

# AVIONICS SYSTEM

CLEAR INFORMATION  
SIMPLER DECISION





# INTEGRATED AVIONICS SYSTEM



INSTANT INSIGHT



EASIER LOGBOOK MANAGEMENT



CONDITION-BASED MAINTENANCE



HIGH QUALITY



MODULARITY AND EXTENSIBILITY





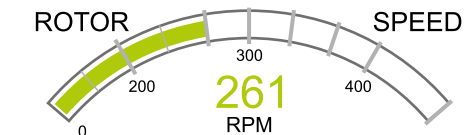
# Instant Insight



Intuitive colour codes indicate the status of the aircraft at a glance. Simple graphics immediately convey key information. With ergonomically designed knobs and excellent workmanship, our instruments are to make you enjoy the flight.



„ALL GREEN”



All parameters within normal operating range.



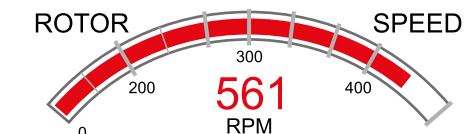
„WARNING”



Some parameters require the pilot's attention.



„ALARM”



Some parameters are outside acceptable limits.







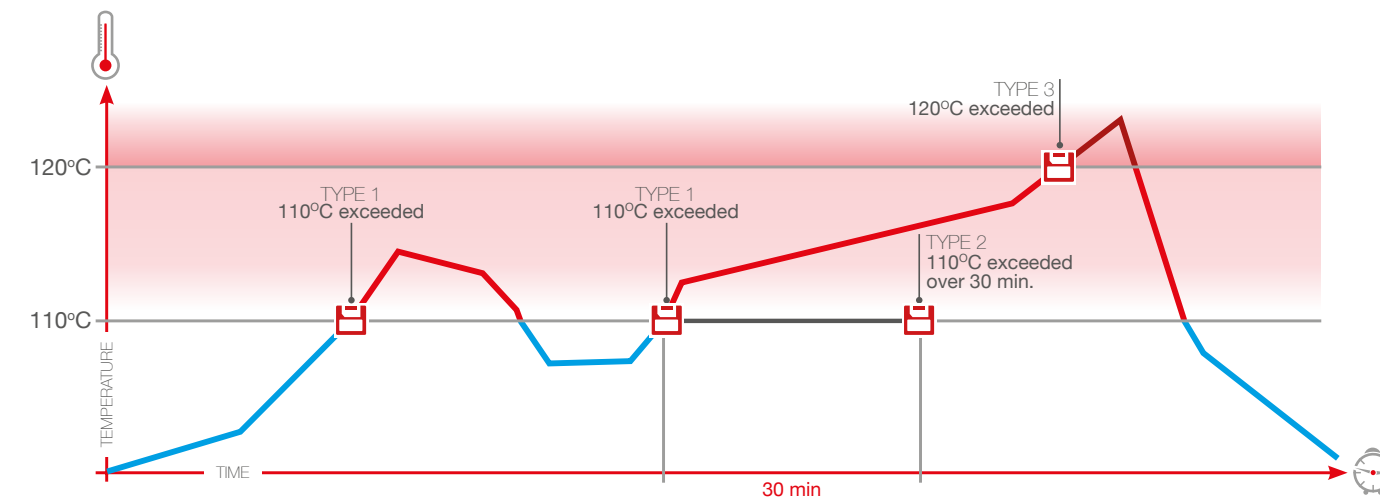
# Easier Logbook Management



PILOT LOGBOOK



The system continuously analyses flight and engine performance parameters to detect instances of exceeding the normal operating range. All deviations are automatically recorded together with flight time and HOOBS without engaging the pilot's attention. This way, the system becomes the pilot's personal assistant and facilitates log book keeping.



The system distinguishes between various types of exceedance events. The events may be just instances of exceeding a threshold value detected while monitoring a particular parameter. However, they may be a result of complex conditions where not only the fact of exceedance, but also its duration are of interest. Therefore, the system remembers four last events of each type, providing necessary data.

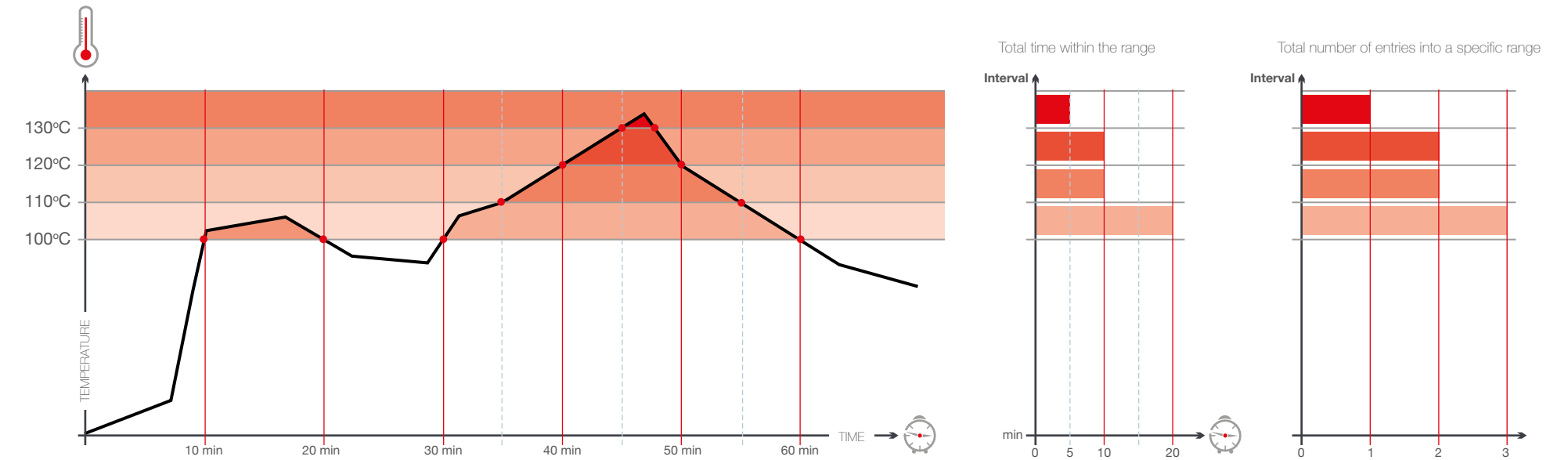




# Condition-Based Maintenance



It is better to prevent than to cure. The system monitors key operating parameters of both the engine and the aircraft. It records how often, to what extent and for how long parameter values were outside the desired range. These records are an invaluable source of operation history data that help detect unwelcome trends before they develop into failure.



The idea of monitoring consists in splitting the range between the desired level and exceedance level of a parameter into sub-ranges. Then the system counts the number of instances of the parameter's value entering each sub-range and measures total time of the parameter's value staying within a specific sub-range.



# Integrated Avionics System

The Integrated Avionics System is designed for ultralights and LSA (Light Sport Aircraft).

It consists of two sub-systems: the flight data monitoring and the engine performance data monitoring. The sub-systems are possible to be used separately, but combining them provides synergetic effect. The modular design allows the user to add other compatible elements in the future.

## HIGH QUALITY WORKMANSHIP

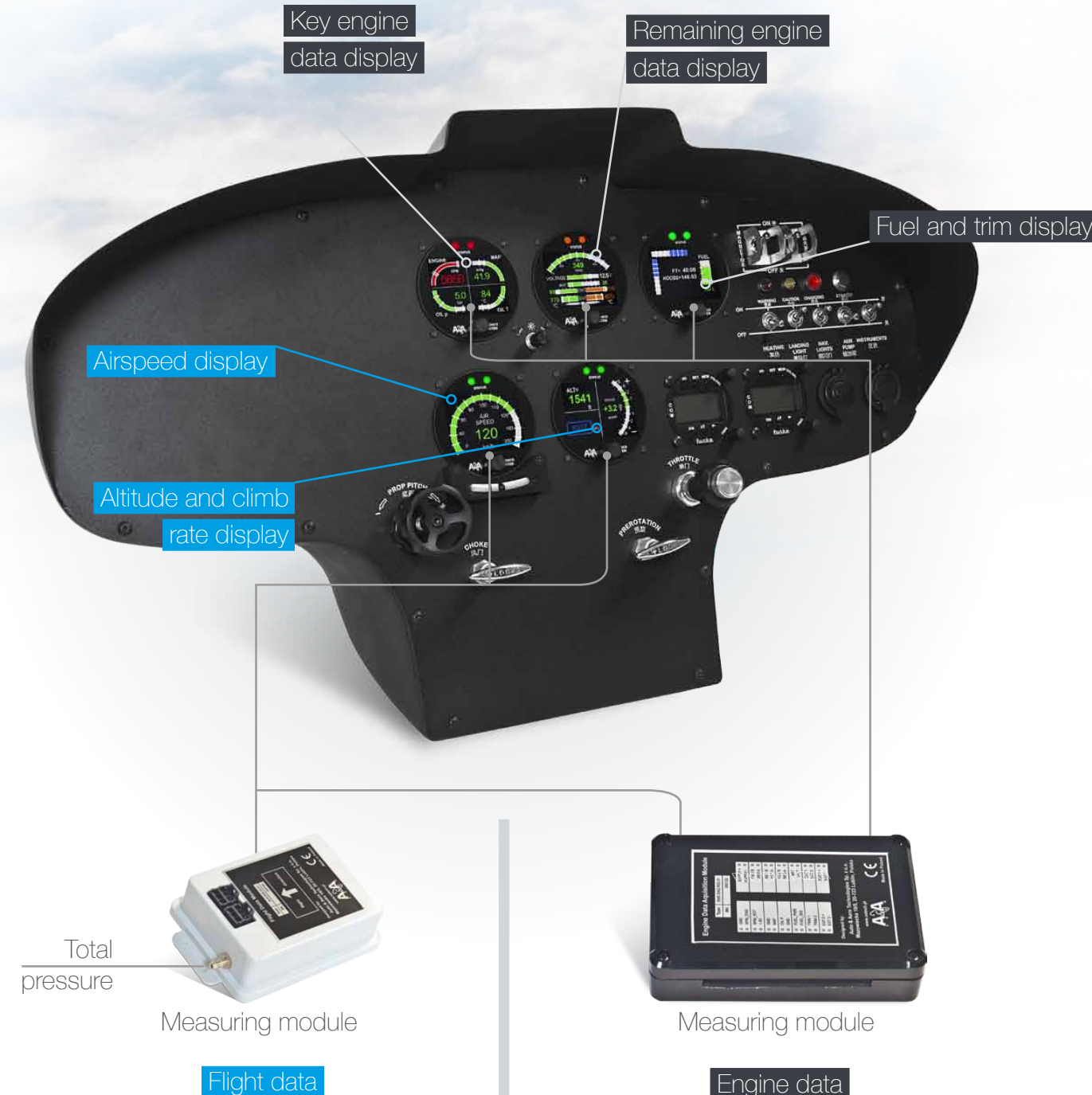
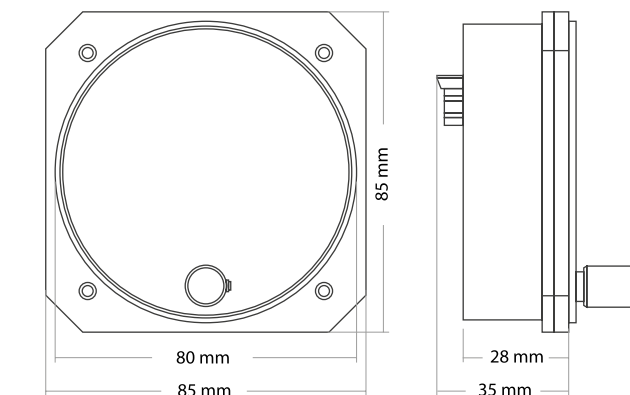
The instruments' anodised aluminium casing ensures high durability and aesthetics. The anti-reflective glass and brightness control makes them convenient to use in any lighting conditions.

## ENERGY EFFICIENCY

The key design objective was to minimise the system's energy demand. The total consumption of electrical energy does not exceed **6,5 W**.

## SMALL SIZE

The instruments' size was optimized to provide a comfortable display in a standard diameter (80mm) casing that is only **28 mm** deep.



## Flight data monitoring system

- Rate of climb/descent
- Current altitude
- Flight speed

## Engine data monitoring system

- Engine performance data
- Settings (trims)
- Flight log (engine operation time)
- Events of exceeding
- Data collection (statistics)





# Flight Data Monitoring Sub-System



The system is designed to measure altitude, vertical speed and airspeed.

It consists of three components:

- AUX AVS 02 Measurement module
- EEM MOT 01 F07.01 Display
- EEM MOT 01 F06.01 Display

The AUX AVS 2 measurement module is equipped with two pressure gauges to detect static pressure and total pressure. The static pressure is measured inside the module's casing (the module ambient pressure), whereas the total pressure requires connection to the Pitot tube. The module contains an integrated system for measuring the magnetic direction, roll, pitch, and yaw, and axial acceleration. This enables the pilot to determine flight direction and to analyse exceeding events under the aircraft operating conditions. The reference pressure used to determine the flight altitude is set up by means of the knob.

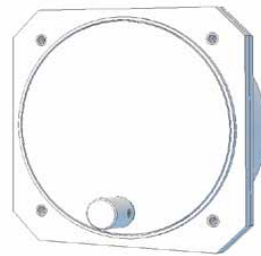
Item	PARAMETER	MEASURING RANGE	ACCURACY
1	Altitude – determined based on the measured static pressure and the reference pressure set up by the pilot	0 – 3000 metres	±8m
2	Vertical speed – determined on the basis of altitude changes	±12 m/s	±0,2 m/s
3	Airspeed – determined based on the dynamic pressure (measured differentially between the total pressure in the Pitot tube and the static pressure in the pilot's cabin)	25 – 250 km/h	±5 km/h

<sup>1</sup> in development

MEASURING MODULE	AUX AVS 2
Dimensions	74 x 120 x 32 mm
Weight	85 g
Casing material	ABS
Voltage	12 V
Current	<12mA
Input	Pitot tube (total pressure)



# Avionics Instruments



MONITOR	EEM MOT 01
Dimensions	85 x 85 x 67 mm
Installation hole	Ø 80 mm
Weight	175 g
Casing material	Anodised aluminium, acrylic glass with anti-reflective coating
Voltage	12 V
Current	<85mA



SOFTWARE VERSION	F06.01
Displayed parameters	1) Altitude above sea level (m, ft) 2) Vertical speed (m/s, ft/min) 3) Reference pressure
Parameters set up by means of the handwheel	Reference pressure
Alarms and warnings	---



SOFTWARE VERSION	F07.01
Displayed parameters	Airspeed (km/h, knt)
Alarms and warnings	



# Engine Performance Data Monitoring System





The system is compatible with the following engine types:  
Rotax TM 912UL, 912ULS, 914 and their modifications.  
It allows the user to measure, display and analyse the basic engine performance parameters.

The system consists of four components:

- EMS DAQ R2 Measuring module
- EEM MOT 01 F02.01 Display
- EEM MOT 01 F08.01 Display
- EEM MOT 01 F09.01 Display

LP.	PARAMETER	MEASURING RANGE	ACCURACY
1	Engine speed	0 ÷ 6500 obr/min	± 10 rpm
2	Rotor speed	0 ÷ 500 obr/min	± 1 rpm
3	Inlet air pressure	0 ÷ 4 bar	± 0.1 bar
4	Oil pressure	0 ÷ 10 bar	± 2°C
5	Oil temperature	-20 ÷ 200°C	± 2°C
6	Cylinder head temperature (two cylinders)	-20 ÷ 200°C	± 2°C
7	Exhaust gas temperature (two cylinders)	-50 ÷ 950°C	± 5°C
8	Inlet air temperature	-20 ÷ 200°C	± 2°C
9	Fuel level	8 ÷ 120 l	± 1 l
10	Trim (pitch and roll signal)	0 ÷ 10 V	± 0.1V
11	Engine operation time		± 1 s
12	Total engine operation time (HOOBS)		± 1 min

MEASURING MODULE	EMS DAQ R02.01
Dimensions	80 x 120 x 28 mm
Weight	160 g
Casing material	ABS
Voltage	12 V
Current	<80mA <sup>1</sup>
Location	Engine compartment
Compatibility with the engines	ROTAX 912 ULS, ROTAX 912 UL, ROTAX 914

<sup>1</sup> including the sensors' power consumption



Measuring module EMS DAQ R2

## Engine Instruments



SOFTWARE VERSION	F02.01
Displayed parameters	1) Engine speed (rpm) 2) Inlet air pressure (bar, inHg) 3) Oil pressure (bar) 4) Oil temperature (°C)
Alarms and warnings	For each parameter 



SOFTWARE VERSION	F08.01
Displayed parameters	1) Rotor speed (rpm) 2) Voltage (V) 3) Engine temperature CHT x2 (°C) 4) Exhaust gas temperature EGT x2 (°C)
Alarms and warnings	For rotor speed and voltage  For temperatures 



SOFTWARE VERSION	F09.01
Displayed parameters	1) Fuel level (litre) 2) Trim: pitch, roll 3) Engine operation time (HH:MM) 4) Total engine operation time (HH:MM)
Alarms and warnings	





# Modularity and Extensibility

The modular design of the system allows the user to add new compatible elements in the future.

Upcoming modules:

- Flight data recorder
- Artificial horizon
- Engine control module



# About the Company



**Our team designed and made the following aviation solutions:**

- Electronic fuel injection system for the ASz-62IR family of aircraft engines
- Electronic ignition system for the ASz-62IR family of aircraft engines
- Electronic control system for the PZL-200 aircraft engine
- Electronic fuel injection system for the iCOMPRESS aircraft engine
- Computer controlled test stand used in research, development, production and certification process of the ASz-62IR aircraft engine family
- Computer controlled test stand used in research, development and production of the PZL-200 aircraft engine

For over 15 years we have combined knowledge, passion and responsibility to create reliable solutions for the aerospace and automotive industries. Experience and knowledge from many disciplines allow us to understand the nature of a particular project and meet your needs in a responsible manner.

Auto & Aero Technologies is an innovative company creating modern solutions for demanding applications. We specialize in electronics design and software development, mechatronics, hydraulics, pneumatics and mechanical systems design.

**Our partners:**

- WSK PZL Kalisz S.A.
- Aviation Artur Trendak
- Institute of Aviation in Warsaw







**Auto & Aero Technologies Sp. z o.o.**

ul. Mazowiecka 10/5  
20-723 Lublin, Poland  
tel. +48 502 022 042  
info@aatech.pl

[www.aatech.pl](http://www.aatech.pl)