RDAC XG

Engine monitoring module for MGL Avionics CAN bus compatible EFIS systems.

This Engine monitor is fully compatible with the larger RDAC XF device. Compared to the RDAC XF the following inputs are not available:

TC9 to TC12 (Thermocouple inputs 8 to 12)

RPM 2 (Engine RPM input 2)

FF 2 (Fuel flow input 2)

The RDAC XG can be used in place of the RDAC XF for applications where the additional inputs are not needed. The RDAC XG is fully compatible with the RDAX XF on the CAN bus.

The RDAC XG also provides a RS232 interface that may be used for third party applications. This communications interface is not used by MGL Avionics equipment and may be left unconnected.

Input Connections

TC 1 to 8	Inputs for use with thermocouple temperature probes. Typcally used for EGT probes (K-types) and CHT probes (K or J types). Can also be used for other types of temperature monitoring depending on abilities of connected system.
GND	Grounding point. Connected to the engine block, also used as ground for sensors not electrically connected to the engine itself such as flow senders and current senders.
OIL P	Oil pressure sender
OIL T	Oil temperature sender
FUEL P	Fuel pressure sender
COOL	Coolant temperature sender
CURR	Electrical current sender (Example: MGL magnetic current sender)
FL 1	Fuel level sender for tank 1
FL 2	Fuel level sender for tank 2
AUX 1 & AUX 2	Auxiliary inputs. Used for example for Rotax 912/914 NTC type CHT probes
RPM 1	Engine RPM input 1
5V OUT	5V DC supply output. Intended only for low current users (30mA maximum). Typically used as supply point for MGL fuel flow senders.
FF 1	Fuel flow sender 1

DB25 connector pins

RDAC XG package includes DB25 connector with 1 meter (3 feet) length of cable fitted. Colors refer to this cable.

1 - Dark Blue - TC7+ Positive connection for thermocouple temperature probe
2 - Red - TC6- Negative connection for thermocouple temperature probe
3 - Black - TC6+ Positive connection for thermocouple temperature probe
4 - White - TC5- Negative connection for thermocouple temperature probe
5 - Green - TC5+ Positive connection for thermocouple temperature probe
6 - Yellow - TC4- Negative connection for thermocouple temperature probe
7 - Purple - TC4+ Positive connection for thermocouple temperature probe
8 - Brown - TC3- Negative connection for thermocouple temperature probe
9 - Pink - TC3+ Positive connection for thermocouple temperature probe
10 - Orange - TC2- Negative connection for thermocouple temperature probe
11 - Grey - TC2+ Positive connection for thermocouple temperature probe
12 - Light blue - TC1- Negative connection for thermocouple temperature probe
13 - White/red - TC1+ Positive connection for thermocouple temperature probe
25 - Braid - TC7- Positive connection for thermocouple temperature probe
24 - Dark Blue/Black - TC8+ Positive connection for thermocouple temperature probe
23 - Orange/Blue - TC8- Negative connection for thermocouple temperature probe
22 - Red/Green - FL1 Fuel level sender input 1
21 - Red/Blue - FL2 Fuel level sender input 2
20 - Red/Brown - AUX1 Auxiliary sensor input 1
19 - Red/Black - AUX2 Auxiliary sensor input 2
18 - Grey/Blue - Cool Coolant temperature sensor input

17 - Dark Blue/Green -   OilT   Oil temperature sensor input
16 - Yellow/Blue -   OilP   Oil pressure sensor input
15 - White/Blue -   FuelP Fuel pressure sensor input
14 - Yellow/Red -   Current: DC current sensor input

DB 9 connector pins

RDAC XG package includes DB9 connector with 1 meter (3 feet) length of cable fitted. Colors refer to this cable.

1 – Red/White -   +5V out Low current output for 5V DC regulated (supply for flow senders etc)
2 – Grey/Yellow -   Fuel flow input
3 – Blue/Green -   RS232 RX
4 – Grey -   RS232 TX
5 – Blue -   RPM input
6 – Red/Yellow -   Supply ground (normally wired to engine block as reference ground)
7 – Green -   +12V supply (please view technical data for supply voltage range)
8 – Red -   CAN Low (Communications to EFIS)
9 – Black -   CAN High (Communications to EFIS)

# Notes on Thermocouple connections using supplied harness.

For maximum accuracy of the thermocouple temperature measurement, please ensure that either end of the harness cable (where used for thermocouple probes) is at fairly even temperature (minimise the temperature difference between the connector side of the cable and the side where you connect the thermocouple). If required, shorten the cable to fulfil this need.

This only applies to thermocouple probes (connected on TC1 to TC8) – this does not apply to any other probe.

Dip switch settings

The RDAC XG contains two 8 switch arrays. These are accessible by removing the two screws holding either of the black mounting plates and sliding the PCB out (see image).

DIP Switches

Dip Switch Position

OFF Position   ON Position
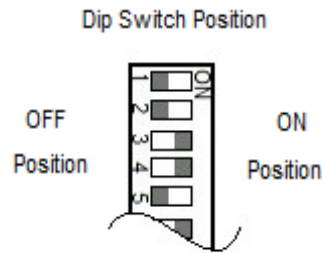
| RDAC SEL B & RDAC SEL A	These switches are used to assign each RDAC in the system with an ID number. up to four RDACs can be connected at the same time on the CAN interface. Note: set both switches to "off" for a single RDAC installation.
AUX 1 PU	used to pull the AUX 1 sensing line high
AUX 2 PU	used to pull the AUX 2 sensing line high
OIPP PD	used to pull the OILP line low
OIPP PU	used to pull the OILP line high
Fuel P PU	used to pull the Fuel Pressure sensing line high
Coolant PU	used to pull the Coolant sensing line high
Fuel level 2 PU	used to pull the Fuel level 2 sensing line high
Fuel level 1 PU	used to pull the Fuel level 1 sensing line high
RPM 1 Filter	Adds a high frequency filter to the signal path
RPM 1 Ballast	used when the RPM 1 signal line requires a 220 ohm ballast resister to ground
RPM 1 High Gain	used when the RPM 1 signal needs a High Gain (increases signal sensitivity approximately by a factor 10)

PD = pull down resister   PU = pull up resister

This drawing illustrates the pull up resister circuit
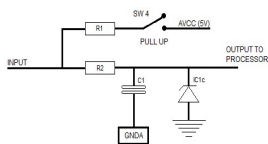
This drawing illustrates the pull up and pull down resister circuit for the oil pressure
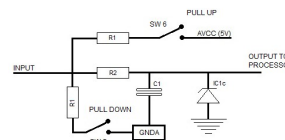
 These circuits shows how the various PU switches feeds 5 volt onto the input(sense) line if required.   Please check the senders information for type and settings needed.
The 2nd circuit shows a pull down circuit that has a 100Ω load resister switched to GND. This intended for use with the Rotax 4-20 mA oil pressure sender. The white wire is connected to the OILP input on the RDAC XF. The OILP PD switch must be in the ON

position and the OIL PU switch must be in the OFF position.

Passive senders such as resistive temperature and pressure senders will require the pull-up resistor to be "ON". If you are using active senders (mostly used as electronic pressure senders) please switch the pull-up resistor "OFF".

Default settings for most installations (assuming the Rotax 4-20mA sender is not used):
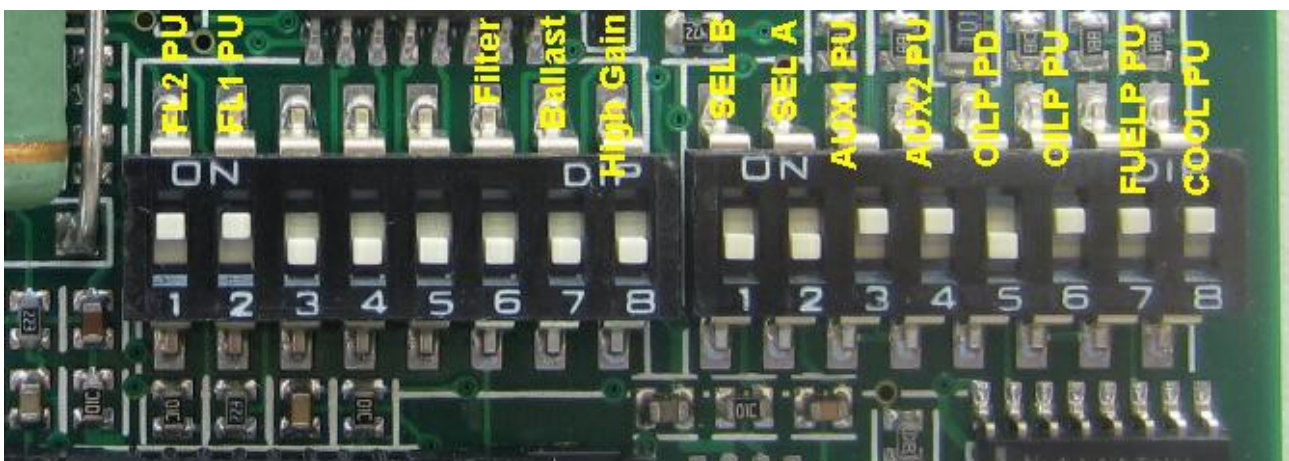
Sensitivity gain adjust

RPM MIN MAX	Adjusts sensitivity of the RPM1 input

Sensitivity to input signals on the RPM input can be adjusted over a wide range in two selectable ranges (via the DIPSwitch selection, high and low range).

Highest sensitivity achievable is around 0.4V peak to peak in high gain and 4V peak to peak in low gain. From this level, the trimmers can be used to reduce the gain over a very wide range to around 50V peak to peak or higher depending on trimmer setting.

The sensitivity trimmer is accessible via a hole in the housing and can be adjusted using a small screw driver.

Indicator

The green LED flashes at about 1Hz during operation. If the LED is steady "ON" there is a serious fault with the RDAC and it cannot operate. If the LED is "OFF" the RDAC is not being supplied with power or there is a serious fault with the RDAC.
If the RDAC is connected to an EFIS the LED will perform a double flash to indicate that it is "seeing" the EFIS.

INSTALLATION

Precautions
Note that the unit is not waterproof, when installing the unit in a location where it will be exposed to fluids it is advisable to install it in an enclosure(box)

This unit is intended for mounting on the aircraft's fire-wall,engine side.
The unit is _**not**_ designed for mounting directly to the engine!
Excessive vibration , moisture and temperature extremes will damage the RDAC or shorten its life span.

Advisory !

Once installation is complete and all setups regarding RDAC XG are done, it is recommended to seal the hole for the sensitivity adjustment with a patch of self adhesive tape or the supplied plastic plug.

RDAC XG DIMENSIONS
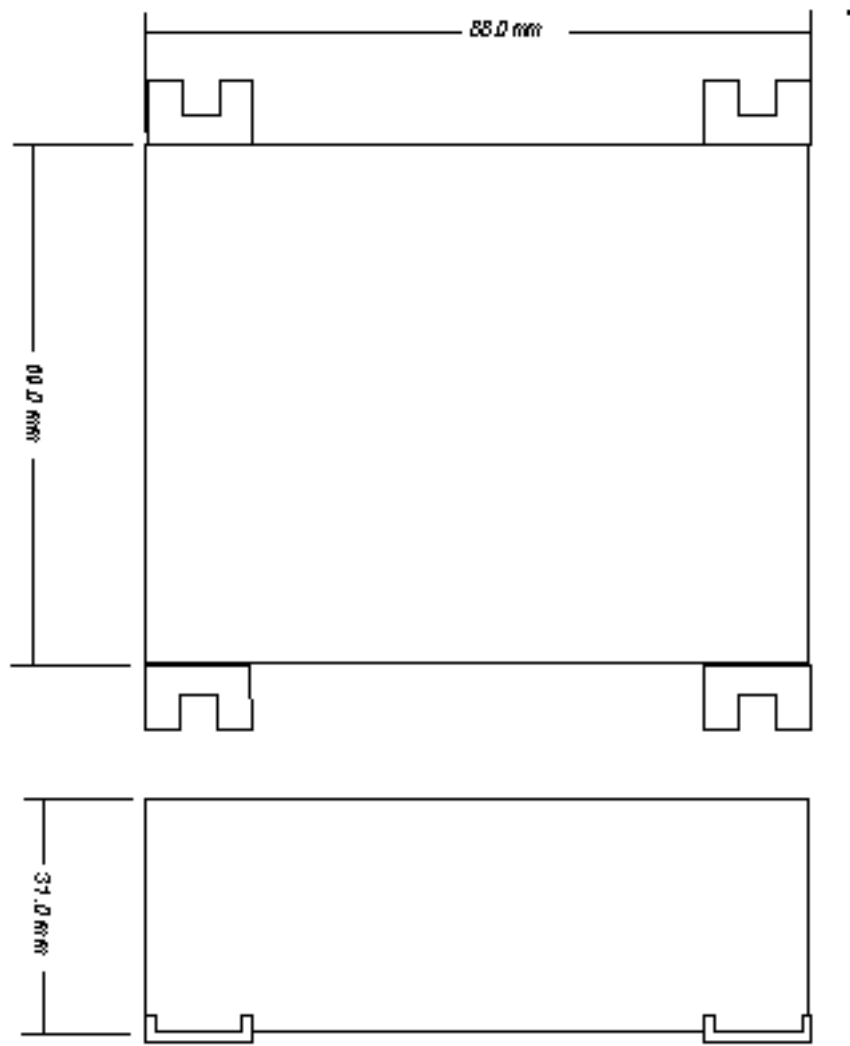
WIRING

It is important to connect the RDAC ground wire to the engine block. Failure to do so will result in the readings from the engine sensors to be incorrect. Please note that the following steps need to be done correctly otherwise unit may function incorrectly or damage could result from bad installation. Take care to insulate all exposed connections. Plan your wire routings carefully to minimise chaffing of cables. The engine compartment may get hot so use suitable wire.
Make neat connections with minimal exposed wire showing from connectors. If you are not sure, then ask for advise from an AMO.

Connecting to EFIS / I-EFIS

Connecting the RDAC to an EFIS / IEFIS can be done in one of three ways.

The ODYSSEY G2(Using current firmware) and the IEFIS systems use the CAN interface. With the Odyssey G2 please use the Engine setup menu to select use of RDAC CAN.

XTreme EFIS, XTreme EMS can use one RDAC XG connected via CAN interface.

Further reading

Please consult the RDAC XF manual for further details on probe types and typical connections.