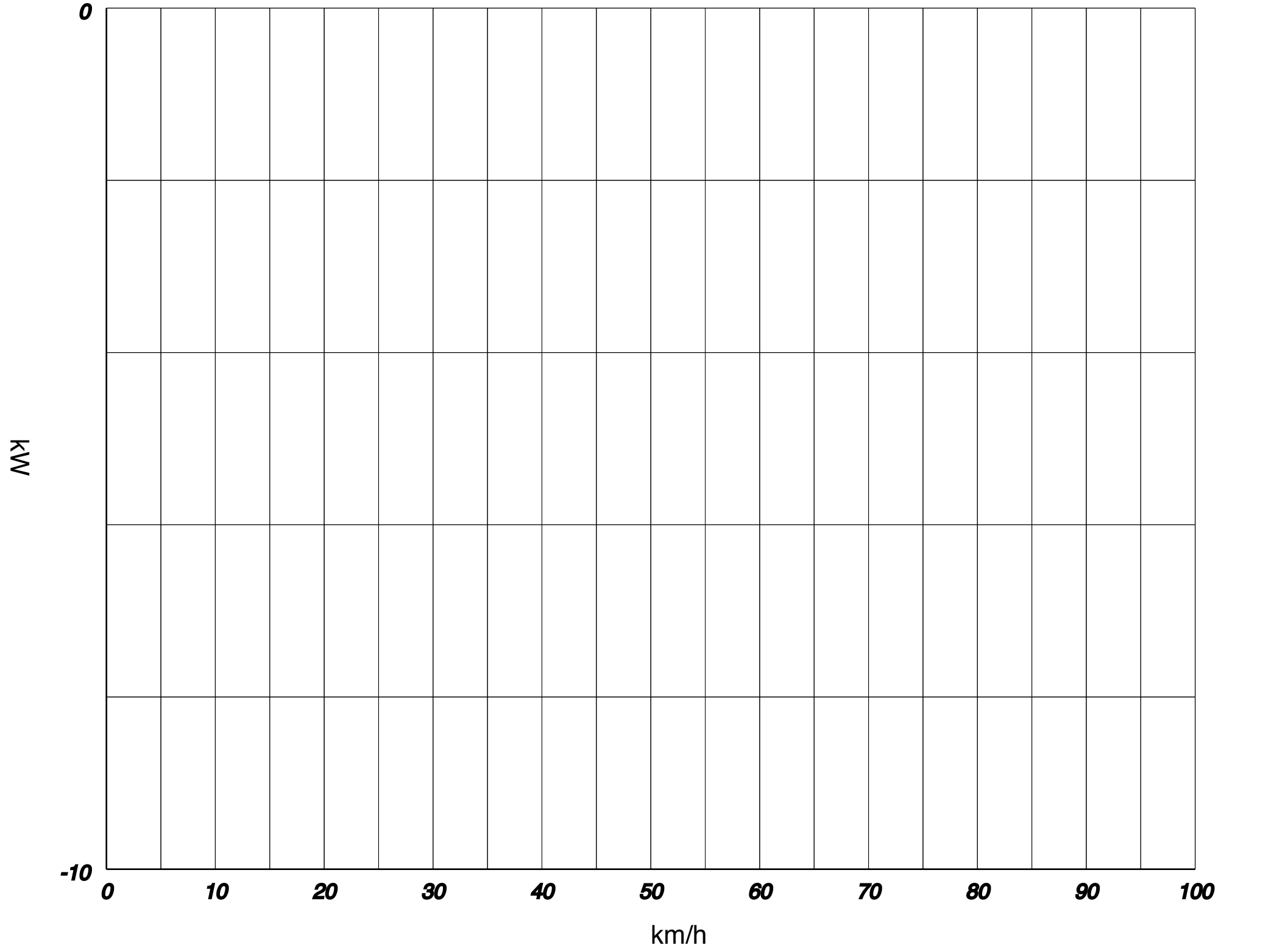
Fuel Trim and Ignition Timings are plotted at various RPM values.
Ignition Timings values are painted with the BSFC value obtained at that specific point.
This map can be used to verify LGP-operating engines working condition.

BSFC	
Average	681
Standard deviation	903

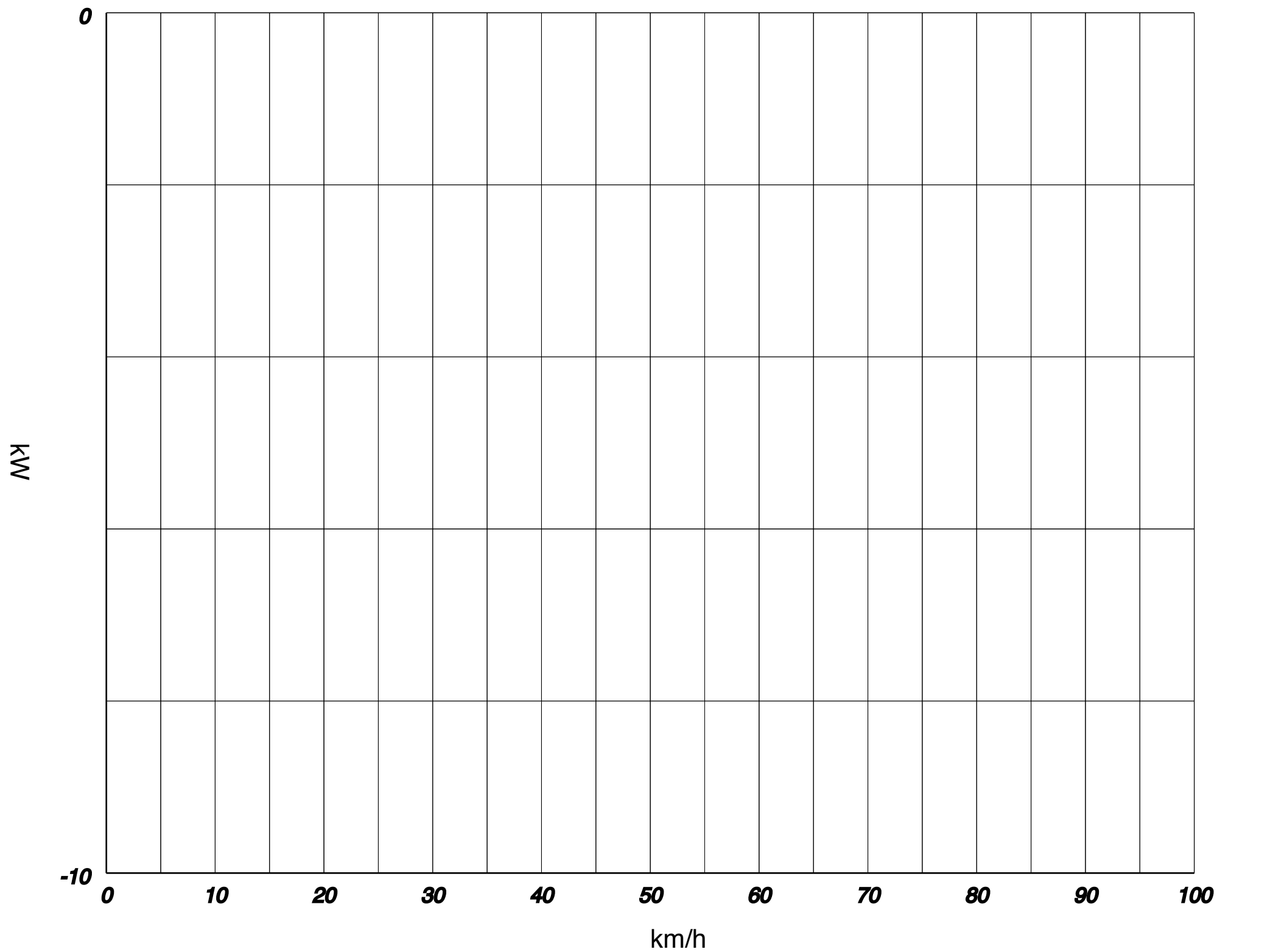
Braking

Brakings	1
Good Brakings	1
Bad Brakings	0
Mixed Brakings	0
Braking Efficiency	100.00 %
Braking while moving	0%
Longest brake event	0:01 sec
Total energy recovered by braking	0.000 kWh

Recovery by braking



Recovery by coasting



Car Driving

State	%	Longest Time
Pulse	0%	0:00 sec
Approximate Glide	0%	0:00 sec
Coasting	2%	0:07 sec
Heretical	0%	0:00 sec
Accelerator pressed	100%	10:49 sec
Accelerating	0%	0:00 sec
Moving	0%	0:01 sec

Car operational state statistics during the trip.
States are expressed as percentage over the entire trip time and longest time span the state persisted.

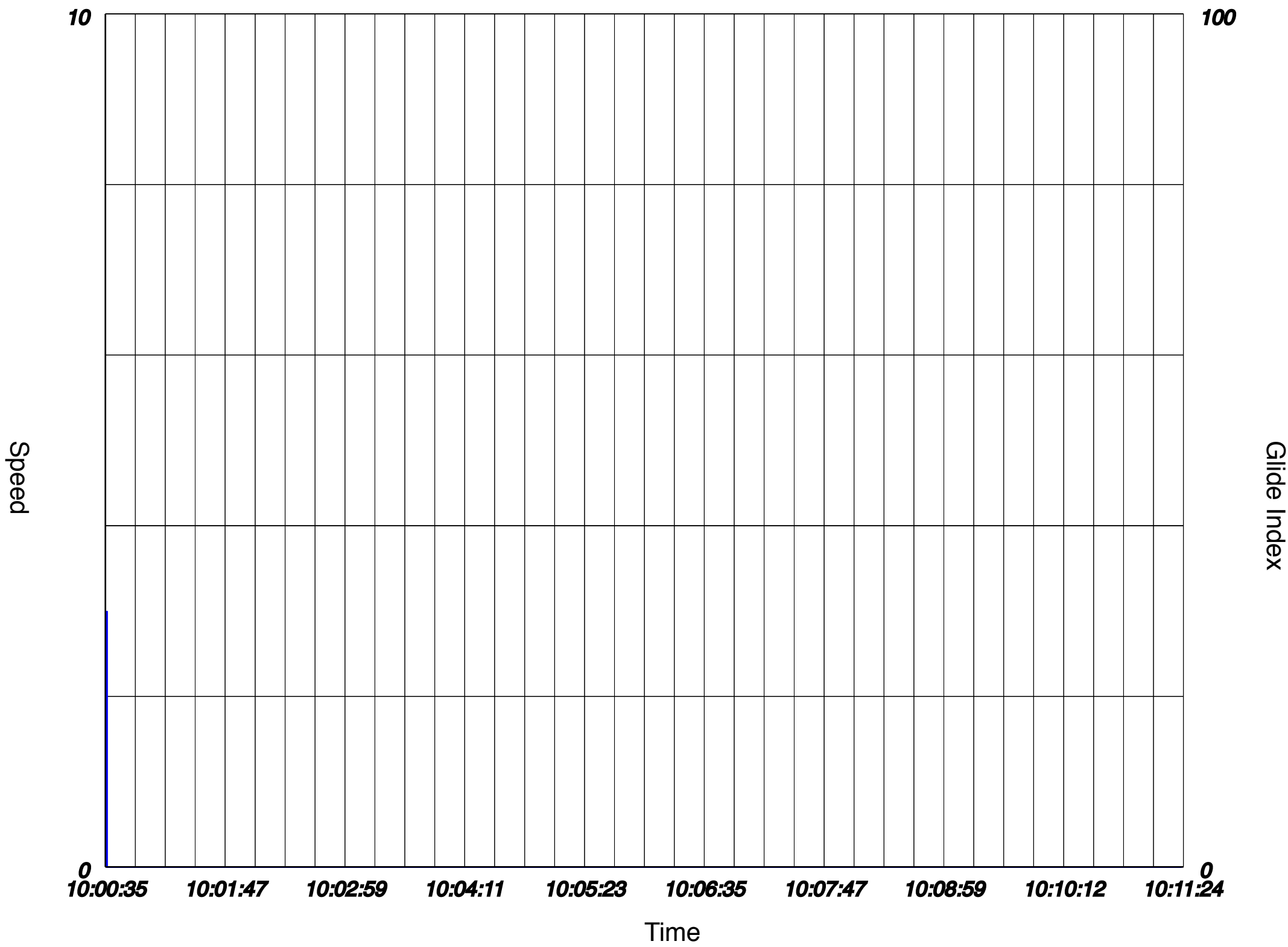
- Pulse: accelerating with nearly all ICE power given to traction.
- Approximate Glide: cruising with no electrical or mechanical traction (approximate evaluation).
- Coasting: cruising with no accelerator or brake applied.
- Heretical: cruising with MG1 electric motor providing traction.
- Accelerator pressed: accerator pedal is pressed, even if not actually accelerating.
- Accelerating: car speed is increasing.

- Moving: car is not stopped.

Glide Evaluation

Glide type	HV Neutral
Glide score	0

Glide Index



Speed

Glide Index

Driver Evaluation

Accelerator Nervousness	1.46
Braking Efficiency	100.00%
Inefficient Ignitions	0/2

- Accelerator Nervousness: Variability of the accelerator pedal usage. Higher values indicate a nervous driving style
- Braking Efficiency: Ability to use regenerative braking
- Inefficient Ignitions: Number of engine ignitions that lasted less than 5 seconds

Notes

Point size on scatter charts is proportional to number of samples: a small, well defined dot represent a higher confidence value than a bigger, faint dot.