



AMT Netherlands b.v.

Heistraat 89

NL-5701 HJ Helmond

Netherlands/Holland

Tel: int+31 492 545801

Fax: int+31 492 550379

Http: //www.amtjets.com

Email: email@amtjets.com

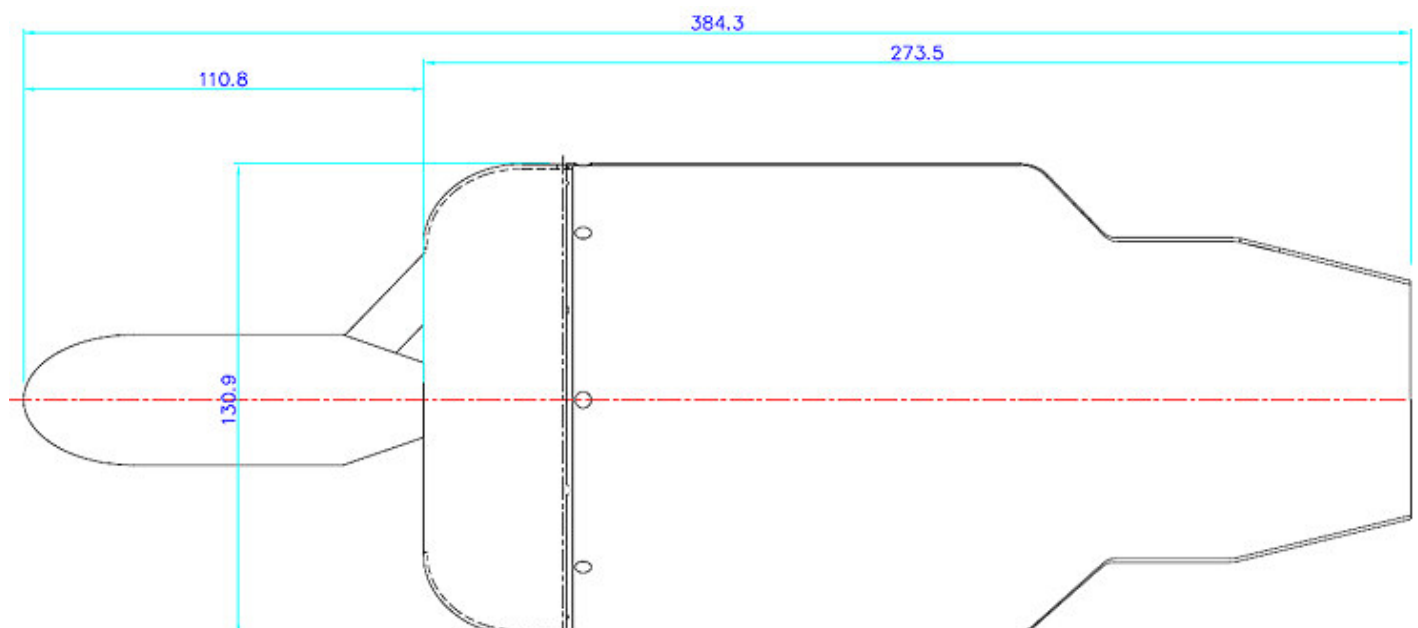
June 2009

Olympus HP gas-turbine.

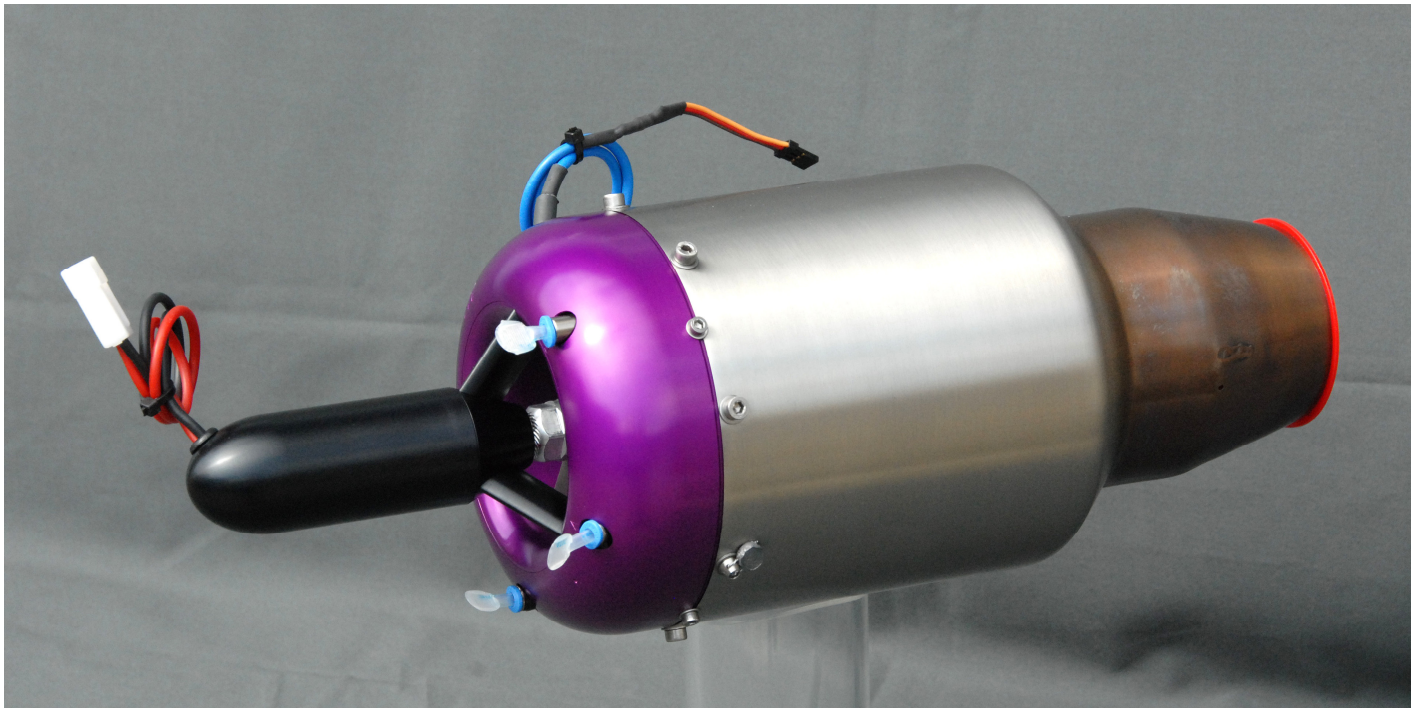
	E-start system	Air-start system
Diameter	131 mm	131 mm
Length	384 mm	273 mm
Turbine weight	2850 gram	2475 gram
System weight *	3795 gram	3150 gram
Thrust @ max. rpm	230 N	230 N
Thrust @ min. rpm	13 N	13 N
Maximum RPM	108,500	108,500
Idle RPM	36,000	36,000
Pressure ratio @ max. rpm	3,8 :1	3,8 :1
Mass flow @ max. rpm	450 gr/sec.	450 gr/sec.
Normal EGT	700 C	700 C
Maximum EGT	750 C	750 C
Fuel consumption @ max. rpm	640 gr/min.	640 gr/min.
Fuel	JP-4/petroleum/Jet A1	
Oil	4,5% aeroshell 500 mixed with fuel.	

* System airborne weight. (complete system)
Engine, ECU, pump, battery, thermo sensor, mounting straps.

All data at STP **S.T.P.** : Standard Temp. & Pressure
 Temperature : 15 Degrees Celsius / 59 Degrees Fahrenheit
 Pressure : 1013 Mbar / 29.91 in



Picture of a standard Olympus HP E-start.

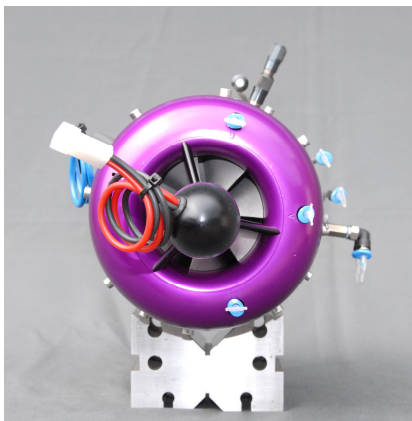


Picture of a Olympus HP E-start with additional measuring points.

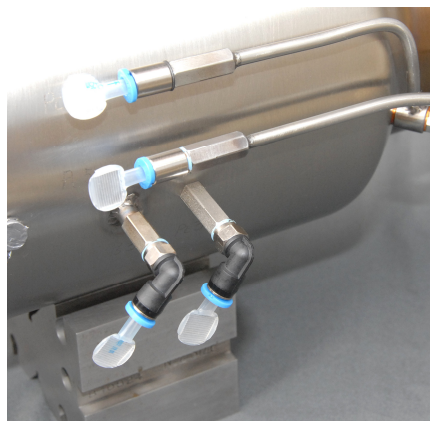


Additional measuring points on engines are build on request and are not standard.

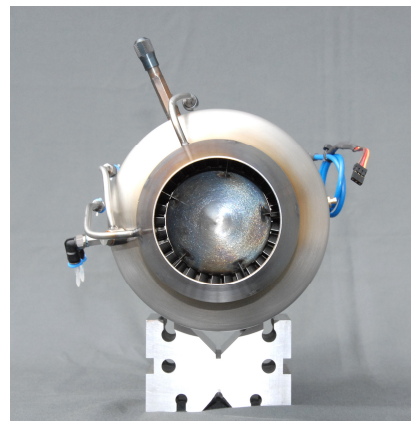
Front engine view



Side view



Rear engine view



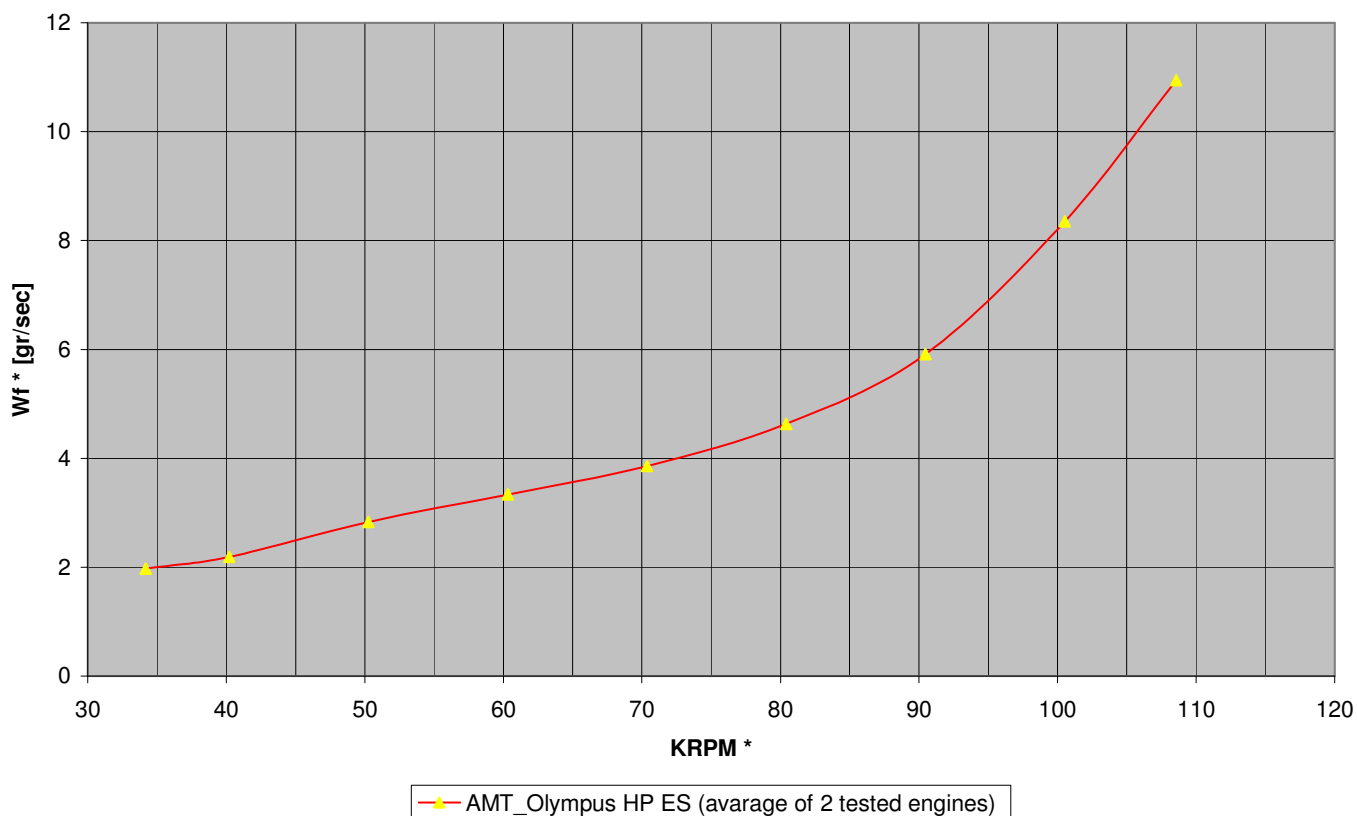
The Olympus HP E-start on a full size glider as a “bringing home” device. (ASW 20)



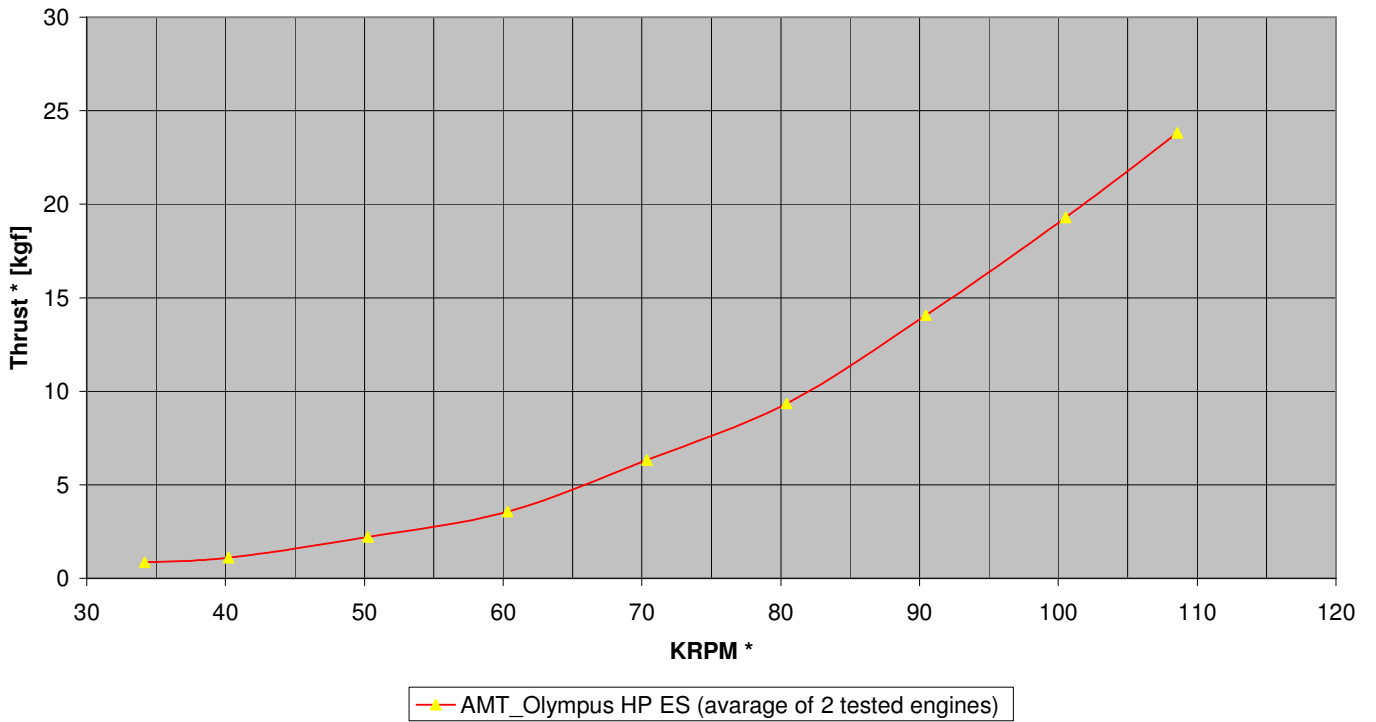
Picture Klaus Meitzner

Olympus HP E-start data as graphical information.

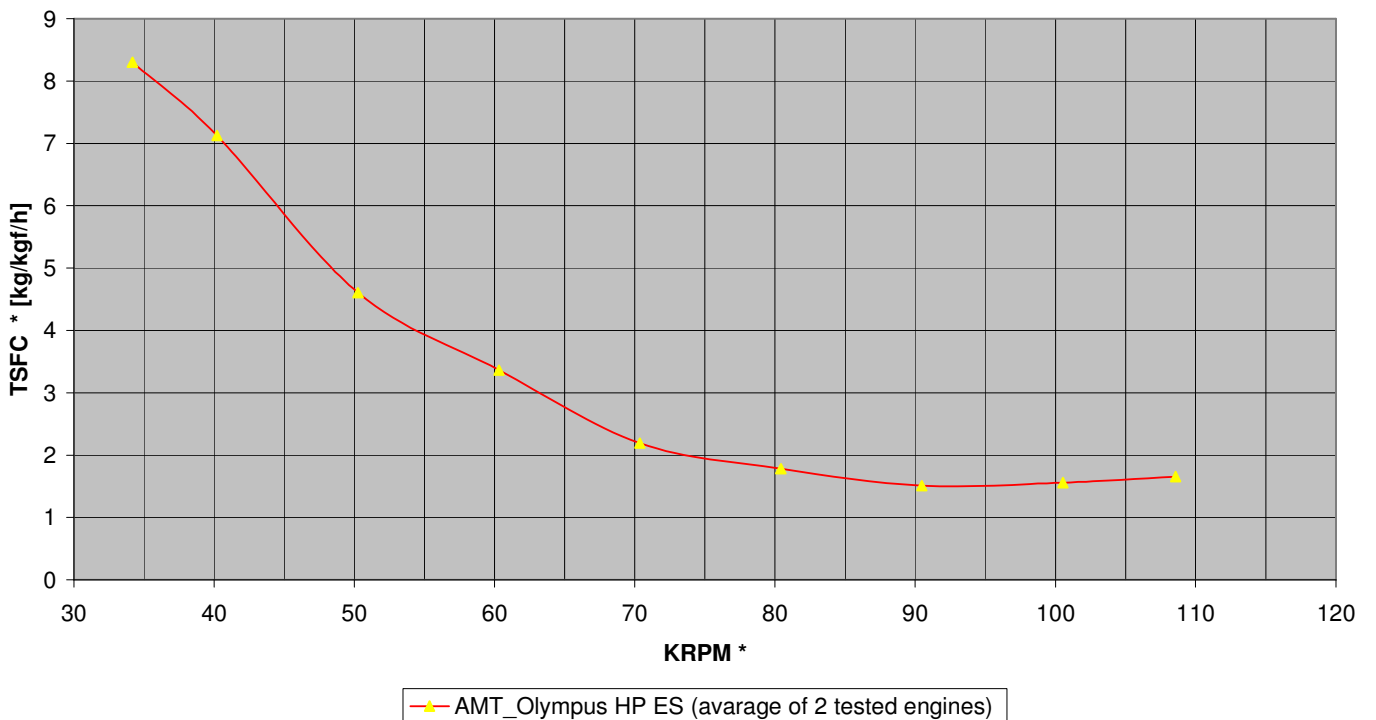
**Fuel Flow VS. RPM (Corrected)
AMT Olympus HP ES**



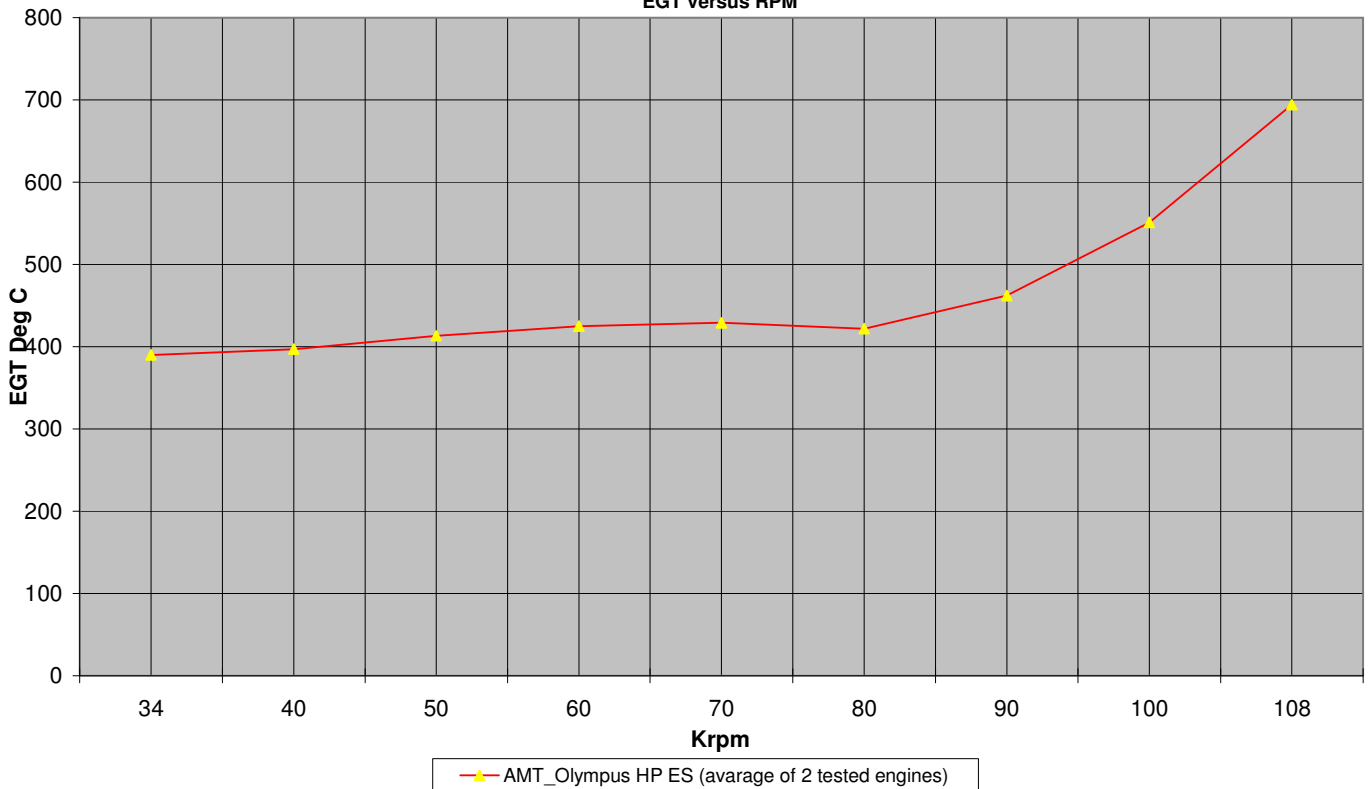
Thrust VS. RPM (Corrected) AMT Olympus HP ES



SFC VS. RPM (Corrected) AMT Olympus HP ES



AMT_Olympus HP ES
EGT versus RPM



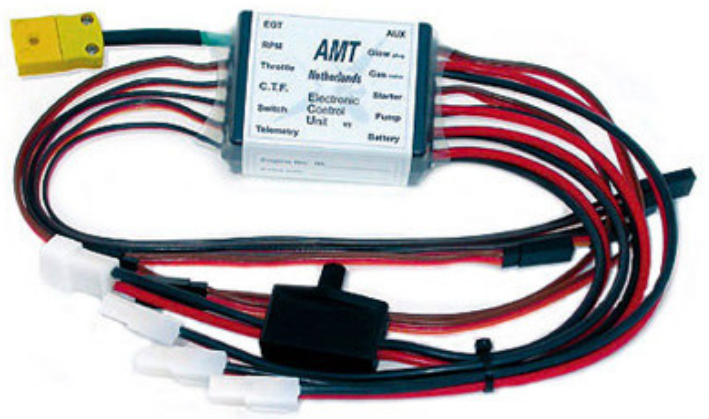
Electronic Control Unit

AMT Netherlands developed in house a fully automatic ECU to control the turbine, main reason for this development was that there was a need for fully automatic starting turbines.

The latest update was to comply with the January 2005 **AMA** requirements, with this software update (V29) we made it also possible to use lithium polymer (LiPo) batteries without changing anything to the settings of the ECU. The lithium polymer batteries are available for all our engine types.

ECU Features.

- * One or Two channel operation.
- * ECU works on 10 cell Nicad or 4 cell Lipo.
- * Output for fuel solenoid valve.
- * Output for propane solenoid valve.
- * Output for glow plug.
- * Output for E-starter.
- * Programmable failsafe timer, standard set to 1 second delay before full stop.
- * Log file of last 22 min, of run @ 1 seconds interval.
- * At error, last 8 sec. log is available in 0.2 sec intervals.
- * Serial 2400 Baud, rs232 level output.
- * Weight 160 gram / 5,4 oz.
- * Fuzzy logic software, for fast throttle response.
- * No adjustments needed.
- * Ridged small ECU housing.
- * All high quality cables with gold plated connectors.
- * Standard "K type" EGT probe connector.



Telemetry software

Settings Tab

The screenshot shows the 'Settings' tab in the AMT Netherlands ECU ToolKit V2 software. The main window displays a table of ECU parameters. Below the table are several control panels for programming, register settings, and compare options.

Addr.	Internal	Description	Value	Unit	Compare
50	217	Maximum RPM; Actual Setting.	108500	RPM	0
51	180	Maximum RPM; Minimum allowed value.	90000	RPM	0
52	220	Maximum RPM; Maximum allowed value.	110000	RPM	0
53	217	Maximum RPM; Basic Factory Setting.	108500	RPM	0
60	224	Over RPM; Actual Setting.	112000	RPM	0
61	200	Over RPM; Minimum allowed value.	100000	RPM	0
62	228	Over RPM; Maximum allowed value.	114000	RPM	0
63	224	Over RPM; Basic Factory Setting.	112000	RPM	0
64	10	Over RPM time allowed (before getting error).	0,55	s	0
87	6	Corrects Vout every time going to maximum RPM. (decrease Vout)	0,05	Volt	0
133	1	Spin timer for correcting pump @ MaxRPM. (less = quicker response)	1	s	0
134	1	Spin timer for correcting pump the first time in MaxRPM range. (less = quicker resp)	1	s	0
135	4	Spin timer for spinning @ over RPM.	0,8	s	0

Below the table, there are several control panels:

- Category:** A dropdown menu with options: Spin timers, EGT, Hardware / Software, RPM settings @ idle side, RPM settings @ max side, Throttle response. An 'Edit' button is below it.
- Programming:** Contains buttons for 'Handshake', 'Erase Log', 'Erase LRI', 'Download All Settings', and 'Program Changed Settings'.
- Register Settings:** Contains buttons for 'Load ARS / SRS', 'Save ARS', 'Save Simple SRS', and 'Swap Value and Compare fields'.
- ScreenControl:** Contains checkboxes for 'DebugInfo', 'Simple Settings', and 'Expert' (checked).
- Compare Settings:** Contains a checkbox for 'Show Differences'.

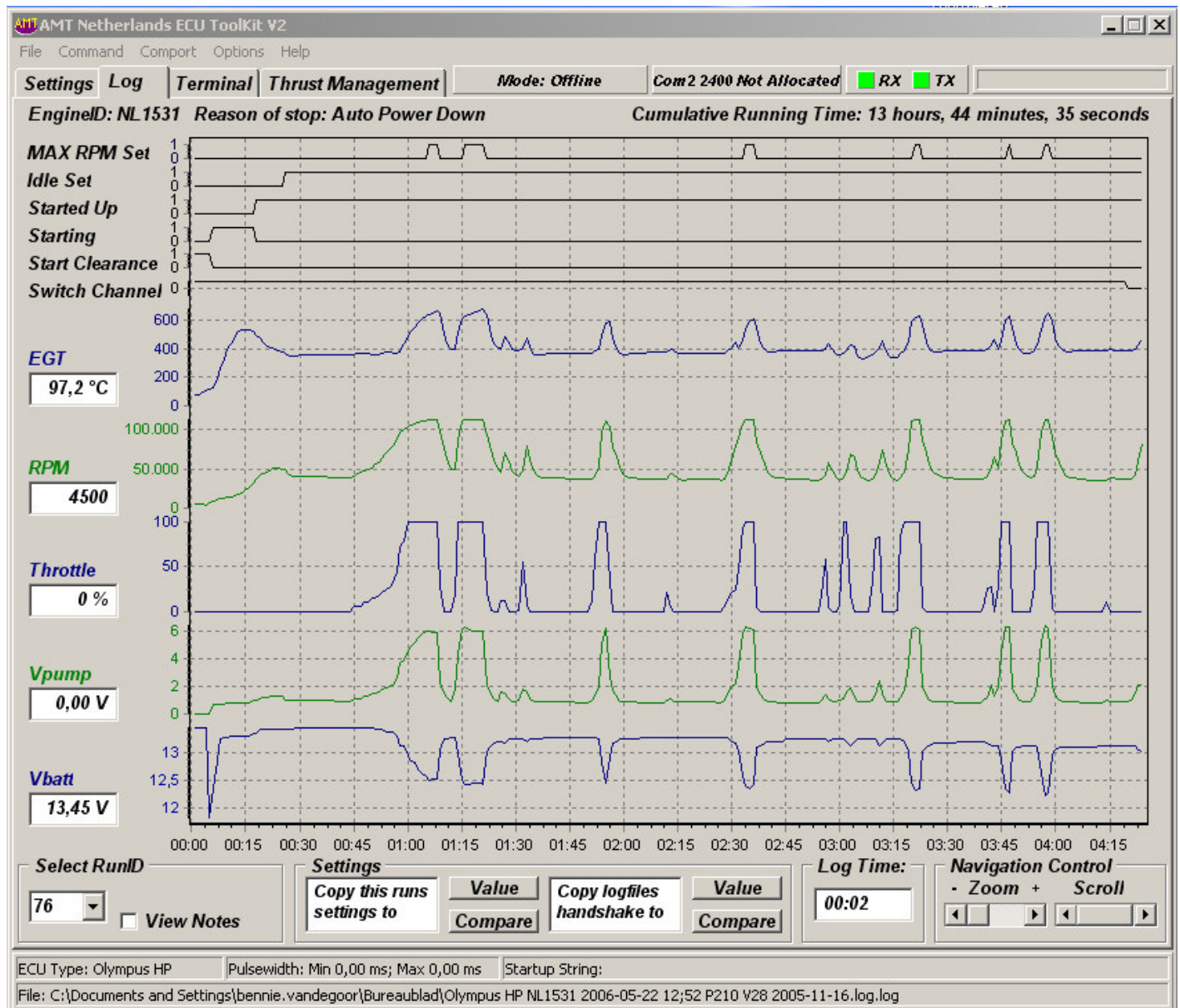
The status bar at the bottom shows: ECU Type: Olympus HP, Pulsewidth: Min 0,00 ms; Max 0,00 ms, Startup String: File: C:\Program Files\ECU Software\V2 Settings\Olympus HP\213\Olympus HP P213 V29 2007-03-16 2007-06-28 NL1673.set

The telemetry PC software is written for use with the Window XP operating system, this software will be shipped with every turbine.

With the “Settings” Tab in the PC program the user can change several parameters in the ECU software. Normally this is not needed, all ECU,s are pre-programmed and tested with the actual engine and fuel pump.

AMT Netherlands keeps record of all information during building of the engine including all data during testing.

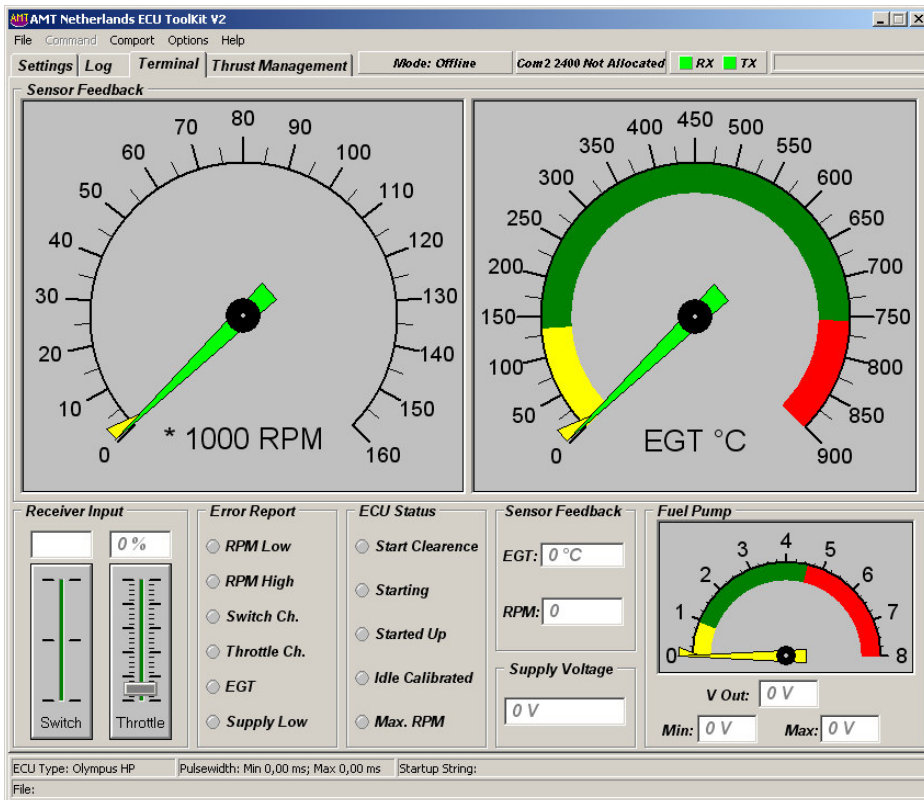
Log Tab



At a running engine the following information is logged.

- > RPM of shaft. (500 RPM resolution)
- > Exhaust Gas Temperature. (4 Degree Celsius resolution)
- > Throttle channel. (1 % resolution)
- > Switch channel, or throttle trim @ single channel operation.
- > Fail save condition if occurred.
- > Number of fail safes during last engine run.
- > Supply voltage of ECU.
- > Pump voltage.
- > Status of ECU (e.g. started up, max RPM set, error messages)
- > Reason of last stop.
- > For each engine run, all engine settings are stored.
- > Each run has its own unique engine number and time.
- > Total running time and run time of last run.

When using the actual program and you move your cursor over the graph, the cursor feedback will give you more detailed information in high resolution. All data from cursor position is displayed on the left of the screen.



Terminal Tab

At the “Terminal” Tab the operator can observe real time data coming from the ECU.

ECU status, control inputs, fuel pump voltage battery voltage and all error messages are visible on the screen.

A standard Olympus HP E-start set contains the following parts.

- 1 x Fully tested Olympus HP E-start gas-turbine.
- 1 x Version 2.0 Electronic Control Unit.
- 1 x CTF switch harness to program ECU.
- 1 x Solenoid valve for kerosene.
- 1 x Solenoid valve for gas.
- 1 x Olympus fuel pump.
- 1 x Rear engine mount
- 1 x Front engine mount + EGT sensor mount.
- 1 x Nicad battery pack 12 volt 1700 Mah.
- 1 x Battery pack charge cable.
- 1 x Safety clip for RPM sensor.
- 1 x Glowplug connector.
- 1 x Thermo sensor (K-type).
- 1 x Glowplug wrench.
- 1 x Glow plug Rossi 8 (spare).
- 1 x Turbine Oil 1 Ltr (Aeroshell 500 or Mobil Jet Oil II).
- 1 x Manual Olympus HP E-start.
- 2 x Sticker.
- 1 x 3 meter Festo PP3 tube.
- 1 x 2 meter Festo PP4 tube.
- 1 x Festo fuel filter.
- 1 x Propane internal gas container.
- 1 x Engine Data Terminal.
- 1 x EDT charge cable.

All specifications are subject to change without notice.

For latest information see **AMT Netherlands** website at [Http://www.amtjets.com](http://www.amtjets.com)