



Fluid property sensor

Continuously validation of fluid quality

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



ENGINEERING YOUR SUCCESS.

Modern mobile equipment calls for a hydraulic fluid ensuring profitable and reliable operation

Description:

The FPS is a novel fluid property sensor that will directly and simultaneously measure the viscosity, density, dielectric constant and temperature of fluids. Relying on patented tuning fork technology, the sensor monitors the direct and dynamic relationship between multiple physical properties to determine the quality, condition and contaminant loading of fluids such as engine oil, fuel, transmission and brake fluid, hydraulic, gears oils, refrigerants and solvents.

The multi-parametric analysis capability improves fluid characterization algorithms. The FPS provides in-line monitoring of fluids for a wide range of OEM and aftermarket installations including fluid reservoirs, process lines and pressurized high flow conduits (e.g., engine oil gallery) for applications that include on and off highway vehicles, HVAC&R, compressors, industrial equipment and turbines. A universal digital CAN J1939 compliant protocol provides easy to connect interface to main Host controller. A simple 4 pin connector allows for cost effective mounting options.

Important note

The Parker FPS does not use a “fingerprint” principle. Sensors using a “fingerprint” principle require up-front calibration in the fluid type subject to future analysis. This calibration can take up to 200 hours, during which time the aging of the oil can start and hence the calibrated reference is not accurate. When a different oil is applied, sensors using the “fingerprint” principle require new calibration. Parker’s PFS sensor directly measures the important fluid properties without the need for calibration in-advance.



Advantages

- Continuously measurement of important fluid properties
- Early detection of fluid aging
- No up-front calibration required
- On board processor with real-time data analysis



Operating range

Ratings	Min	Typ	Max	Unit
Supply Voltage	5	12	20	Vdc
Ambient Operating Temperature (electronics)*	-40	-	125	°C
Ambient Operating Temperature (fluid)*	-40	-	150	°C
Storage Temperature**	-50	-	150	°C
Input Current @12Vdc	40	100	<200	mA
Operating Pressure	0	-	25 (Note: 1)	Bar
Vibration (Peak)	0	-	20	G rms

Peak conditions: less than 10% of the operating time.

NOTE: 1 Elevated pressure ratings are available, contact Parker filtration for specs.

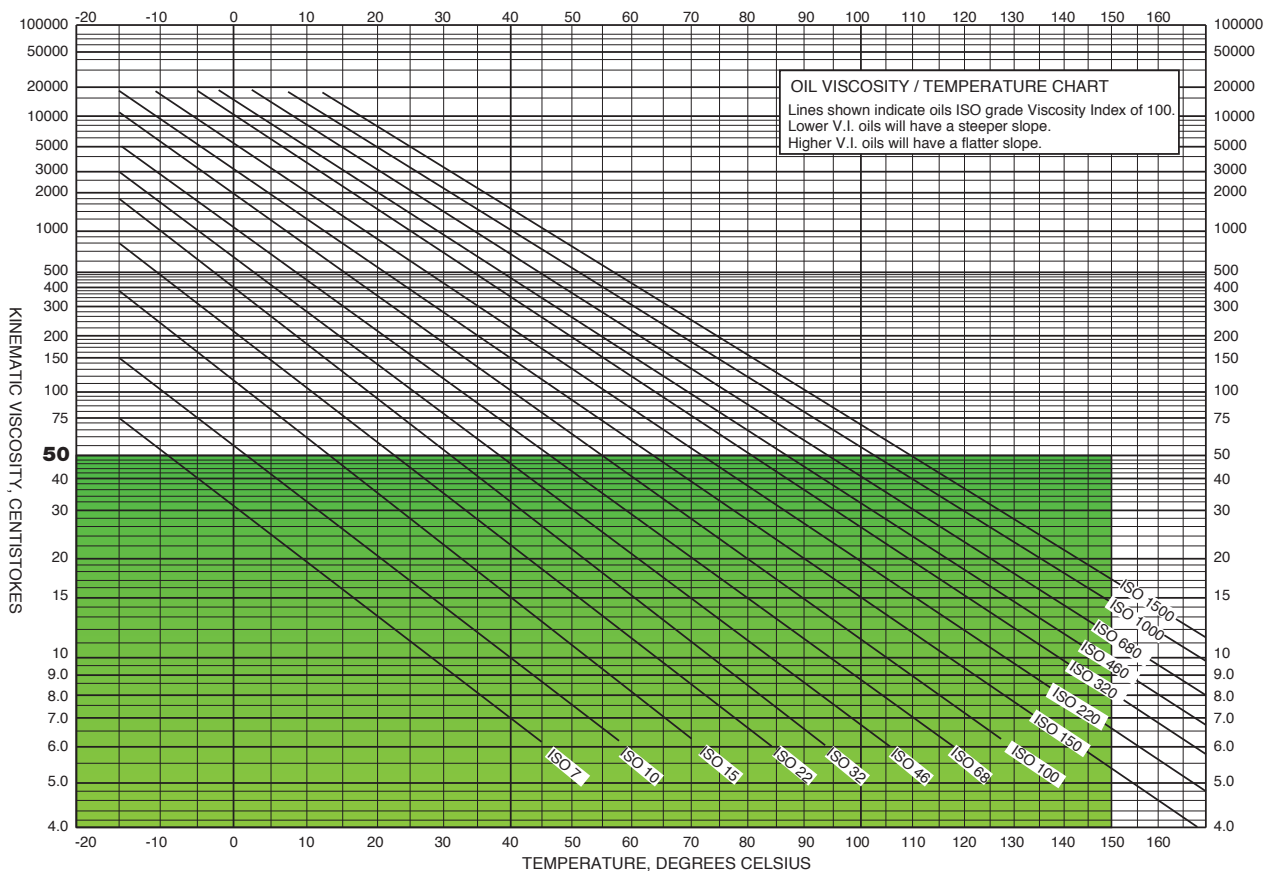
* Ambient Operating Temperature: Service temperature range at which the sensor and its electronics can operate securely.

** Storage Temperature: Temperature range at which the sensor can be stored with no risk of damage.

Metrological characteristics

(@Vcc=12Vdc, T=100°C, unless otherwise noted)

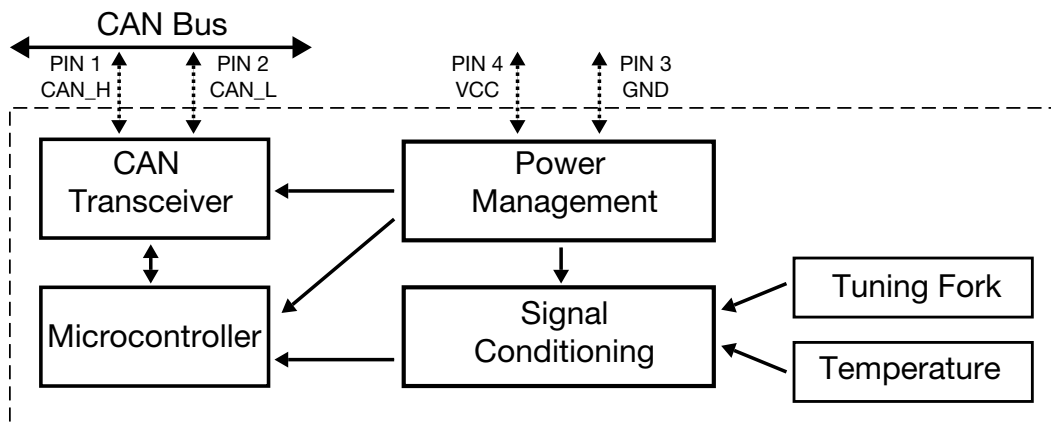
Multi-Parametric Measurement Ranges	Symbol	Min	Typ	Max	Unit
Viscosity (dynamic)	μ	0.5	15	50	mPa-s (cP)
Viscosity (dynamic) Accuracy for viscosity > 10 mPa-s (cP)		-5	+/-2	+5	% Value
Viscosity (dynamic) Accuracy for viscosity < 10 mPa-s (cP)			+/-0.2		mPa-s (cP)
Density	ρ	0.65	0.85	1.50	gm/cc
Density Accuracy		-5	+/-2	+5	% Value
Dielectric Constant	ϵ	1.0	2.0	6.0	-
Dielectric Constant Accuracy		-3	+/-1	+3	% Value
Fluid Temperature	T	-40		150	°C
Temperature Accuracy	T		0.1		°C



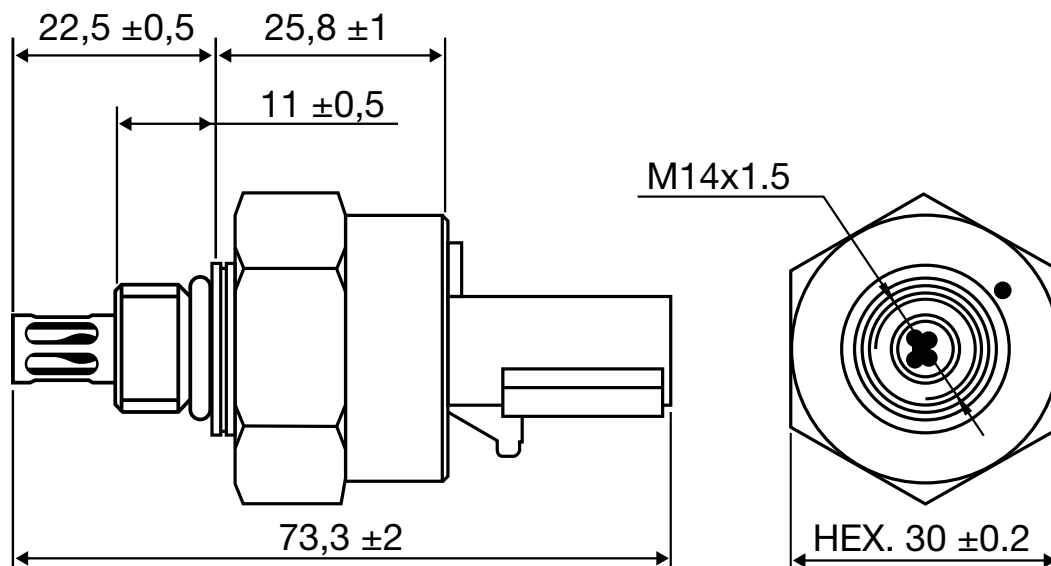
ISO oil viscosity chart with recommended temperature and viscosity range.

Specification

Block diagram



Dimensions



All dimensions are millimeters (mm). Communication cable ACC6NF004. Sensor body is stainless steel.
NOTE: For installation details, please refer to the Parker FPS Installation Guide.

Product usage FPS without data display

Connect FPS with master system controller

- Parker software to be installed on master controller
- Part numbers FPS2000 + ACC6NF004

Product usage FPS with data display

FPS as stand-alone sensor with remote controller

- Parker software installed on MD3 controller
- Part numbers FPS2000, ACC6NF005 and ACC6NN050



Transmission data

Viscosity	Min	Typ	Max
Limits (mPa-s)	0.0		1003.9
Limits (DATA)	0x0000		0xFAF9
Resolution (mPa-s)		0.015625	
Resolution (DATA)		1	
Update period (s)		30	
Density	Min	Typ	Max
Limits (gm/cc)	0.000		1.9608
Limits (DATA)	0x0000		0xFAF6
Resolution (gm/cc)		0.00003052	
Resolution (DATA)		1	
Update period (mn)		30	
Dielectric Constant	Min	Typ	Max
Limits (-)	0.000		7.842
Limits (DATA)	0x0000		0xFAF1
Resolution (-)		0.00012207	
Resolution (DATA)		1	
Update period (mn)		30	
Temperature	Min	Typ	Max
Limits (°C)	-273.0		+1735
Limits (DATA)	0x0000		0xFB00
Resolution (°C)		0.03125	
Resolution (DATA)		1	
Update period (mn)		30	

FPS2000 standard SPN and standard PGN

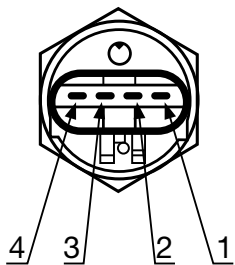
Parameter	SPN	PGN
Kinematic Viscosity	5055	64776
Density	5056	64776
Dielectric Constant	5468	64776
Oil Temperature Sensor	175	65262

No delay is required between command write and data read.

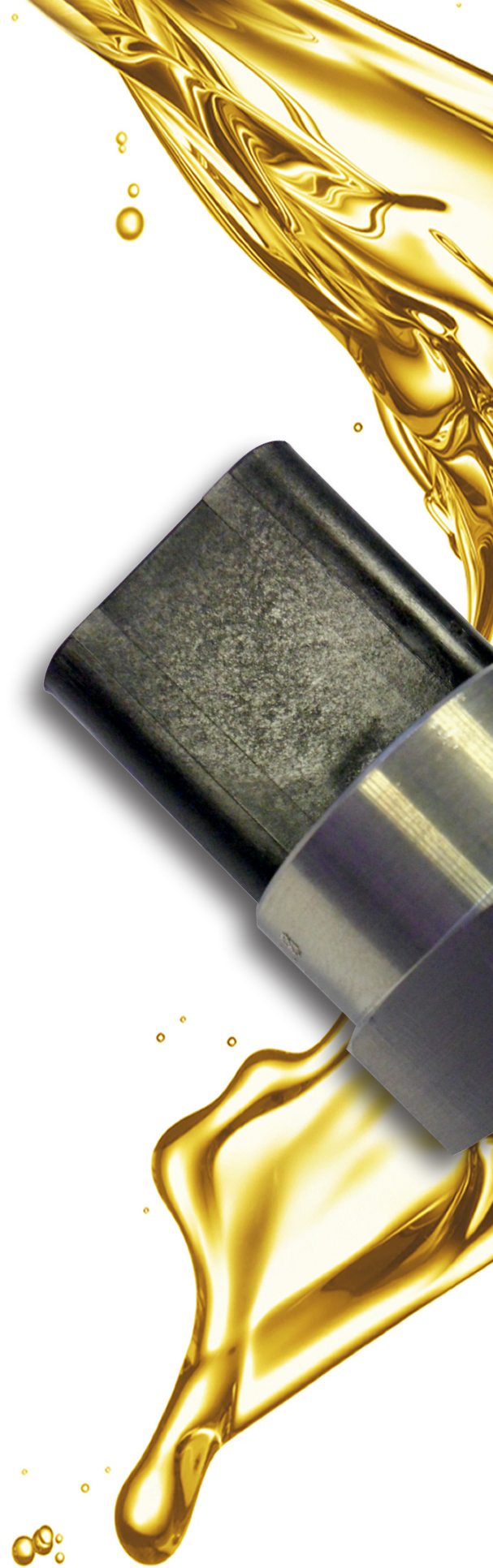
NOTE: the FPS Node ID cannot be changed.

Connecting & mechanical packaging

Pinout assignment (subject to further confirmation)



NO	Function
1	CAN_H
2	CAN_L
3	GND - Ground
4	VCC -Voltage Supply





Resistance to physical and chemical stress

The PFS2000 is protected against:

- EMC interferences (SAE J1114)
- Reverse polarity
- Electrostatic discharges (ESD) up to +/- 25kV (air discharge)
- Cross wire connection

The PFS2000 is tested under harsh chemical conditions and demonstrate good operation in presence of 5% nitric acid, soot, fuel, water and oxidized oil. For specific questions related to fluid compatibility please consult Parker Filtration.

Ordering information

FPS connected to system controller

Description	Partnumber
FPS sensor	FPS2000
Communication cable	ACC6NF004

FPS connected to system controller

Description	Partnumber
FPS sensor	FPS2000
iCount FPS data display with 4.5 mtr cable	ACC6NF005
iCount IQAN run software	ACC6NN050

MD3 controller

Example of visual presentation of measurements



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