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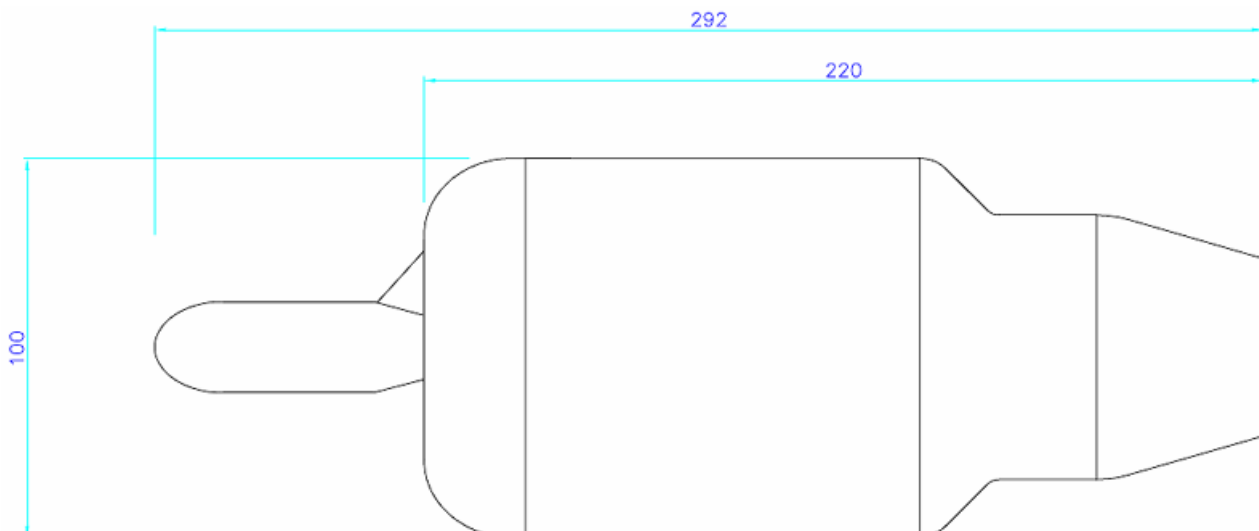
Mercury HP gas-turbine.

January 2008

	E-start system	Air-start system
Diameter	100 mm	100 mm
Length	292 mm	220 mm
Turbine weight	1550 gram	1400 gram
System weight *	2235 gram	2005 gram
Thrust @ max. rpm	88 N	88 N
Thrust @ min. rpm	4 N	4 N
Maximum RPM	151,900	151,900
Idle RPM	47,600	47,600
Pressure ratio @ max. rpm	2,8 :1	2,8 :1
Mass flow @ max. rpm	250 gr/sec.	250 gr/sec.
Normal EGT	650 C	650 C
Maximum EGT	750 C	750 C
Fuel consumption @ max. rpm	295 gr/min.	295 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.

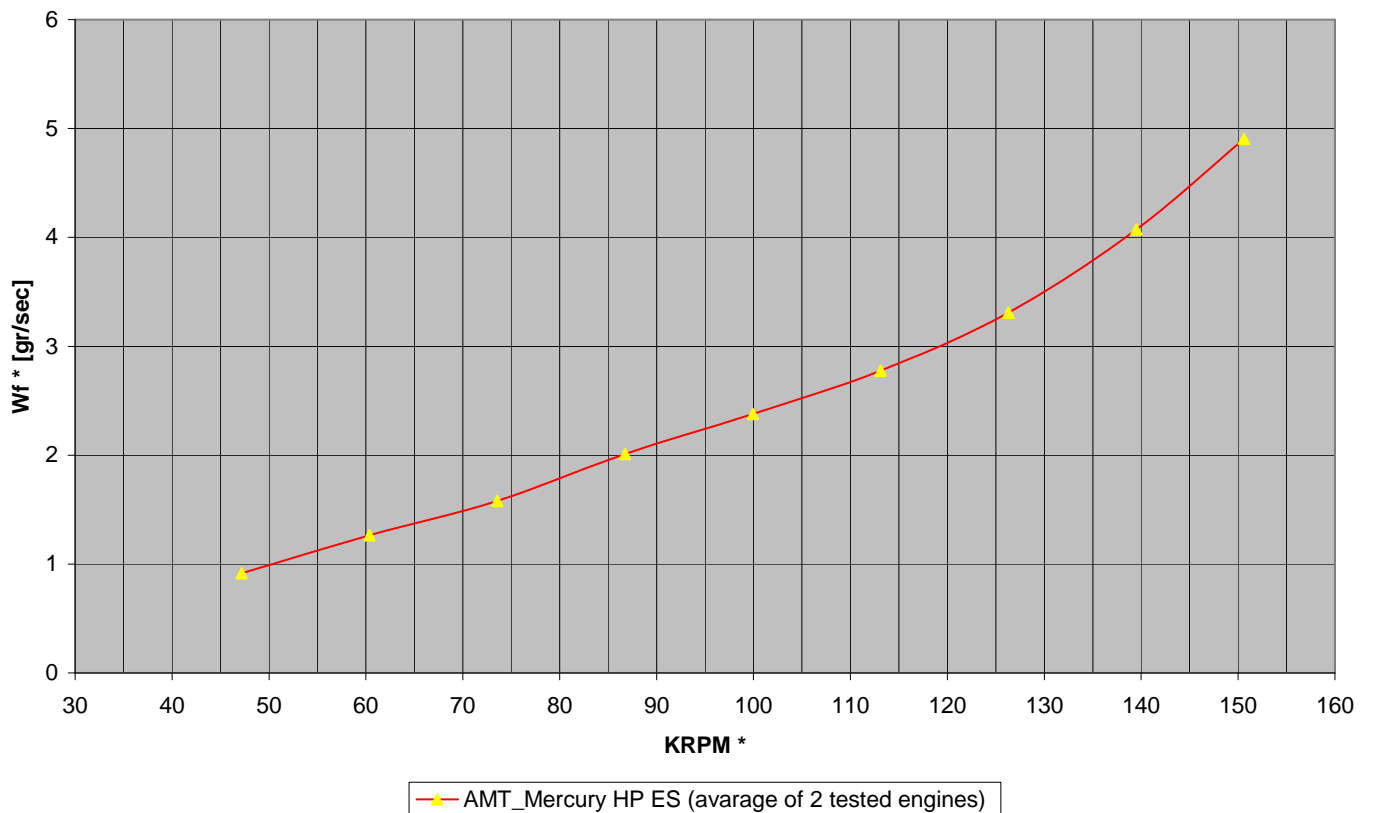
All data at STP +/- 2% **S.T.P.** : Standard Temp. & Pressure
 Temperature : 15 Degrees Celsius / 59 Degrees Fahrenheit
 Pressure : 1013 Mbar / 29.91 in



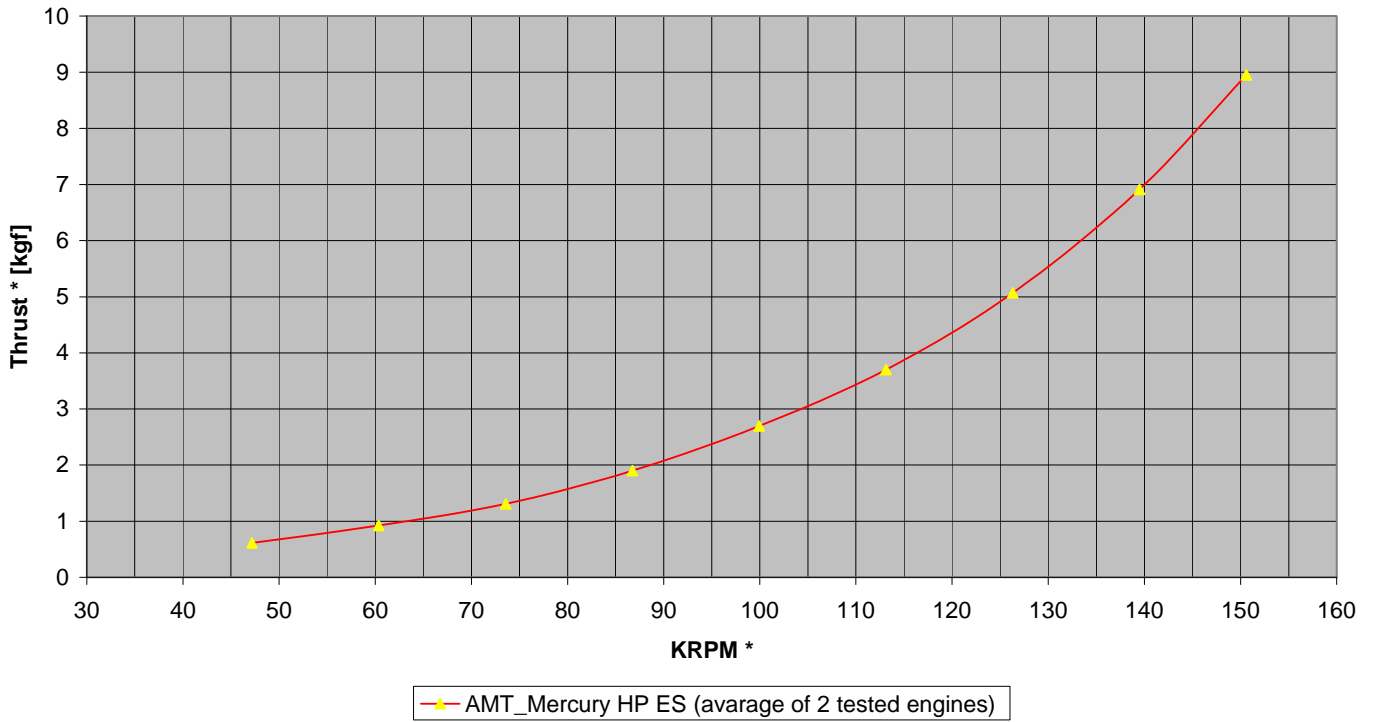
Picture of Mercury HP E-start



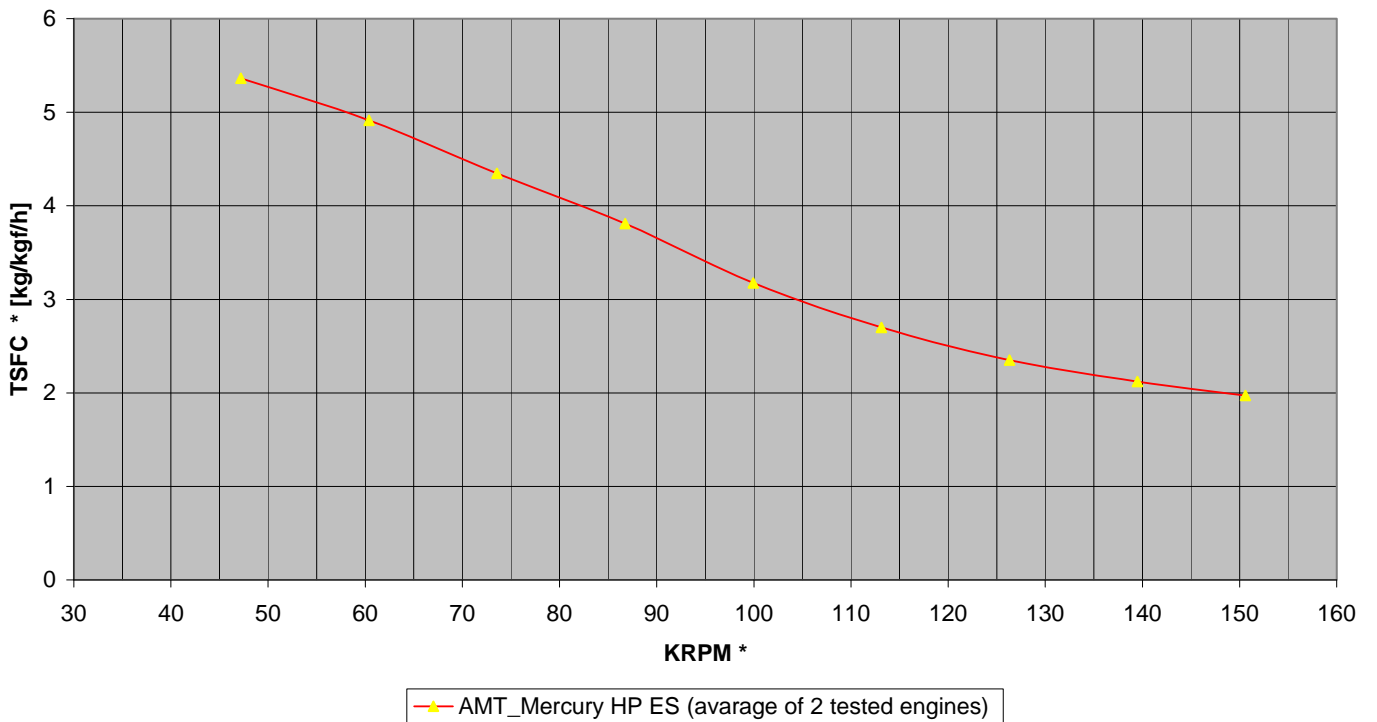
Fuel Flow VS. RPM (Corrected)
AMT Mercury HP ES

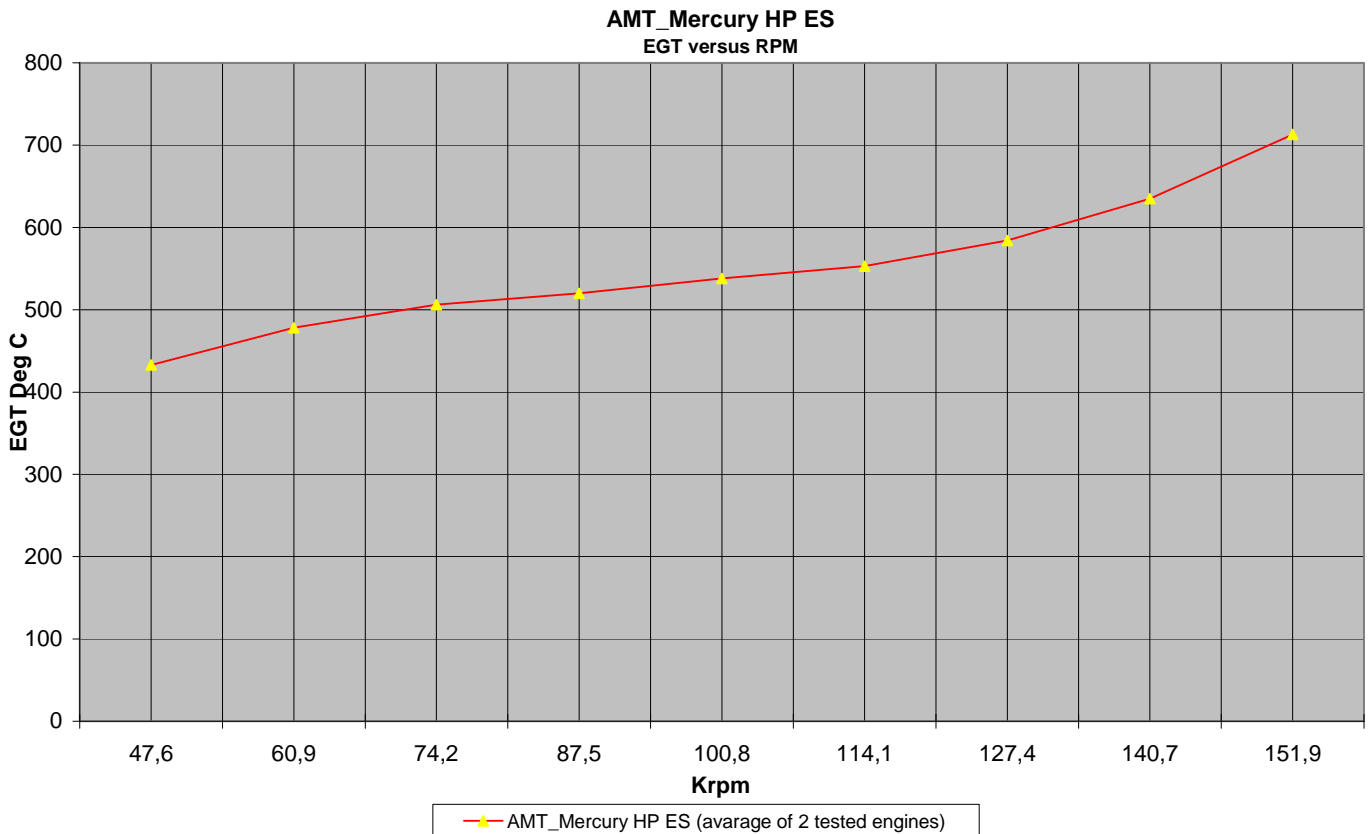


Thrust VS. RPM (Corrected) AMT Mercury HP ES



SFC VS. RPM (Corrected) AMT Mercury HP ES





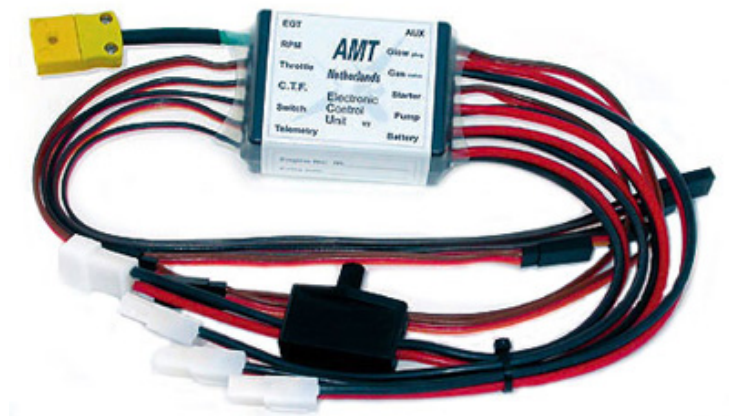
Electronic Control Unit

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.

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 and settings.

Addr.	Internal	Description	Value	Unit	Compare
50	217	Maximum RPM; Actual Setting.	151900	RPM	0
51	179	Maximum RPM; Minimum allowed value.	125300	RPM	0
52	217	Maximum RPM; Maximum allowed value.	151900	RPM	0
53	217	Maximum RPM; Basic Factory Setting.	151900	RPM	0
60	221	Over RPM; Actual Setting.	154700	RPM	0
61	200	Over RPM; Minimum allowed value.	140000	RPM	0
62	222	Over RPM; Maximum allowed value.	155400	RPM	0
63	221	Over RPM; Basic Factory Setting.	154700	RPM	0
64	10	Over RPM time allowed (before getting error).	0,55	s	0
87	12	Corrects Vout every time going to maximum RPM. (decrease Vout)	0,11	Volt	0
133	2	Spin timer for correcting pump @ MaxRPM. (less = quicker response)	2	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

Category: EGT, Hardware / Software, RPM settings @ idle side, **RPM settings @ max side**, Throttle response, Inputs. **Edit**

Programming: Handshake, Erase Log, Erase LRI, Download All Settings, Program Changed Settings

Register Settings: Load ARS / SRS, Save ARS, Save Simple SRS, Swap Value and Compare fields

ScreenControl: DebugInfo, Simple Settings, Expert

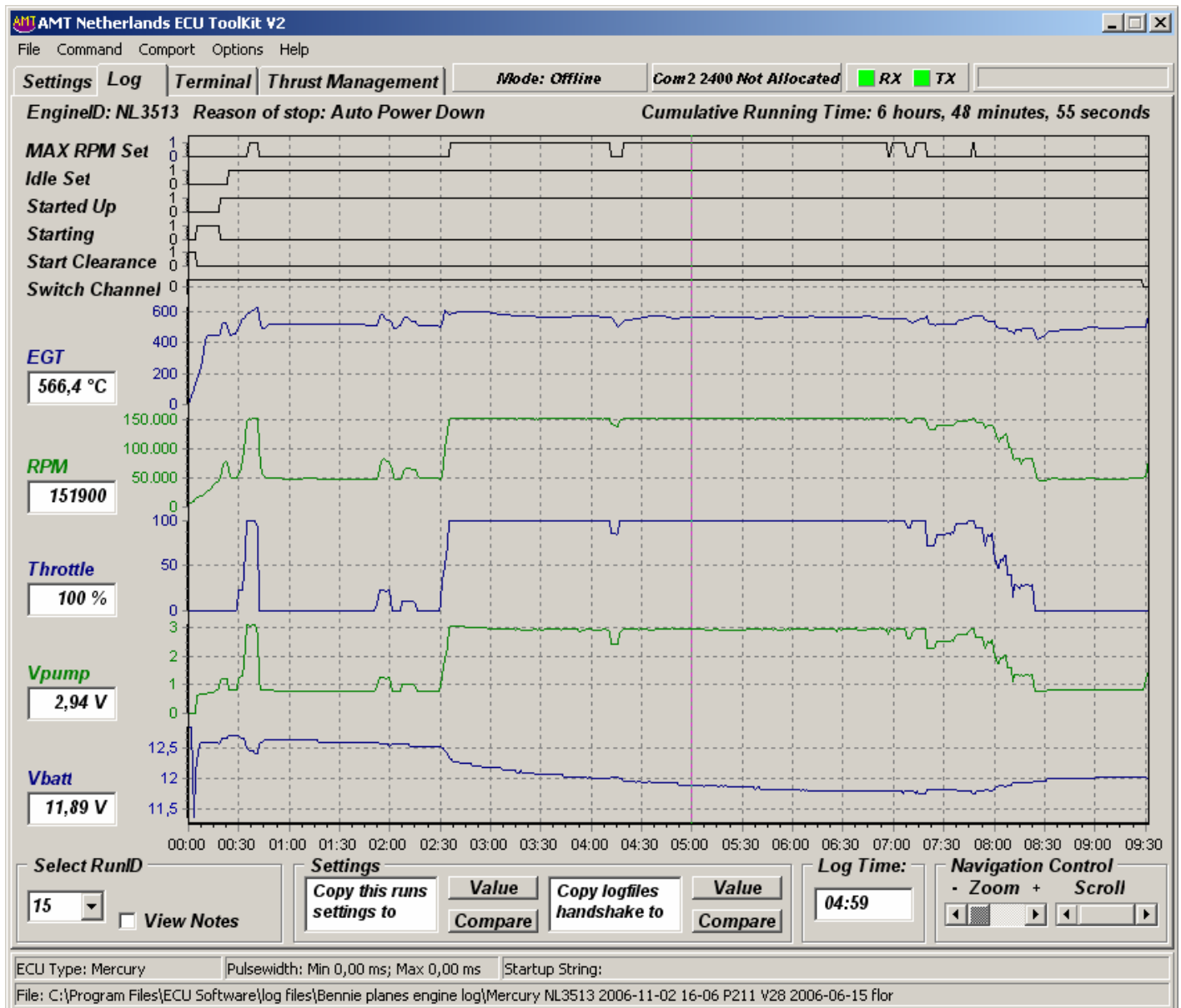
Compare Settings: Show Differences

ECU Type: Mercury | Pulsewidth: Min 0,00 ms; Max 0,00 ms | Startup String: | File: M:\+Archief\ECU Software_backup\ECU Software (27-07-2007)\ECU Software\log files\Bennie planes engine log\Mercury NL3513

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

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

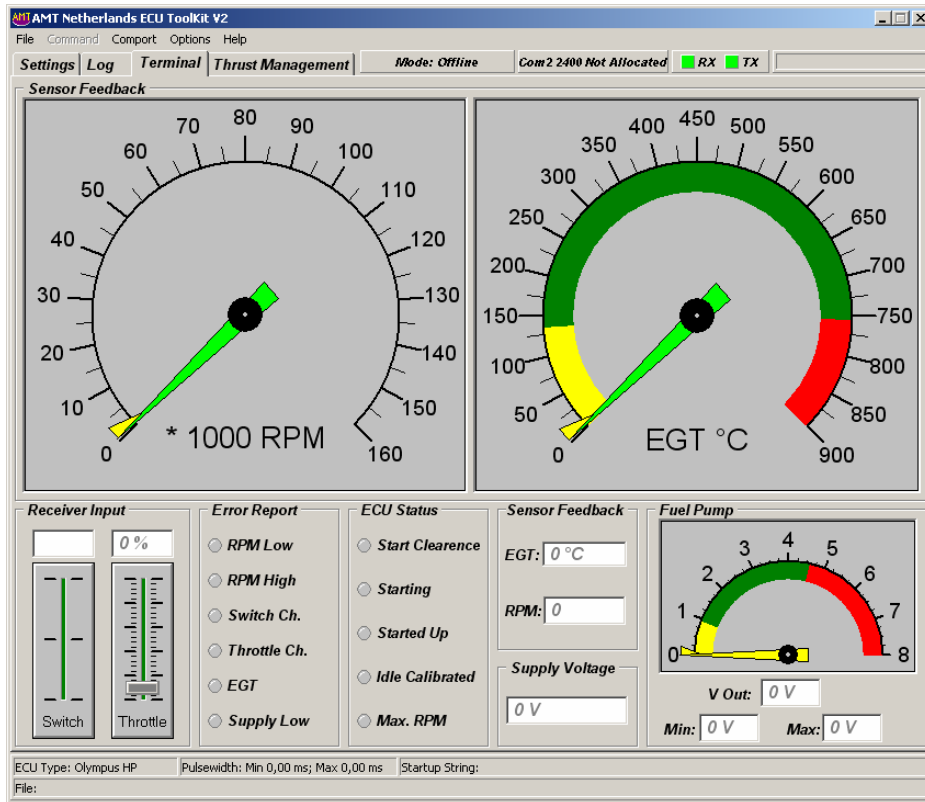
Log Tab



At a running engine the following information is logged.

- > RPM of shaft. (700 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, at the picture above the cursor hairline (pink line) is exactly positioned on the 5 minutes grid. All data on this 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 Mercury HP E-start set contains the following parts.

- 1 x Fully tested Mercury HP E-start gasturbine.
- 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 Mercury 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 Telemetry PC software

All specifications are subject to change without notice.

For latest information see **AMT Netherlands** website at <Http://www.amtjets.com>