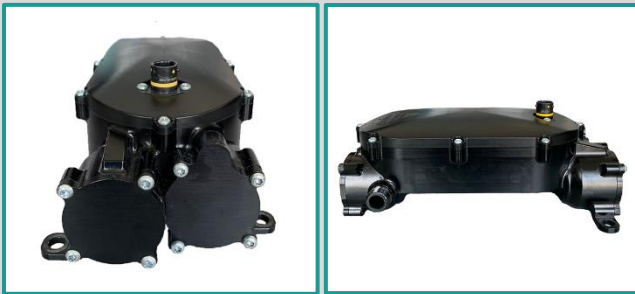


FUEL FLOW SENSOR



Product highlights

- **Ultrasonic** flow meter with dual measurement channel
- High **accuracy** and **repeatability**
- Flow measurement frequency > 4.5 kHz
- **Anti-aliasing** features
- **Pressure compensated**
- **Long lifetime** under difficult operating conditions

Applications

- Motorsport
- Car fleets
- Testing equipment
- ... other applications

Description

Allengra fuel flow sensor is tailored for operation in combustion engines under high vibrations and quick pulsating flow conditions. Without moving parts or components subject to wear, a long lifetime can be guaranteed.



Homologated fuel flow sensor by the Fédération Internationale de l'Automobile

Homologation number: FIA-OBFFM-003
 FIA Technical List N °45 – On board Fuel flow meter: [Click](#)
 Model: AL-12-0026

Table of content

1.	<i>Technical data</i>	3
	1.1. FLOW MEASUREMENT	3
	1.2. TEMPERATURE MEASUREMENT	3
	1.3. PRESSURE MEASUREMENT	3
2.	<i>Environmental data</i>	4
	2.1. OPERATING CONDITIONS	4
	2.2. SUSTAINABILITY	4
	2.3. MATERIALS	4
3.	<i>Electrical data</i>	5
	3.1. OUTPUT SIGNALS	5
4.	<i>Mechanical</i>	6
	4.1. DIMENSIONS.....	6
	4.2. INSTALATION NOTES (Recommended).....	6
5.	<i>CAN Details</i>	7
	5.1. CAN Select (Loom resistor)	7
	5.2 CAN message structure	7

1. Technical data

1.1. FLOW MEASUREMENT

Measurement element:	Ultrasonic transducers
Measurement range:	+/- 5 – 8000 ml/min
Accuracy:	< +/- 0.50%
Repeatability	< +/- 0.25%
Response time:	< 0.01s

1.2. TEMPERATURE MEASUREMENT

Measurement element:	2x PT1000
Measurement range:	0 – 110°C
Accuracy:	0.15K
Repeatability:	0.15K
Response time:	T95% <4s

1.3. PRESSURE MEASUREMENT

Measurement element:	Ceramic pressure sensor
Measurement range:	- 0.5 bar – 10 bar
Accuracy:	1% of m.v.
Repeatability:	0.5% of m.v.
Response time:	<100 ms

2. Environmental data

2.1. OPERATING CONDITIONS

Mediums:	Gasoline, Diesel, Water, others on request
Operating temperature:	0 – 90°C
Thermal shock:	Up to 120 °C
Storage temperature:	- 40 – 100°C (without liquids inside)
Operating pressure:	- 0.5 – 10 bar
Over pressure:	20 barA
Burst pressure:	60 barA
Protection class:	IP68
Relative humidity:	< 95% rh
Lifetime:	> 5 years

2.2. SUSTAINABILITY

RoHS:	Compliant
Reach:	Compliant

2.3. MATERIALS

Wetted parts:	Aluminum 7075, POM, PPS, Al2O3, Stainless steel, VITON™
Surface quality:	Polished + anodized aluminum (black)

3. Electrical data

Supply voltage:	5.5 – 24 VDC
Current consumption:	62 mA @ 12V 110mA @ 5.5V
Electrical connector:	ASDD006-09-PA-FI-952K
Mating connector:	ASDD606-09SA-FI-952K
PIN assignment:	1 – Supply +ve 2 – CAN +ve 3 – CAN -ve 4 – Reserved 5 – Reserved 6 – RS485 (ModBus A) 7 – RS485 (ModBus B) 8 – CAN Select 9 – GND

3.1. OUTPUT SIGNALS

CAN

Standard:	ISO 11898-2 (high-speed applications)
Message format:	2.0A (11 bit identifier)
Baud rate:	1 Mbit/sec
Termination resistor:	open
Base ID:	0x190

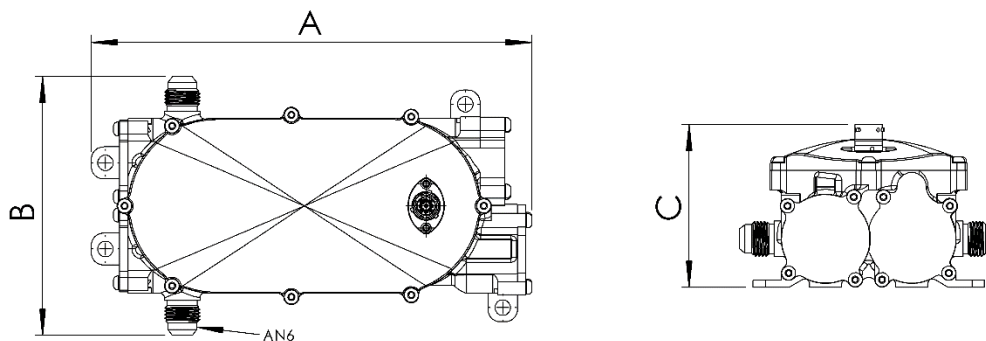
RS485

Designation:	Firmware update and configuration
--------------	-----------------------------------

4. Mechanical

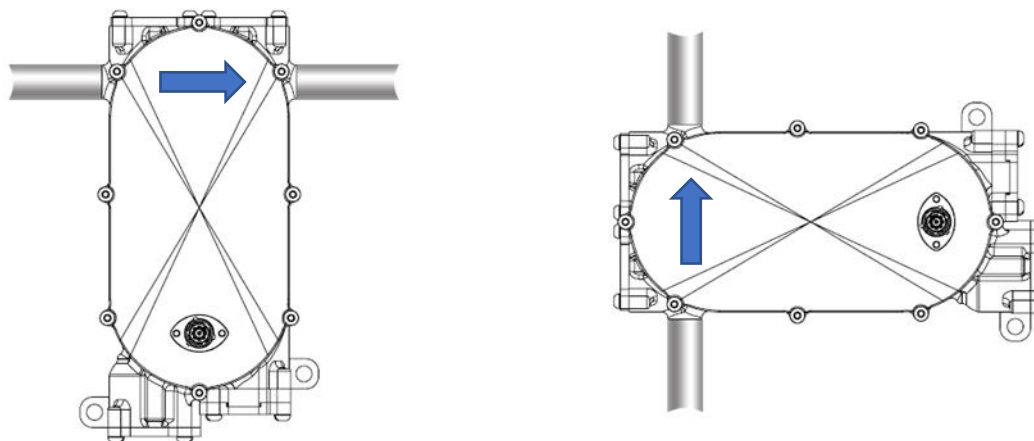
Hydraulic connections:	2x 6AN male
Pressure loss:	950 mBar @ 6000 ml/min
Weight:	605g
Fixation:	4x $\Phi 6.3$

4.1. DIMENSIONS



Length (A):	179.41 mm
Width (B):	105.24 mm
Height (C):	66.25 mm

4.2. INSTALATION NOTES (Recommended)



5. CAN Details

5.1. CAN Select (Loom resistor)

Loom detect resistors	Base ID
Open	0x190
10k	0x1A0
5k6	0x194
3k3	0x1A4
1k8	0x198
470R	0x19C

5.2. CAN message structure

Base ID + 0								
Message description:		Mass flow, Volume flow, Mass total						
Message ID:		Base ID + 0						
Message format:		Big Endian (MSB First)						
Message rate:		100 Hz						
Message Type:		Continuous Transmit @ message rate						
Filter:		Filtered flow values (4th order low pass Butterworth with 25Hz – 3dB cut-off frequencies)						
Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	
Volume flow (16 bit signed integer MSB first)		Mass flow (16 bit signed integer MSB first)		Total mass (32 bit signed integer)				
Base units: 0.5 ml/min per bit		Base units: 0.5 g/min per bit		Base units: 1g per bit				
Max: 16,384.0 ml/min Min: -16,384.0 ml/min		Max: 16,384.0 g/min Min: -16,384.0 g/min		MSB		LSB		
BASE ID + 1								
Message description:		Multiplexed debug and diagnostics message						
Message ID:		Base ID + 1						
Message format:		Big Endian (MSB First)						
Message rate:		100 Hz						
Message Type:		Continuous Transmit @ message rate						
Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	
Speed of sound, 0.1 m/s/bit		0	CAN ID select (1, 2, 3, -)	Fuel temperature (0.01 degC/bit signed)	PCB temperature (0.1degC/bit signed)			
		1	CPU 1 SW Version	Min fuel temperature (0.01degC/bit signed)	Max fuel temperature (0.01degC/bit signed)			
		2	CPU 2 SW Version	Min PCB temperature (0.1degC/bit signed)	Max PCB temperature (0.1degC/bit signed)			
		3	Boot SW version	Hardware version (unsigned)	Supply voltage (0.1V/bit unsigned)			
		4	Data logger SW version	Diagnostics bitword (unsigned)	Seconds from hardware reset (s unsigned)			
		5	SW programming counter	Latched diagnostics bitword (unsigned)	Total time with flow / Service Indicator (min unsigned)			
		6	Manufacturer calibration counter	Manufacturer status bitword (unsigned)	Elapsed time indicator (min unsigned)			
		7	Third party calibration counter	Sensor serial number (unsigned)	resistor sense input voltage (0.01V/bit unsigned)			
		8	Density calibration counter	CPU 1 software checksum (unsigned)	density calibration checksum (unsigned)			
		9	Reserved	Bootloader checksum (unsigned)	density value in use (0.1kg/m3/bit, unsigned)			
		10 (A)	Product identification	Configuration checksum (unsigned)	Reference density at a reference temperature (0.1kg/m3/bit, unsigned)			
		11 (B)		Calibration checksum (unsigned)	Reference temperature for density calibration (0.1degC/bit unsigned)			
		12 (C)		Third party calibration checksum (unsigned)	Slope (Density vs temperature) (0.001 kg/m3/degC/bit signed)			
		13 (D)		PCB serial number				
		14 (E)		CPU 2 software checksum (unsigned 32 bits)				
		15 (F)		Received Signal Strength				
		16 (10)	Received signal phase	Measurement error count				
	17 (11)							
	18 (12)							
	19 (13)							



About Allengra

Allengra GmbH based in Germany and Romania, founded in 2005, is capable to develop and produce standard or OEM devices for ultrasonic flow sensors and control valves for liquids and gases, tailored on the end client application.

The complete development and manufacturing processes are carried out in our company and we are able to transform an idea into a robust serial product thanks to the various engineering departments and prototyping skills.

The core technology of Allengra, ultrasonic metering has been refined over the years to a level where both integration into high-end devices and cost-effective applications are possible.

Do you have a project that needs a flow, temperature, pressure measurement or an electric valve?

Do not hesitate to contact us at info@allengra.eu for a solution.
