

FPA2400BST- Liquid Property Analyzer



- Real-time fluid properties
 - dynamic viscosity
 - density
 - dielectric constant
 - temperature
- data logging
 - The sampling frequency can be programmed
 - More than **30** days
- main interface
 - **RS-232** or standard **CAN**
 - **Modbus32** protocol
- Solid structure
 - Protection class **IP-68**
- running voltage
 - **12V**

description

The FPA is an innovative fluid property analyzer that simultaneously measures viscosity, density, dielectric constant, and temperature of fluids. Utilizing patented tuning fork technology, the sensor detects direct and dynamic relationships between multiple physical properties of fluids such as engine oil, fuel, transmission fluid, brake fluid, hydraulic oil, gear oil, coolant, and solvents. This capability enables precise determination of fluid retention, condition, and contamination levels. The multi-parameter analysis significantly enhances computational accuracy in fluid characteristic evaluation.

FPA provides online fluid detection solutions for OEMs and end-users, with applications spanning transportation vehicles, special-purpose equipment, refrigeration systems, HVAC systems, compressor operations, oil/gas refining, general chemical processing (including distillation processes), as well as industrial machinery and turbines. These systems support fluid storage, production lines, and high-pressure pipelines in chemical supply and processing loops.

The FPA is a portable testing instrument designed for laboratory and remote applications. It offers diverse configurations with various thread types, line lengths, and communication modes to meet different needs. Supporting mainstream communication interfaces like digital CAN J1939 and RS-485-based Modbus32, the FPA enables plug-and-play connectivity with hosts, Distributed Control Systems (DCS), and SCADA systems. Its data storage capability makes it an ideal solution for critical data acquisition scenarios, automatically saving data even when the computer is powered off. Additionally, the FPA can be directly connected to computers through our dedicated FPA software.

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feature

apply

- Temperature, viscosity, density and dielectric constant were also measured
- Data records, with a sample taken every two minutes, can collect data for up to 30 days
- The sampling frequency can be programmed, at x-min./sample
- Overheat protection: (+ 125°C) automatic shutdown
- Real-time timing, battery charging
- Modbus32 Interface based on RS-232
- For applications in pressurized and flow systems, threaded fluid interfaces can be used
- Additional wire length options are suitable for remote measurement applications
- Host application software
- Dynamic, mixed state fluids (e.g., process fluids, engine oil, fuel quality)
- wind turbine
- Industry and manufacturing
- Transmission and drivetrain
- Naval, rail and air
- transformer
- Compressor, oil and refrigerant
- hydraulic pressure system
- Lubricants, fuel oil

performance index

maximum rating

Probe rating	sign	numeric value	unit
storage temperature	T _s	-50 to +150	°C
Impact (peak)	S _{peak}	20	G
Vibration limit	V _{vol}	50	Grms
Fluid pressure adaptability	P	Vacuum to 50	bars
blast pressure	P	450	bars

SCU rating value	sign	numeric value	unit
Maximum power supply voltage	V _{cc}	+32	V _{dc}
Input current @ 24 Vdc (peak)	I _{in rush}	< 400	mA
Input current @ 5-32 Vdc	I _{max}	170	mA
storage temperature	T _s	-50 to +105	°C
Vibration limit	V _{vol}	45	Grms
Impact (peak)	S _{peak}	10	G

* Storage temperature: The sensor can be stored at no dangerous temperature

Specific indicator values

Probe rating	sign	least value	representative value	crest value	unit
operating ambient temperature **	T _a	-40		+125	°C
working pressure	P	0		25	Bar
Liquid temperature	T _f	-40		+150	°C

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SCU rating value	sign	least value	representative value	crest value	unit
operating ambient temperature **	T _a	-40		+85	°C
service voltage	V _{supply}	5	+12/24	+32	V _{dc}
Input current @ 5-32 Vdc	I _{avg}		100		mA

** Working environment temperature: Sensor electronic components ambient temperature at which they can operate

Statistical characteristics

Multi-parameter measurements	sign	least value	representative value	crest value	unit
Viscosity (dynamic)	μ	0.5	15.0	75*	mPa-s(cP)
Viscosity (dynamic) accuracy (in the range of 10 <μ<50 mPa-s (cP))		-5	+/-2	+5	% Value
Viscosity (dynamic) accuracy(within the range of <10 mPa-s (cP))			+/-0.2		mPa-s(cP)
density	ρ	0.65	0.85	1.50	gm/cc
Density accuracy		-3	+/-1	+3	% Value
dielectric constant	ε	1.0	2.0	6.0	-
Dielectric constant accuracy		-3	+/-1	+3	% Value
temperature	T	-40		150	°C
Temperature accuracy	T		0.1		°C
Access characteristics	sign	least value	representative value	crest value	unit
Output refresh rate	t		30		Second

* Viscosity greater than 75 cP can also be measured through FPA, depending on the specific application

Transmission Signal

signal output

Standards: RS-232 and CAN.

RS-485 optional

USB is also available for connection, optional.

Host application output

The FPA can also operate independently, without the need for a PC or DCS, and the FPA can record data independently for a period of time. The connection between the PC or host is designed for data retrieval and recovery. The software on the PC enables users to read data and save it as text files. The recorded data can be downloaded in text file format.

It can also record data in text file format in the storage function in the off mode

The FPA is a slave module compliant with the Modbus standard RS-485 or RS-232 protocol. Additionally, it can utilize RS-485 connections to USB or RS-232 connections to USB adapters.

Can provide bus transceiver signal and data transmission specification.

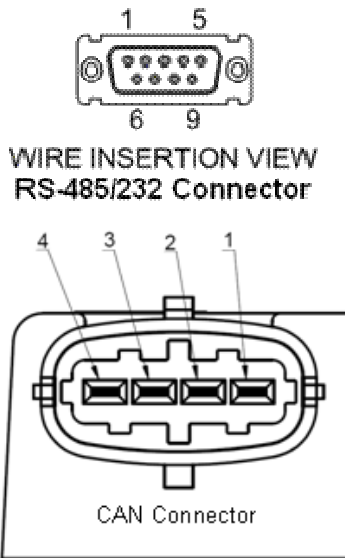
This data storage even works when the computer is turned off to ensure that the data is recorded

Automatic diagnosis of data processing

The FPA sensor control unit is equipped with four green LEDs, etc., to display the correctness and status of the measurement and processing data.

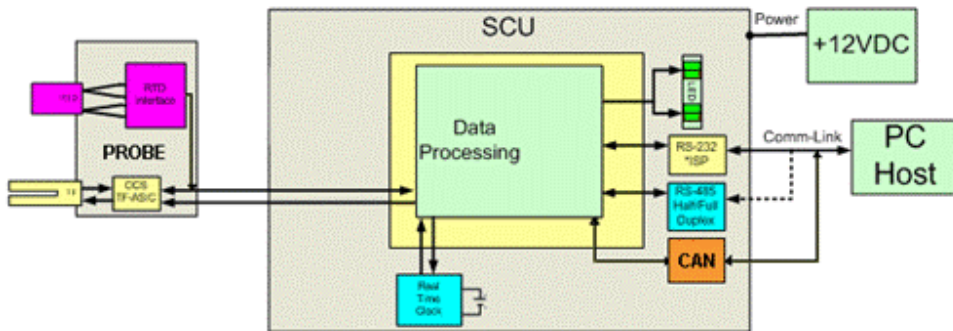
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Definition of pins



pin	Description of RS-232	RS-485 description
1	n/c	Tx-
2	TxD	Tx+
3	RxD	Rx+
4	n/c	Rx-
5	GND	GND
6	n/c	n/c
7	n/c	n/c
8	n/c	n/c
9	n/c	n/c
pin	Can describe	
1	CAN_L	
2	CAN_H	
3	GND	
4	Vcc	

Assumption Diagram



FPA assumption diagram

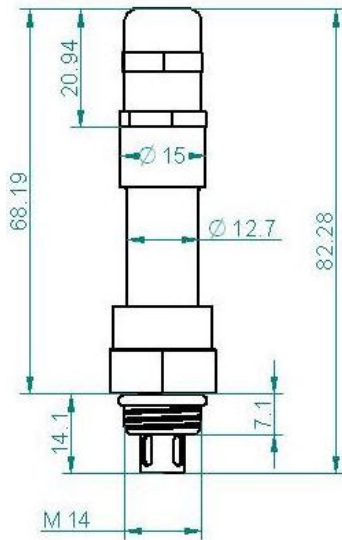
Mechanical Properties and Connections

The FPA consists of a sensor probe, Sensor Control Unit (SCU), and four connecting cables. The standard configuration features 2-meter cables, while the 8-meter version offers optional connection modes including RS-232, RS-485, RS-232/USB, and RS-485/USB.

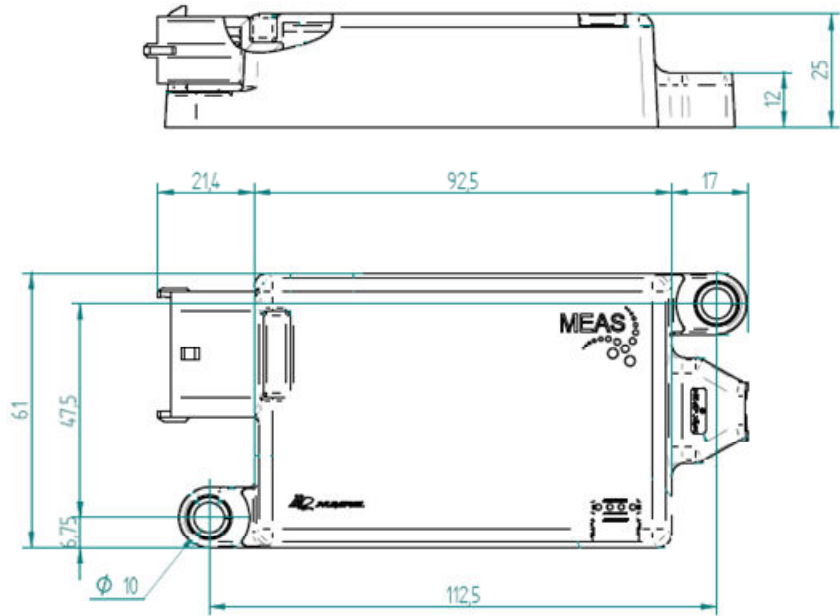
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FPA dimensions (all in mm)

Probe (M14x1.5 thread)



Sensor control unit

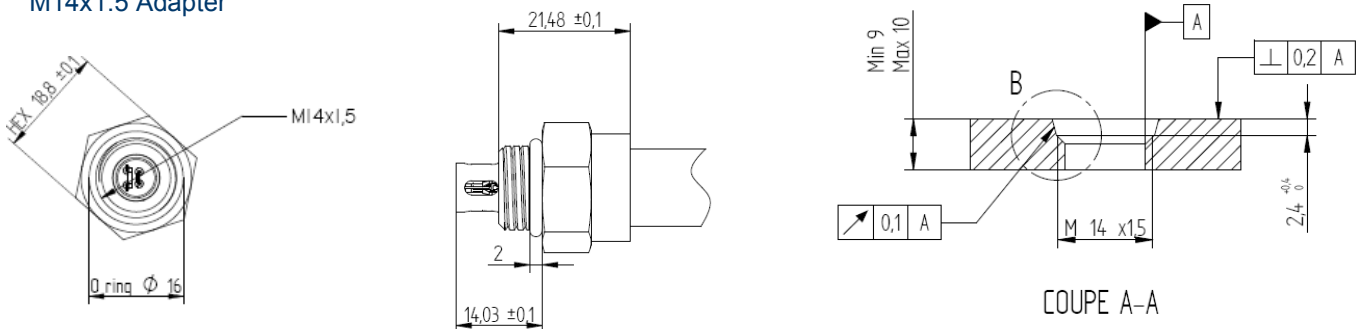


Mechanical interface / assembly position

Standard sensor thread is M14x1.5 / 3/8" NPT which can be optionally equipped with O-ring
And provide a protective rubber sleeve.

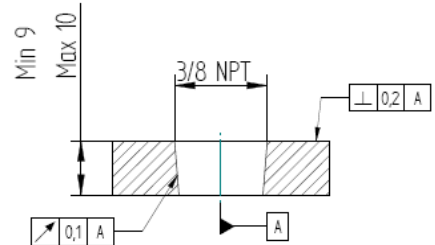
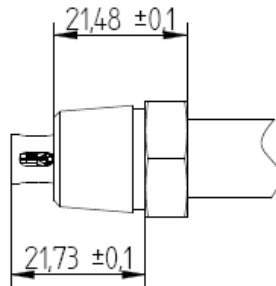
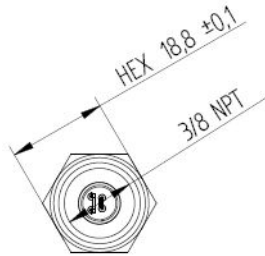
The sensor is designed to operate in high pressure liquids at any flow rate. See the threaded adapter for details of the FPA installation guidelines below. For details, contact the factory.

M14x1.5 Adapter



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3/8" NPT Adapter



COUPE B-B

Standard and Optional Configurations

component	standard layout	Optional configuration
probe		
Probe wire length (probe to SCU)	2m	N/A
Type of thread	M14 x 1.5 or 3/8" NPT	N/A
Sensor control unit		
RS-232 line (SCU to computer)	2m	8m can be chosen
CAN line length (SCU to CAN connection point)	2m	N/A
Power supply length (SCU to power)	2m	N/A
protocol	CAN & RS-232	RS232 & CAN + RS232-USB adapter
	CAN & RS-485	RS485 & CAN + RS485-USB adapter
Power Supply Voltage	12 Vdc	110Vac/12Vdc transformer (US)
		220Vac/12Vdc transformer (EU)
FPA documentation and software		
The document includes	FPA product information	N/A
	FPA Installation Guide	N/A
	FPA introduce	N/A
	Introduction of hydraulic oil application	N/A
	FPA white paper	N/A
	MEAS handbook	N/A
FPA Network Communications Protocol	Communications policy	N/A
FPA operating software and instructions for use	Can use Windows 2000, XP, Vista ** on the following system	N/A
serve		
guarantee	1 year	2 years additional warranty
Standard calibration	Medium viscosity (18 cP @100°C)	N/A
Special designation	N/A	Client requirements
periodic inspection	N/A	Client requirements

* The file is included in the accompanying USB drive

** Not applicable to 64-bit versions

FPA2400BST- Liquid Property Analyzer

RESISTANCE TO PHYSICAL AND CHEMICAL STRESSES

- The FPA2400BST has a protection circuit against electrostatic discharge (ESD) (range: $\pm 15\text{kV}$, air discharge)
- FPA2400BST has anti-polarity protection.
- FPA2400BST has cross wire protection
- The FPA2400BST wetted sensing element is protected by MEAS coating, which can ensure good detection performance under harsh chemical conditions such as 5% nitric acid, carbon deposition, fuel oil, water, and oxidized oil.

It is stated that this FPA product and its applications contain one or more patents, including U.S. Patent No.6,957,575; 6,873,916; 6,494,079; 6,336,353; 7,043,969 and other pending U.S. and foreign patents.

Order information

Please use the order information below to make your purchase

	screw thread	protocol	wire length	Power Supply Voltage	guarantee	demarcate
standard FPP801F001	S = M14 x 1.5 or O = 3/8"NPT	2 = RS232 & CAN	2 = 2m	O = 12V	1 = 1 year	M = medium viscosity
		3 = RS232/USB & CAN 4 = RS485 & CAN 5 = RS485/USB & CAN	8 = 8m	U = 110/12 V adapter E = 220/12V adapter	2 = 2 years	S = Special calibration

for instance :

Standard configuration: FPP801F001 S/02201M

Available for selection configuration: FPP801F001 S32E1S

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