

FH8500

**Metering Solution for Custody
Transfer Applications**

One Step Ahead in Ultrasonic Flowmetering



Main Applications

Oil Production & Allocation
FSO, FPSO Metering
Tanker Off-loading
Storage Management
Pipeline Measurement



FAURE HERMAN
Mastering the Flow

IDEX
LIQUID CONTROLS GROUP



FH8500

Leading the market in liquid metering, FAURE HERMAN has developed an ultrasonic flowmeter for custody transfer applications of liquid hydrocarbons. The FH8500 is suitable for the measurement of crude and refined products. FH8500 features bring key technical advantages and excellent ROI for end-users.



- Extremely low pressure drop (filter + flow conditioner + meter) compared with turbine and PD meters minimizes power consumption.
- 100% cross section area eliminates need for filters



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An Integrated and Cost-Effective Metering Solution

Key Technological Features

- Fully integrated electronics
- High speed data processing
- Optimized signal processing
- 18 ultrasonic paths covering the whole velocity profile
- No moving parts
- No pressure drops
- Insensitive to viscosity changes and swirls
- Infrared remote control
- Modbus communication

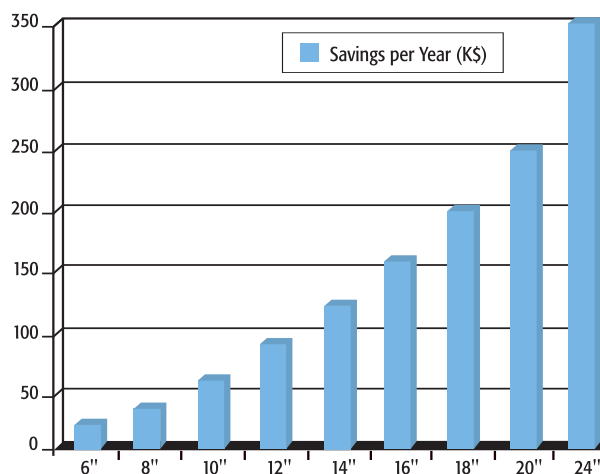


Key Customer Advantages

- Fully integrated metering solution
- User-friendly advanced system
- High accuracy in accordance with OIML Recommendation R117 class 0.3 and API Standard, Chap. 5.8
- Bi-directional measurement
- Insensitive to pressure surges
- Low installation costs
- Low total cost of ownership

Ownership Costs

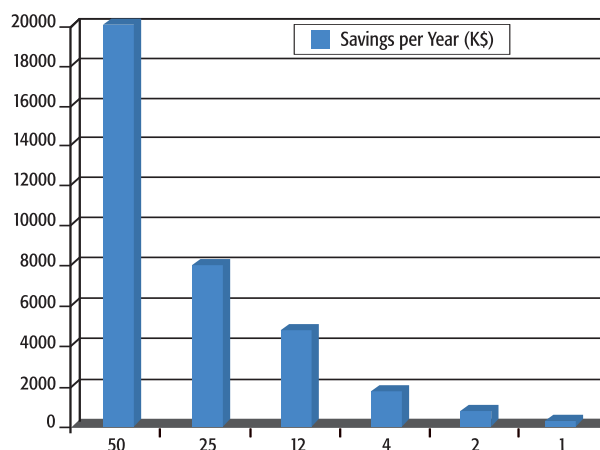
Power Consumption Savings



Meter sizes

1 bar pressure drop savings (14.5 PSI)
1kW.h=\$0.1

Maintenance Cost Savings

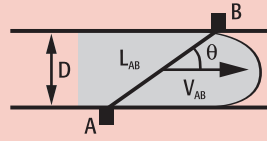


Number of operations per year

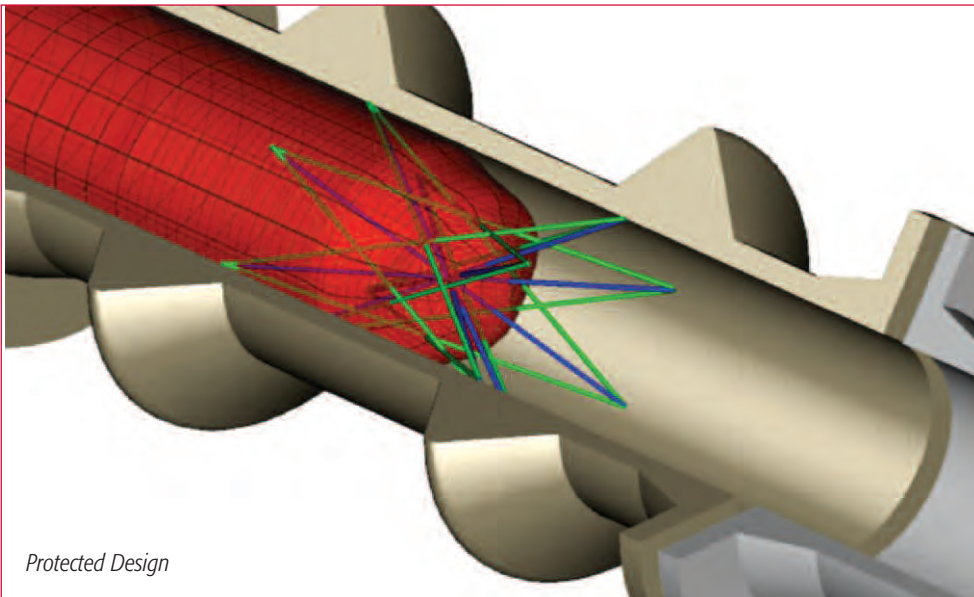
A Clear Concept Innovation



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



The innovative 18-path configuration



Protected Design

The FH8500 multi-path ultrasonic flowmeter is the only flowmeter that integrates 36 transducers generating 18 ultrasonic beams, providing a complete 3D view of the flow velocity profile.



Tri-dimensional Transducer

A Fully Integrated Electronics



Thanks to a powerful integrated processing unit (using leading-edge digital technology), the FH8500 offers an integrated and compact metering solution.

Ultrasonic Transit Time Method

The FH8500 operates on the Ultrasonic Transit Time Method. This method uses the difference in propagation time between ultrasonic pulses transmitted along and against the flow from **A** to **B** and **B** to **A**. The average flow velocity V_{AB} along AB is proportional to $(T_{BA} - T_{AB})$.



The Flow Velocity Profile Compensation

The average speed measured along the ultrasonic propagation path depends on the flow velocity profile. The FAURE HERMAN ultrasonic technology provides detailed information on the flow velocity profile. An accurate measurement of the flowrate can be achieved by rebuilding the whole flow velocity profile across the pipe.

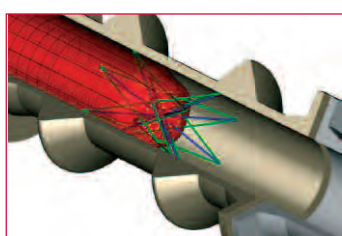


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FH8500

- FH8500 meets or exceeds OIML R117.
- FH8500 meets API International Measurement Standards for custody transfer applications.
- FH8500 rangeability exceeds 10:1.
- FH8500 covers a viscosity range from 0.2 to 500 cSt*.
 - * Please consult your FAURE HERMAN local representative for higher viscosities



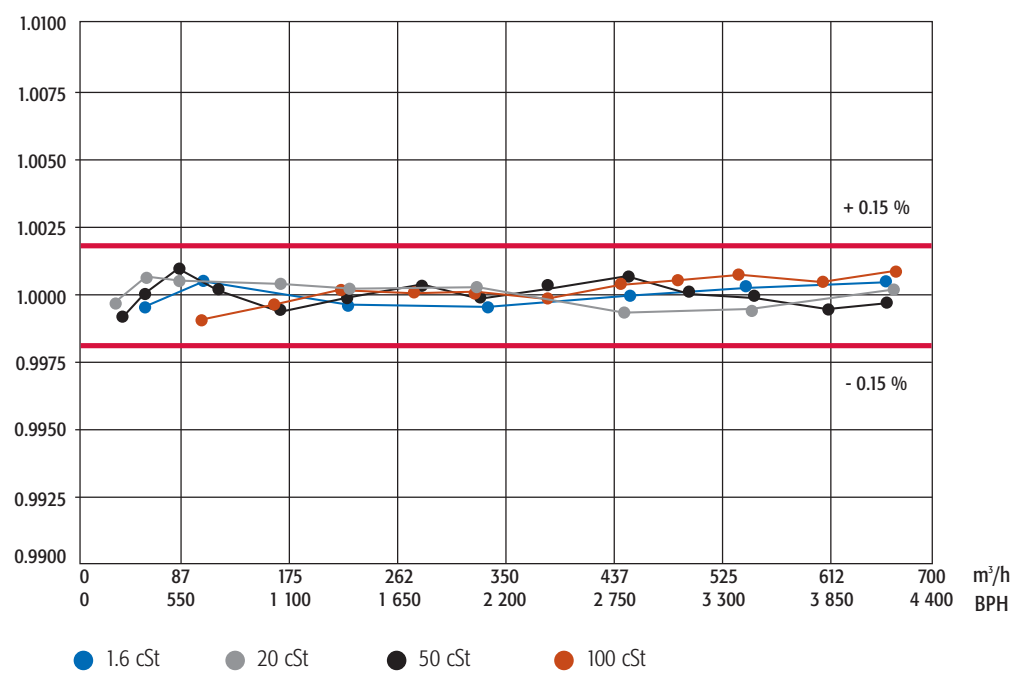
- FAURE HERMAN's 18-path technology provides real-time information about the flow velocity profile and enables compensation of dissymmetries.
- The FH8500 performance corresponds to the Reynolds number of the measured product. One meter factor for one Reynolds number.



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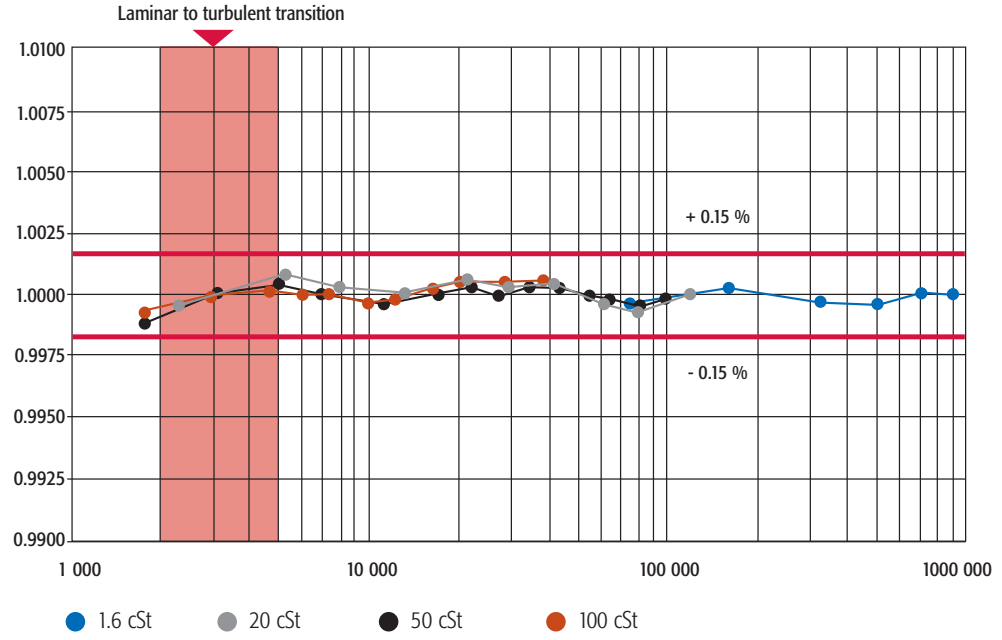
High Accuracy Multi-Product Measurement

▶ 6" FH8500 Flowmeter Typical Curve Calibration Factors / Flowrates

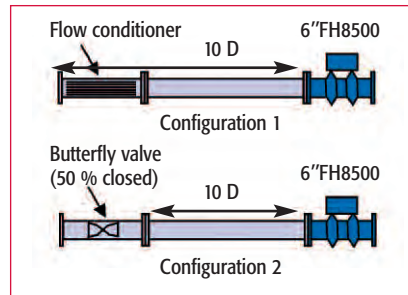
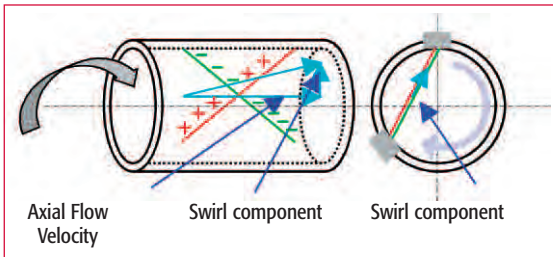


Turbulent and / or Laminar Flow Profiles Processing

▶ 6" FH8500 Flowmeter Typical Curve Calibration Factors / Reynolds Number

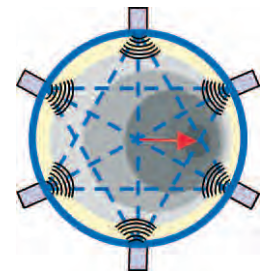
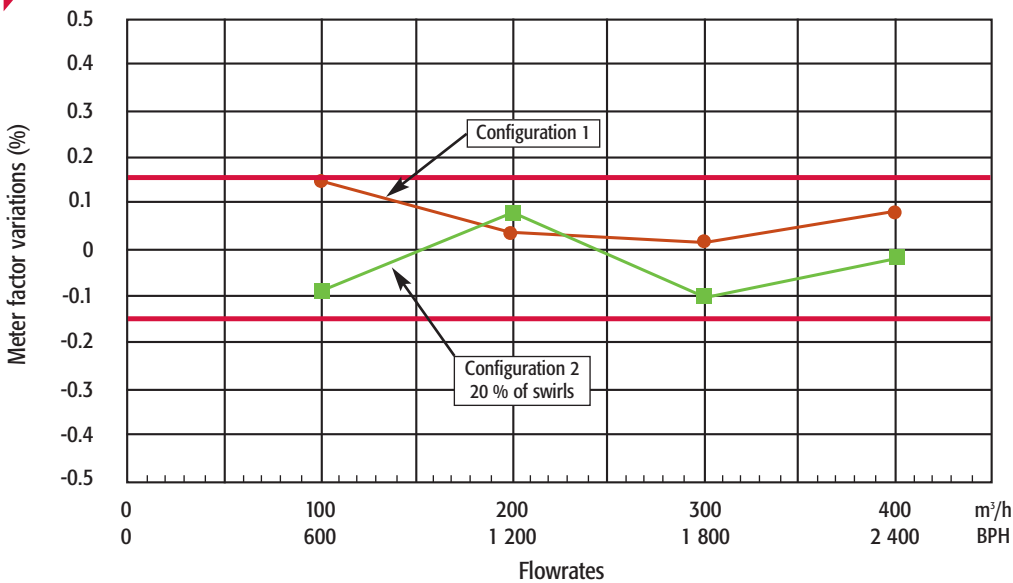


Swirls and Asymmetric Profiles Compensation



Thanks to the unique FH8500 tri-dimensional symmetric path configuration and software compensation, the flowmeter measurement accuracy is maintained within requirements when swirls and asymmetric profiles are present in the pipe.

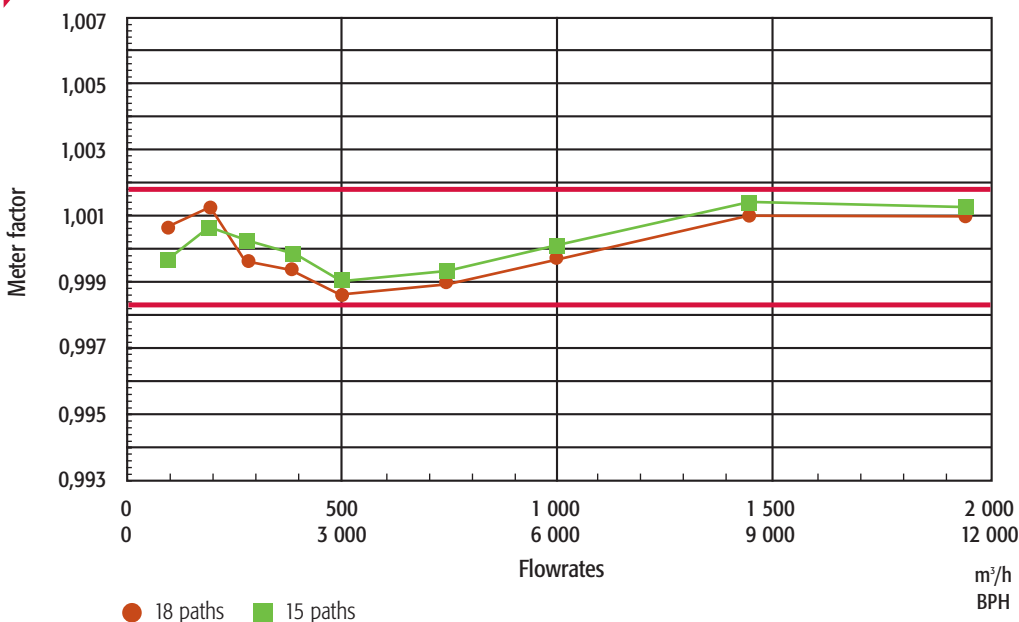
Flow Perturbation Test Results for a 6" FH8500



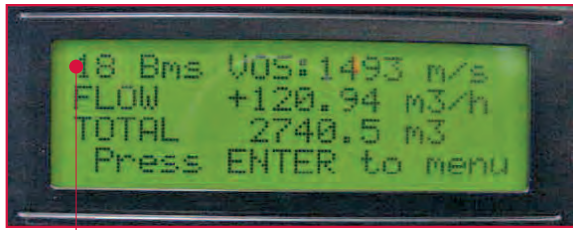
The FH8500 ultrasonic path configuration ensures the measurement accuracy is still in compliance with API recommendations for custody transfer applications after losing one transducer.

18-path Measurement Redundancy

10" FH8500 Test Results with 10D straight line upstream



Remote Control and Local Display



Number of operating beams

Velocity of sound

Flowrate

Totalizer

Local display

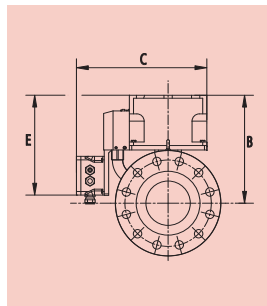
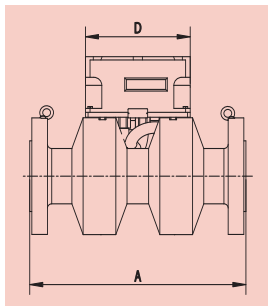
The local display provides non-fiscal information about the flow conditions, flowrate, totalizer, VOS, etc. The display units can be modified by using either the configuration software or the infrared remote control.



Global parameters display

The unique intrinsically safe infrared remote control allows for non-contact communication and adjustment of display parameters and access to various configuration levels, and alarms management based on preset security levels.

Meter Selection



Flow Velocities

The turndown ratio is determined on the basis of a flow velocity of 1 m/s to 10 m/s. The extended flow rate is determined on a velocity of 15 m/s.

Standard Dimensions: ANSI 150 to ANSI 600 RF Flanged Ultrasonic Flowmeter

Sizes		A		B		Standard Turndown Ratio				Extended Flowrates		Approx. Weights (ANSI 150)	
in.	mm	in.	mm	in.	mm	m ³ /h	Bbl/h	m ³ /h	Bbl/h	m ³ /h	Bbl/h	kg	lbs
4	100	23.0	584.2	13.8	350	30	180	300	1 800	450	2 700	125	275
6	150	26.0	660.4	14.4	365	65	390	650	3 900	975	5 850	150	330
8	200	30.0	762.0	14.4	365	120	720	1 200	7 200	1 800	10 800	180	396
10	250	32.0	812.8	14.6	370	180	1 100	1 800	11 000	2 700	16 200	215	473
12	300	35.0	889.0	15.6	395	250	1 500	2 500	15 000	3 750	22 500	270	594
14	350	37.0	939.8	17.3	440	350	2 100	3 500	21 000	5 250	31 500	400	880
16	400	40.0	1 016.0	19.1	485	450	2 700	4 500	27 000	6 750	40 500	550	1 210
18	450	43.0	1 092.2	19.3	489	600	3 600	6 000	36 000	9 000	54 000	750	1 430
20	500	46.0	1 168.4	20.9	530	700	4 200	7 000	42 000	10 500	63 000	900	1 790
24	600	52.0	1 320.8	26.2	665	1 000	6 000	10 000	60 000	15 000	90 000	1 200	2 640

Overall Dimensions of Electronic Enclosures

	in.	mm
C	17.4	441
D	12.6	320
E	13.3	339



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Specifications

Environment	
Ambient temperature range	- 40 to + 60 °C (- 40 to + 140 °F)
Process temperature range	- 45 to + 120 °C (- 49 to + 248 °F)
Climatic protection	IP 66, NEMA 4X
EMC	EN 61000
Safety : ATEX II 2 G	
Transducer classification	Ex m II T6 to T4
Enclosure classification	Ex d IIB T6
Remote control	Ex ia IIC T4
Mechanical	
Pressure range	ANSI 150 / 300 / 600
Meter body materials	Carbon steel Low temperature carbon steel (upon request) Stainless steel 316 (upon request) Duplex
Performances	
Accuracy	± 0.15 % (10:1)
Repeatability	In compliance with API recommendations
Fluid velocity range	1 m/s to 10 m/s (3.28 fts to 32.8 fts) (extended range upon request)
Viscosity range	0.2 to 500 cSt (higher upon request)
Density range	400 to 1,500 kg/m ³
Electronics	
Enclosure material	Cast iron EN: GJL 200
Power supply voltage	110 to 220 Vac ± 15 % - 25 W
Power supply frequency	50/60 Hz
	Parameters back-up battery
LCD Local Display	4 lines x 20 characters
Remote Control	
Type	Infrared with numeric keyboard (16 keys)
Dimensions	120 x 65 x 22 mm (14/3", 5/2", 13/15")
Weight	60 g
Power supply	1 or 2 Lithium battery 3.6 V
Inputs / Outputs	
Analog inputs	2 4-20 mA (pressure, temperature)
Pulse outputs	2 (with 90° phase shift) TTL (Vmax 5 Vdc, Imax 1mA, Fmax 2kHz) or Open collector (Umax 30 V, Imax 500 mA, Pmax 300 mW)
Analog outputs	3 4-20 mA
Serial link	2 Relay contacts (Alarms) 1 RS485 (Modbus)
Approvals	
ATEX	94/09/EC compliant
PED	97/23/EC compliant
EMC	2004/108/EC compliant
Custody transfer	OIML R117-1 / MID (Class 0.3) and other national approvals (upon request)



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