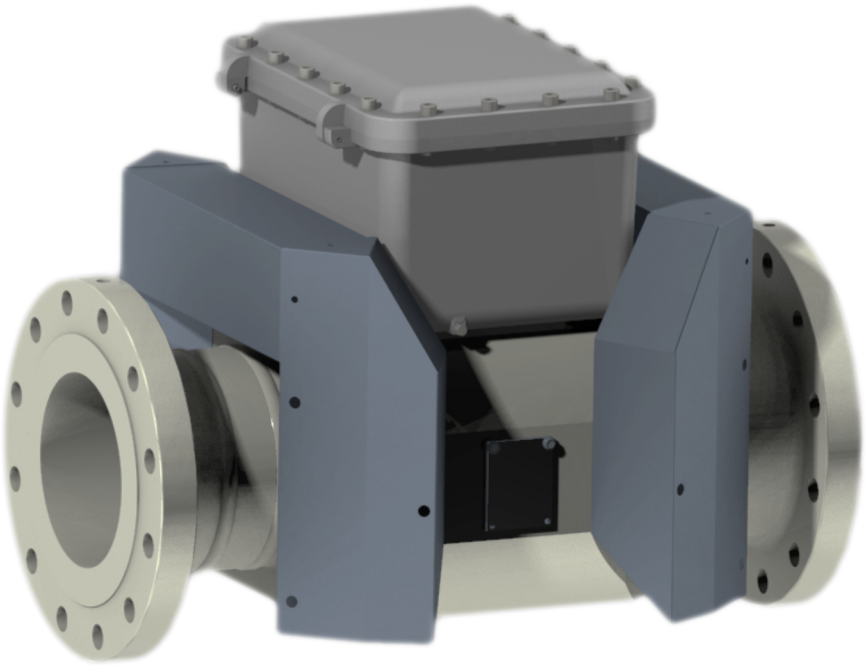
FH Sonic

ULTRASONIC FLOWMETER FOR CUSTODY TRANSFER



Main applications
Custody Transfer
Oil Production / Allocation
FSO / FPSO's Metering
Loading / Off Loading operations
Pipeline Measurement
Storage management

Destined for the measurement of
Hydrocarbons
Alcohols
Petrochemicals
Others

- Fully integrated metering solution
- Transducers extractable without draining the pipe
- Advanced, user-friendly software
- Custody transfer accuracy
- Bi-directional measurement
- Low installation costs
- Low total cost of ownership

FAURE HERMAN Ultraflux

COM 23.04.01 EN - 202305

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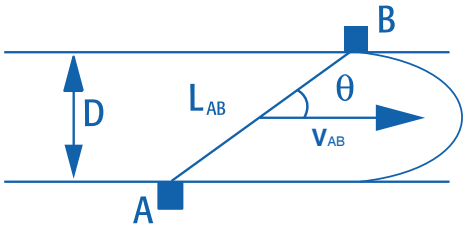
The operating principle of the FH Sonic

The FH Sonic uses the transit time measurement method.
This method consists in measuring the difference in propagation time between the ultrasonic pulses transmitted in the direction of the flow and in the against the flow direction from A to B and from B to A, respectively T_{AB} and T_{BA}.
The average velocity V_{AB} along the segment AB is proportional to (T_{BA} - T_{AB}).



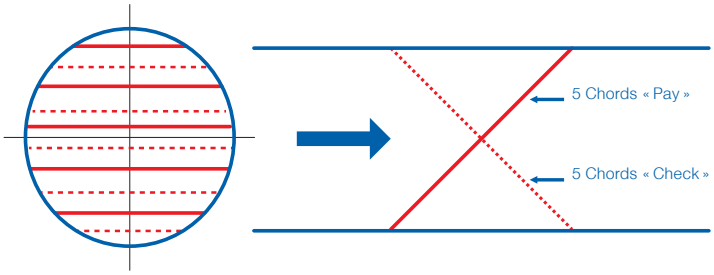
$$V_{AB} = \frac{L_{AB}}{2 \times \cos\theta} \times \frac{T_{BA} - T_{AB}}{T_{BA} \times T_{AB}}$$

FH Sonic features

The FH Sonic is a high-performance liquid volume flowmeter for demanding applications such as custody transfer.

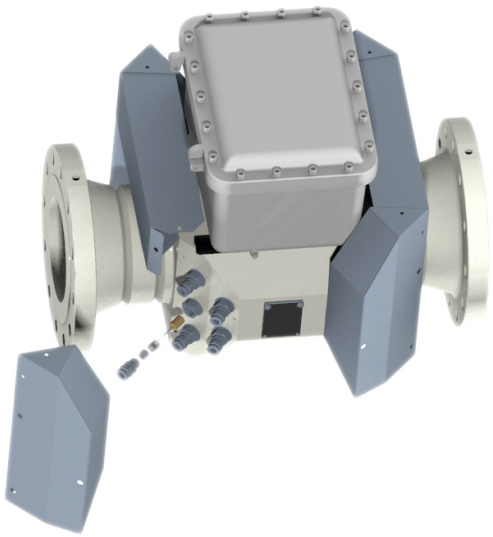
In the standard version, the FH Sonic integrates up to 5 parallel measuring paths arranged asymmetrically in the measuring section to optimize the evaluation of the flow profile (symmetry and swirl) for flow correction and diagnostic purposes.

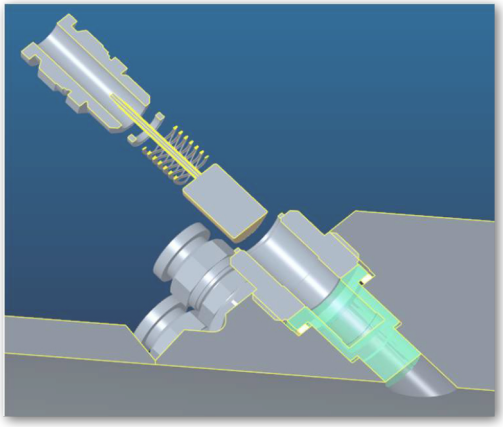
This configuration can be "doubled" by adding a second set of 5 paths, symmetrically arranged in the horizontal plane, to reinforce the analysis and correction capacity of the flow profile or to have a second meter (pay & check) in the same unit. The first set of 5 paths represents the first meter (pay) and the second set is an independent second meter (check).



Performance and quality of measurement are improved by the addition of a 6th (or 11th) central path placed in the vertical plane; dedicated to the velocity of sound measurement as well as the detection of stream inhomogenities such as gas, deposits, etc.

Transducers replaceable under process conditions





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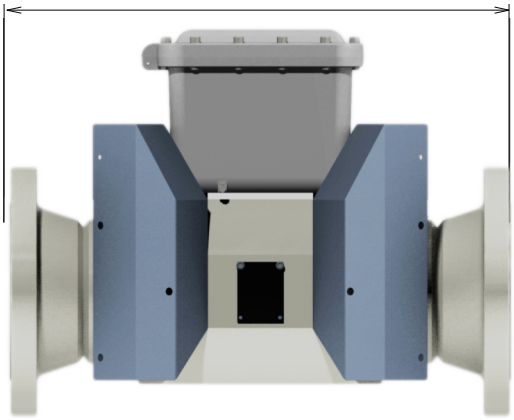
PC Remote configuration and consultation - Customizable HMI

	Gain	Tmoy (µs)	Dt (ns)	VOS (m/s)	Instab. VOS(%)	VOS Gap (m/s)	VOF (m/s)	Instab. VOF(%)
Beam 1	10.2	150.2	0.03	1450.2	0	0	12.15	0.1
Beam 2	10.5	150.3	-0.01	1450.4	0	0	12.38	0.1
Beam 3	10.6	150.2	-0.03	1450.6	0	0	12.58	0
Beam 4	10.9	150.2	-0.04	1450.8	0.1	0	12.84	0.1
Beam 5	11.1	150.3	-0.01	1451	0	0	12.95	0.1

FH Sonic Dimensions & Flowrate Range



Diameter (#150 to #900)	Flange to Flange (mm)
4"	584
6"	660
8"	762
10"	812
12"	889
14"	940
16"	1016
18"	1092
20"	1168
22"	1245
24"	1320

Meter Size		Minimum flowrate V= 0.5 m/s		Maximum flowrate V= 12 m/s	
Inches	mm	BPH	m³/h	BPH	m³/h
4	100	85	13.5	2 015	320
6	150	190	30	3 185	726
8	200	345	55	8 000	1 270
10	250	545	87	12 585	2 000
12	300	800	127	17 830	2 835
14	350	975	155	21 500	3 420
16	400	1290	205	28 200	4 480
18	450	1665	265	35 790	5 690
20	500	2075	330	44 275	7 040
24	600	3050	485	63 985	10 175

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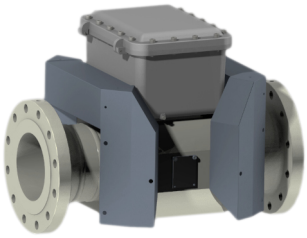
Specifications

Environnement	
Temperature range - Ambient	- 45 to + 65 °C (- 49 to + 149 °F)
Temperature range - Process	- 50 to + 120 °C (- 58 to + 248 °F)
Temperature range - Storage	- 50 to + 80 °C (- 58 to + 176 °F)
Protection	IP 66 / NEMA 4X
Explosion Proof	
For safety use in gaz atmosphere	Marking :
Hazardous locations	II 2 G
	Ex d mb IIB T4
Zone 1 IIB T4	T ambient : - 45 to + 65 °C (- 49 to + 149 °F)
Class 1, Division 1, Groups C and D	T Fluid - 50 to + 120 °C (- 58 to + 248 °F)
Mechanical Specifications	
Size	DN 100 to DN 600 (4" to 24") (other, upon request)
Maximum Service Pressure	150 bar (2180 PSI) B16.5 #900
Body Material	Carbon Steel
	Stainless Steel
	Other, upon request
Flanges	ANSI 150 / 300 / 600 / 900
Transducer	Stainless Steel / PEEK
Performances	
Turndown	24:1
Linearity	± 0.15%
Repeatability	5.8 B1 API
Compact Prover Compliance	Under conditions
Custody Velocity	0.5 to 12 m/s
Viscosity	0.2 to 500 cSt
Density Range	400 to 1 500 kg/m³
Pressure Drop	Negligeable
Electronics	
Power Supply	24 Vdc
Outputs	**Pulse Outputs**
	2x pulse output channels selectable as either 0-5 V or Open Collector.
	Each pulse represents a fixed volume function of the configured Kfactor.
	Duty Cycle: 50/50
	Analog Outputs
	2x independent and configurable analog outputs (0-20 / 4-20 mA)
	Analog outputs can be used for: Instantaneous flow rate, Average velocity, Average VOS …
	HART (Option)
	Digital Outputs
	4x independent and configurable digital outputs (0-5 VDC or 0-12 VDC)
	Digital outputs can be used for: Flow direction, Alarms …
Serial Communication	1x RS 485
	1x RS 232
	1x Ethernet
Protocol	Modbus TCP, Modbus RTU (RS485)
Installation Requirements	
Standard	Upstream staight length, (x10) to (x30) D
	Downstream staight length, (x3) D
Remote converter (option)	Distance < 5 meters
Compliance	
CE marking	2014/68/EU PED
(Compliant to EU Directives)	2014/34/EU ATEX
	2014/30/EU EMC
	2014/32/EU MID (Pending)
Hazardous area approvals	ATEX / IECEx / UL
OIML R117-1 (Pending)	Class 0.3
	H2/M1/E2
NEC Certification (Pending)	Compatibility Class 1, Division 1, Groups C&D



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