

FH8500

OIML R117-1 / MID
Class 0.3

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. The 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.
- No need for filters



FAURE HERMAN

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 drop
- Insensitive to viscosity changes and swirl
- Infrared remote control
- Modbus communication

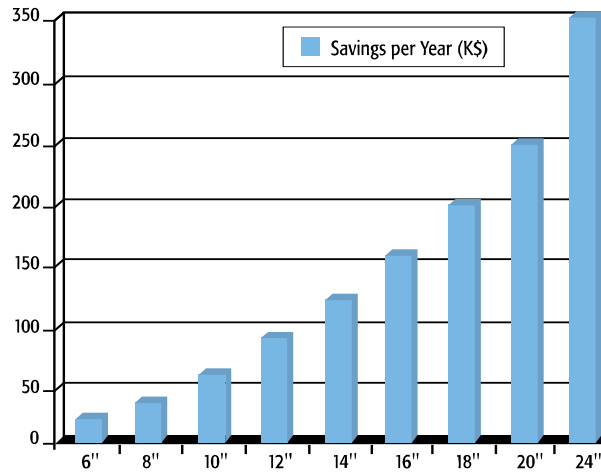


Key Customer Advantages

- Fully integrated metering solution
- Advanced, user-friendly 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

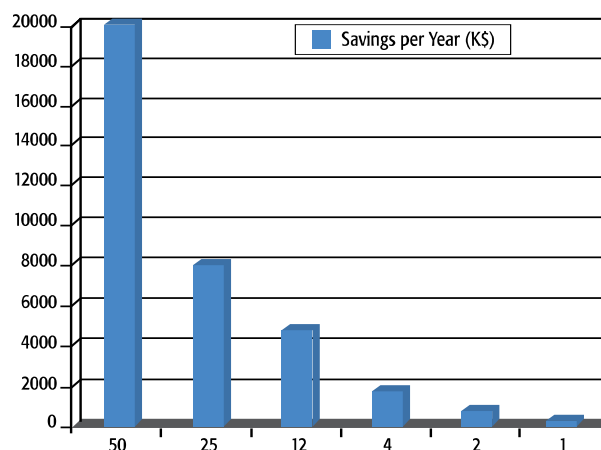
Power Consumption Savings



Meter sizes

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

Maintenance Cost Savings

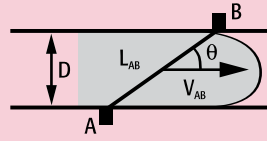


Number of operations per year

A Clear Concept Innovation



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



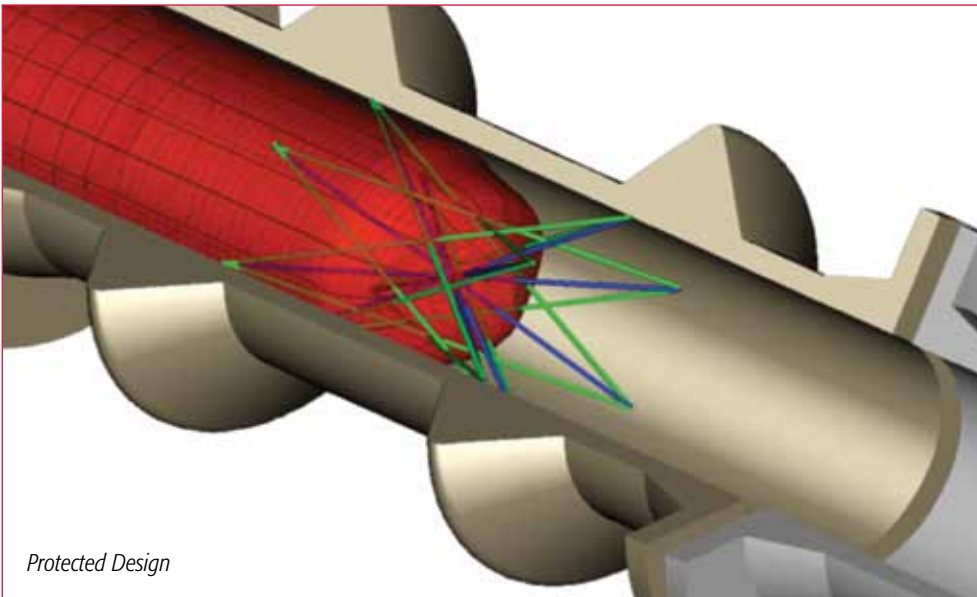
Ultrasonic Transit Time Method

The FH8500 measurement is based on the Ultrasonic Transit Time Method.

Basically, this method measures the difference in propagation time between ultrasonic pulses transmitted along and against the flow between A and B, T_{AB} and T_{BA} respectively.

The average flow velocity V_{AB} along AB is proportional to $(T_{BA} - T_{AB})$.

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



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.

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.



FAURE HERMAN



High Accuracy Multi-Product Measurement

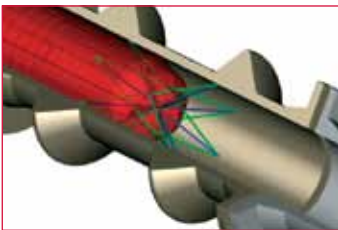
FH8500 meets or exceeds OIML R117.

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



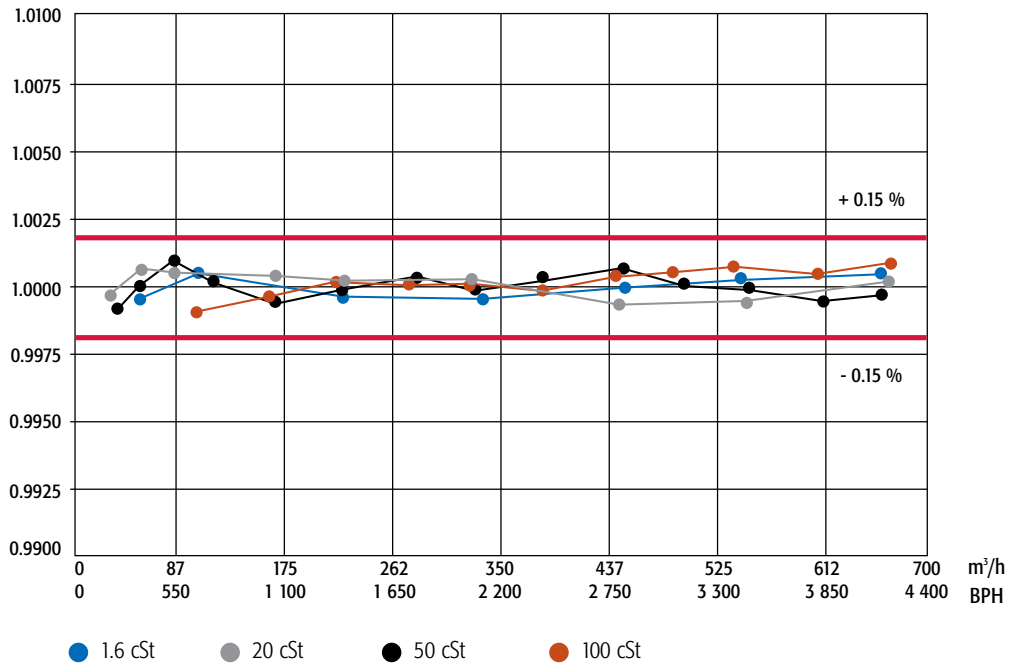
FAURE HERMAN's 18-path technology provides real-time information about the flow velocity profile and enables compensation of asymmetries.

The FH8500 performance corresponds to the Reynolds number of the measured product. One meter factor for one Reynolds number.



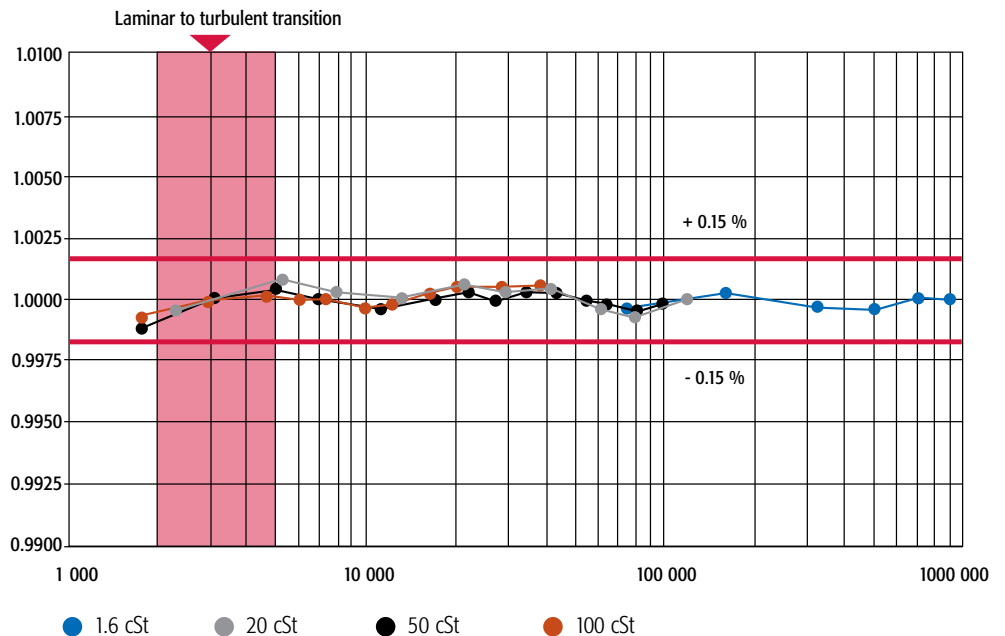
FAURE HERMAN

6" FH8500 Flowmeter Typical Curve Calibration Factors / Flowrates

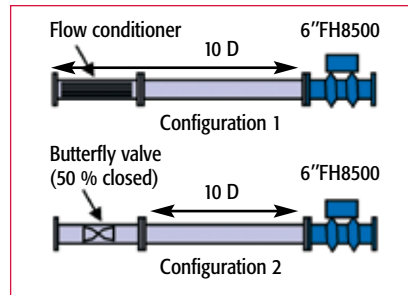
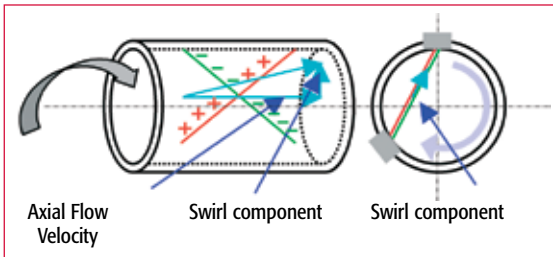


Turbulent and / or Laminar Flow Profiles Processing

6" FH8500 Flowmeter Typical Curve Calibration Factors / Reynolds Number

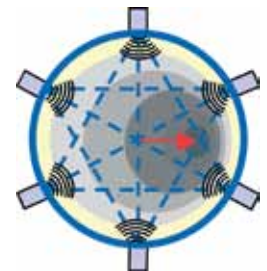
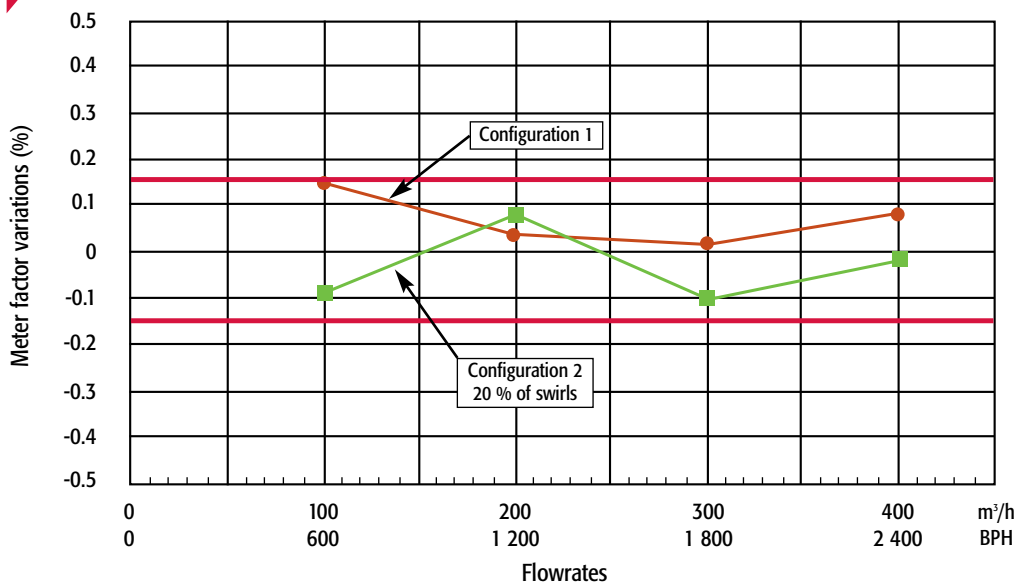


Swirls and Asymmetric Profiles Compensation



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.

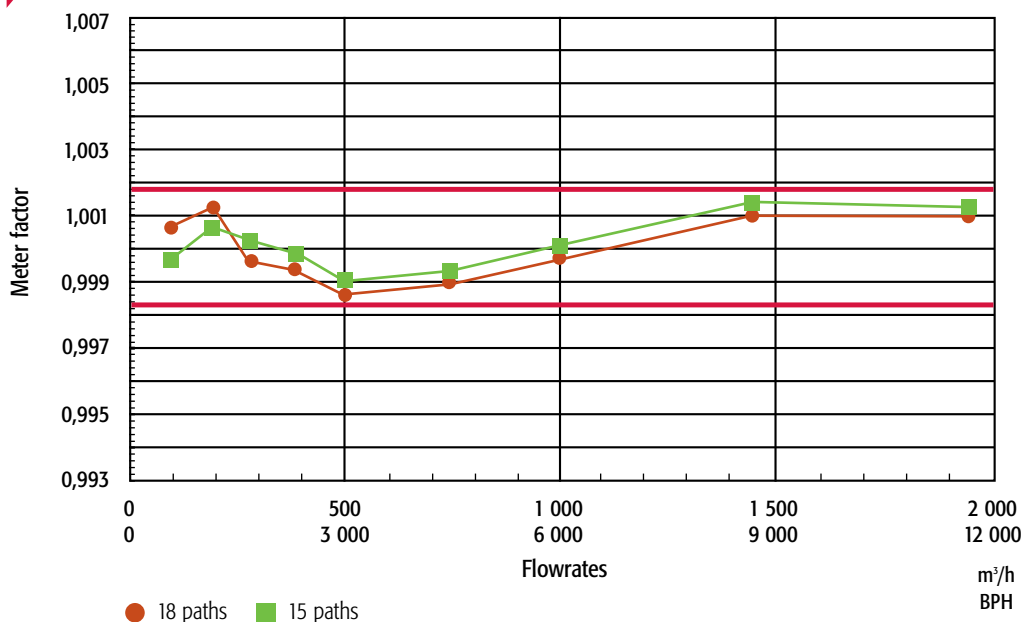
Flow Perturbation Test Results for a 6" FH8500



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





FHview Communication Software



I/O setting

This screen gives access to the configuration of the analogue 4-20 mA inputs and outputs. Users can allocate one parameter, for example flowrate or VOS (Velocity of Sound), to each of them and adjust the operating range.

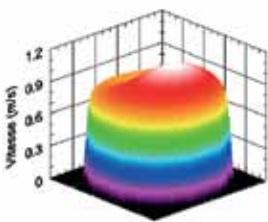
The FHview Software
 FHview is the PC software for the configuration and operation of the FAURE HERMAN FH8000 ultrasonic product line. The FH8000 product line includes ultrasonic flowmeters for both fiscal and process applications. The communication between FHview and the FH8000 uses MODBUS protocol via a RS485 serial link.



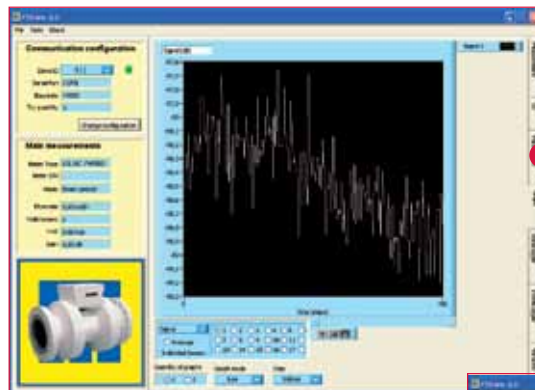
Global parameters display

This screen provides instantaneous information on the FH8500 flow conditions such as gross flowrate, average VOS, etc. In addition, users get data relating to the operating status of meter, number of working beams, alarms, and average ultrasonic signal level.

3D Profile of Velocities



Example of reconstruction of a 3D profile of Velocities using FH8500 ultrasonic 18 paths.



Measurement integrity

This screen gives all necessary parameters relating to the 18 ultrasonic paths, VOF (Velocity of Flow), VOS and signal gain. These data allow the user to check the measurement integrity on each single beam.

Graph visualisation

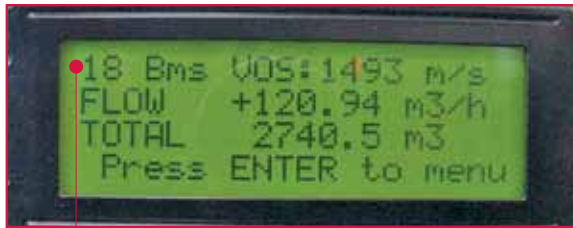
A range of functionalities is available to track and view average VOF, VOS and signal gain over time.

Data and events loggers

Users can download and record data from the flowmeter with respect to the previously defined period of time. These data relate to the flowmeter parameters. Dated events such as alarms can be downloaded and recorded.



Remote Control and Local Display



- Velocity of sound
- Flowrate
- Totalizer

Number of operating beams

Local display

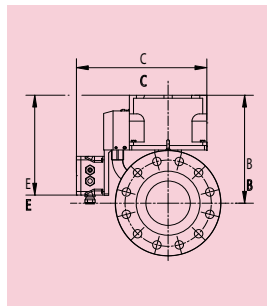
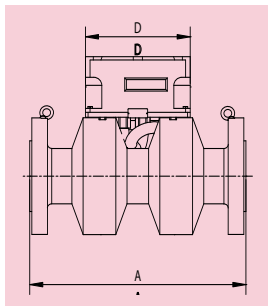
The local display provides non-fiscal information about the flow conditions, flowrate, totalizer, VOS, etc. The display units can be modified by using either the configuration software or the infrared remote control.



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 15 m/s.

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

Size		A		B		Approx Weights (ANSI 150)		Standard Turndown Ratio			
								Minimum Flowrates (1 m/s)		Maximum Flowrates (15 m/s)	
in.	mm	in.	mm	in.	mm	kg	lbs	m ³ /h	Bbl/h	m ³ /h	Bbl/h
4	100	23.0	584.2	13.8	350	125	275	27	170	405	2550
6	150	26.0	660.4	14.4	365	150	330	60	380	900	5660
8	200	30.0	762.0	14.4	365	180	396	110	690	1650	10380
10	250	32.0	812.8	14.6	370	215	473	170	1070	2550	16040
12	300	35.0	889.0	15.6	395	270	594	240	1510	3600	22640
14	350	37.0	939.8	17.3	440	400	880	290	1820	4350	27360
16	400	40.0	1 016.0	19.1	485	550	1 210	380	2390	5700	35850
18	450	43.0	1 092.2	19.3	489	750	1 430	480	3020	7200	45290
20	500	46.0	1 168.4	20.9	530	900	1 790	600	3770	9000	56610
24	600	52.0	1 320.8	26.2	665	1 200	2 640	850	5350	12750	80200

Overall Dimensions of Electronic Enclosures

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



FAURE HERMAN



Specifications



Environment	
Ambient temperature range	-40 to +60°C (-40 to +140°F)
Process temperature range	-40 to +120°C (-40 to +248°F)
Storage temperature	-40 to +60°C (-40 to +140°F)
Climatic protection	IP 66 / NEMA 4X
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 (upon request)
Performances	
Accuracy	± 0.15 % (10:1)
Repeatability	In compliance with API recommendations
Fluid velocity range	1 m/s to 15 m/s (3.28 fts to 49.2 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
	2 Relay contacts (Alarms)
Communication / Serial link	1 RS 485 (Modbus) (other upon request)
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)



FAURE HERMAN
www.faureherman.com

FAURE HERMAN - Route de Bonnétable - BP 20154 - 72406 La Ferté-Bernard Cedex - France

Tel. : + 33 (0)2 43 60 28 60 - Fax : + 33 (0)2 43 60 28 70

E-mail : fhprojects@idexcorp.com

FAURE HERMAN METER - 4702 North Sam Houston Parkway West - Suite 100 - Houston, TX 77086 (U.S.A)

Phone : +1 713 623 0808 – Fax : +1 713 623 2332 – E-mail : FHH-Sales@idexcorp.com

www.liquidcontrolsgroup.com