

Stratomaster Smart Single

EMS-503



Fully integrated Engine Monitoring System for the Rotax 503 DCDI and similar two-stroke engines such as available from Hirth, 2SI and others.

The EMS-503 unit is a 2.25" instrument incorporating all that is needed to accurately monitor the performance of a Rotax 503 DCDI engine.

Included functions are:

2 channel EGT gauge (Exhaust gas temperature)

2 channel CHT gauge (Cylinder head temperature)

Digital engine RPM display

Engine hobbs meter (can be set to current engine time)

Engine running timer (can be used as flight timer), resettable to zero at any time.

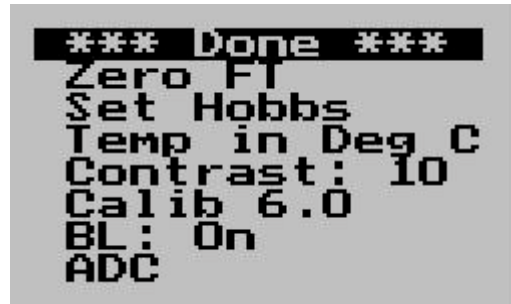
External alarm output to switch a lamp in case of exceeded temperature(s).

Flashing on screen alarms.

Setting up the EMS-503

Press the Menu key to enter the menu. You can move forward and backwards in the menu by using the + and – keys. To change or select a menu item, move the highlight to the desired item and then press the Menu key. To end an edit or function, press the Menu key again.

To exit the menu and continue normal operation, select the *****Done***** function and press the Menu key. Note, all changes you have initiated during your session will only be remembered by the instrument if you exit the menu using the *****Done***** function.



Zero FT

This function allows you to set the flight timer to zero. The flight timer counts hours and minutes while the engine is running.

Set Hobbs

This function allows you to set the hobbs meter to your current engine running time.



Use the plus and minus buttons to change the indicated part of the hobbs reading. Use the Menu button to change from hour hundreds to hours to minutes. Moving the update cursor below the numbers past the minutes field on the right ends the edit of the hobbs meter reading and stores any changes.

Temp in ...

Choose your temperature units. You can select Degrees Celsius or Degrees Fahrenheit.

Contrast ...

This function allows you to change the display contrast to your liking. You can select values from about 20 to 45. Values may vary with display types.

Calib ...

Enter the number of pulses per revolution.
You can enter fractions of a pulse in case of engines that generate a non-integer number of pulses per revolution.

Typical settings:

Rotax 503 DCDI – 6.0

Rotax 503 Single ignition 1.0 or 2.0 depending on wiring

BL ...

This function allows you to switch the display backlight on or off.

ADC

This function is for technical personal. It is not used for ordinary operation of the unit.

Technical specifications:

Display temperature range (operational): -20 to +80 degrees C
Supply voltage: +8 to +18V. +24/28V with optional pre regulator.
Supply current: 25mA/45mA (backlight off/on)
Thermocouples: K-type
Measurement range EGT: 0 to 700 degrees C (digital to 1200 degrees C)
Measurement range CHT: 0 to 300 degrees C (digital to 1200 degrees C)
Alarm level EGT: 650 degrees C
Alarm level CHT: 250 degrees C

Technology: Fully cold junction compensated using precision internal temperature reference.
Measurement accuracy: +/- 5 degrees typical over full temperature range if used with Stratomaster EGT and CHT probes.
Measurement interval: 2 seconds per channel.
Inputs: Differential, can use grounded and isolated probes.
Common mode voltage range: -2V to +3V
Alarm contact:
Maximum permissible current through alarm contacts: 500mA.
Maximum permissible voltage over alarm contacts: 50V.
Typical load for alarm contacts: 12V/1W lamp. Be aware of low resistance of higher wattage lamps. A cold filament resistance of 20 ohms or less will damage the internal alarm relay contact.

Rev counter:
Crystal based accuracy, resolution 20 RPM typical, dependent on number of pulses per revolution from engine and "Calib" setup. Range 0-9999 revs.
Minimum signal for stable display: 2Vpp.
Fully A/C coupled, maximum voltage +/- 40V.
RF noise filter plus Schmidt trigger based input.

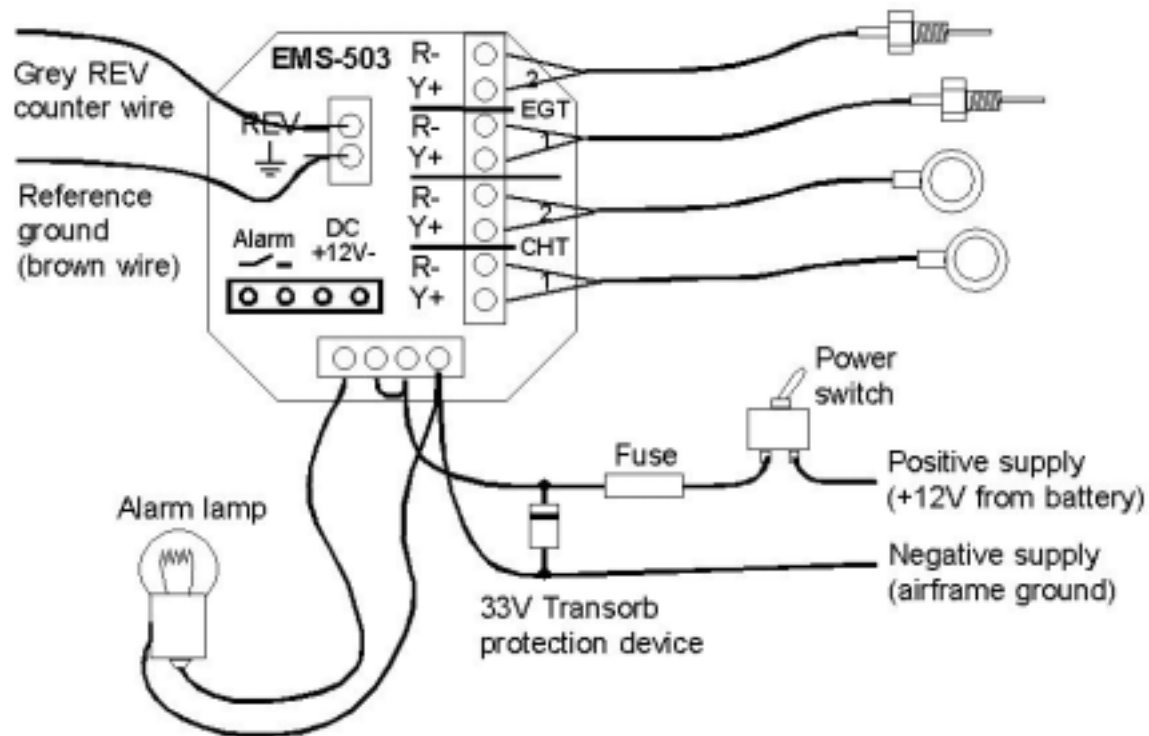
Note: It is essential that a single wire be connected from the reference terminal of the instrument to the engine block (brown wire on Rotax 503 DCDI engines). This wire must not be used to share currents with other electrical users as this will affect accuracy of indicated temperatures.

Warranty:
MGL avionics warrants their products for a period of one year from date of purchase against faulty workmanship. Warranty is limited to the replacement of faulty components and includes the cost of labor. Shipping costs are for the account of the purchaser.

Note for operation on supplies with inductive loads:

Any operation of electronic instrumentation on power supplies that are subject to high voltages caused by operation of inductive loads (starter motors, solenoids, relays) are required to be fitted with suitable protection.
All Smart Singles are guaranteed to withstand temporary over voltage up to 40V without additional protection. We recommend that measures are taken to prevent voltage transients in excess of this limit.
MGL Avionics recommends the fitment of a fuse in line with a 33V transorb (available from MGL Avionics at low cost) to protect electronic instruments, radios and intercom systems. Only one such arrangement is required for a cluster of instruments.
Please note that product warranty excludes damages caused by unprotected, unsuitable or incorrectly wired electrical supplies.

Installing the EMS-503



The two CHT probes and two EGT probes are wired as shown above. Connect probes according to the colors of the wires. These are red and yellow for MGL probes.

Shown is typical wiring used to connect a 12V lamp as external alarm indicator. Note that the two terminals used for the alarm are the contacts of a switch. The switch is closed when the alarm is active. If you have more than one instrument with alarm contacts, you can wire all contacts in parallel so you can use a single lamp if so desired. A 12V/0.5W or 1W lamp is the usual choice.

Power supply here assumes a 12V DC source. It is recommended to install suitable protection against over voltage such as can be generated by solenoids and starter motors. The above suggestion uses a fuse and a transorb. The transorb is available from MGL Avionics at very low cost. This device ensures that the voltage across it cannot rise above 33V, the transorb will cause the fuse to blow if prolonged over voltage is present.

Note that you only need a single fuse and transorb to protect a cluster of several instruments. Please install the transorb as close as possible from a wiring point of view to the instruments. You can use the protected power for your radio, intercom or other low current users. Keep this power rail separated from high current rails for lamps etc.

Be sure to install a reference connection between the minus terminal of the instrument and the engine block. On the Rotax 503, this is available on the connector block as the Brown wire. Finally, connect the Grey REV counter wire as shown above.

Should you find unstable RPM readings, you may have a burned magneto coil. This can happen if you have used low impedance rev counters before. In this case you can try fitting a 220 ohm resistor from the grey wire to the brown wire. Alternatively, you can connect the REV counter terminal to one of the yellow lighting coil wires if you have a rectifier/regulator fitted.

Extending leads of probes and senders

Thermocouple leads as used with the EGT and CHT probes can be extended either with ordinary copper cable or with special K-Type extension cable. The choice of either depends on your desired accuracy.

If it is possible in your installation to ensure that both ends of a copper extension cable will be at the same temperature (or very close), then it is quite possible to use the copper cable. In most open-air installations this will be the case.

Should this not be possible or you require best possible accuracy at all times, you can obtain a special K-type extension cable. This cable is made from the same metals as your probes cable but uses ordinary plastic sleeving to save costs.

In either case, ensure that the cable is not routed close to sources of electromagnetic interference of any kind. The voltages present in this cable are very small and are subject to changes applied by external fields. This can lead to false temperature indications.

You can check your installation by using a hand-held transmitter, such as an airband radio. If you transmit a signal, no change in temperature reading should occur.