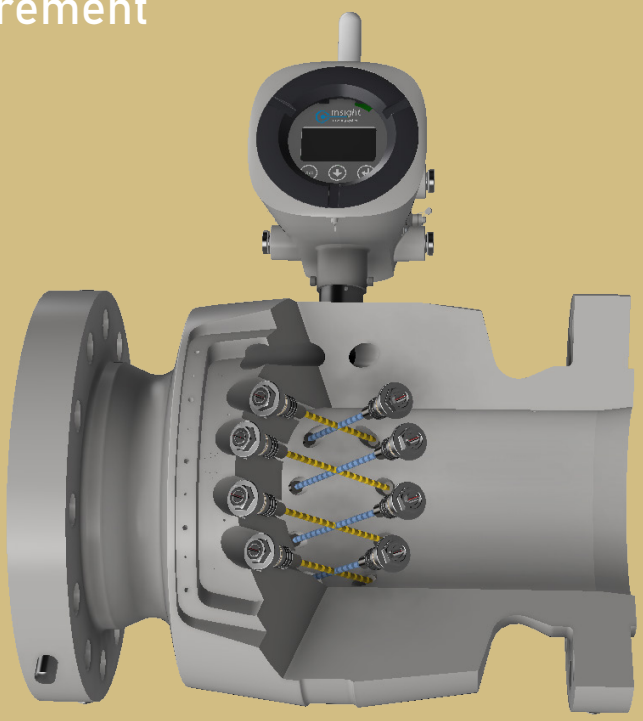
CRUDE & REFINED PRODUCT MEASUREMENT

iSonic 8L – Liquid Flow Measurement
reinvented for the 21st century.
Small Volume Prover's best friend



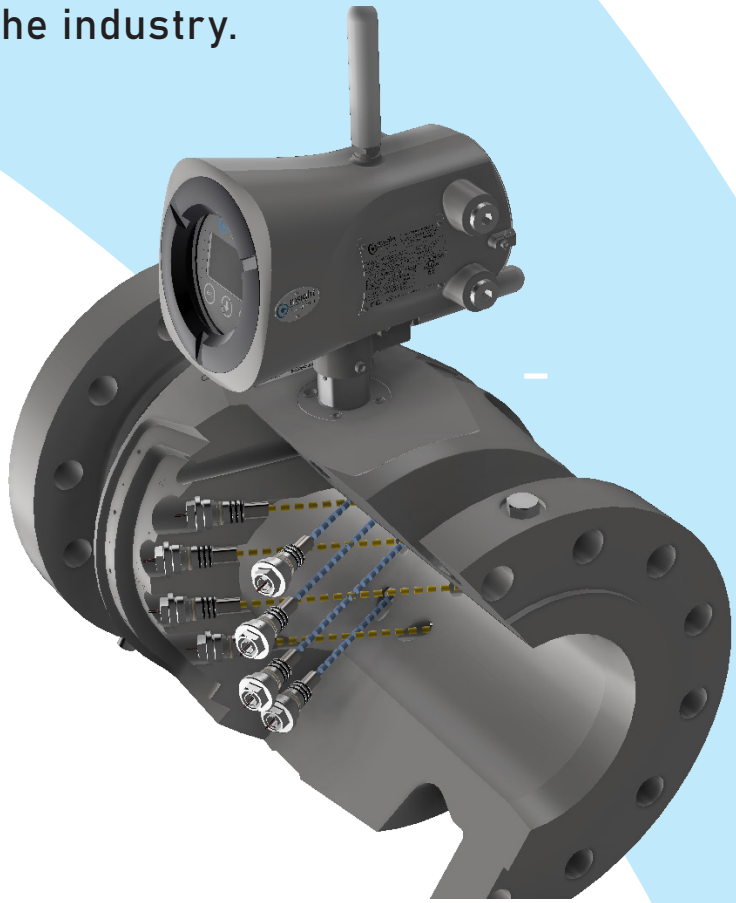
insight
metering systems

THE NEW **iSonic 8L**

Verifiable / Prove-ready via Compact, Small Volume or Ball Provers

The iSonic 8L, a new addition to the iSonic family. It's a state of the art multi-path flowmeter designed to measure a wide range of Liquid Hydrocarbons.

The iSonic 8L is an 8 path ultrasonic flowmeter comprising a forged steel body, 16 high precision non-wetted transducers, high speed electronics, and lighning-fast signal processing resulting in the most innovative, accurate and reliable ultrasonic flow meter in the industry.



FEATURES AND BENEFITS

- A multi-path flowmeter designed for custody transfer.
- Non-wetted transducers, either titanium or welded-in ss housing
- Available in sizes 4"- 24"
- Working pressures up to 3,705 psig
- Working temp, -40 to 100C std -200 to 100C cryogenic operation

TYPICAL APPLICATIONS

- Wide viscocity and flow range, ideal for Petroleum products including: Crude oil, Refined Products and Blends
- Fully compliant with; API Chapter 5.8, OIML R 117 Conformities include ATEX 2014/34/EU, NEC/CEC (US/CA) explosion-proof/ Intrinsically Safe

iSonic 8L PERFORMANCE

Linearity : ± : 0.15% of measured value over a 40:1 turndown
Uncertainty of Meter Factor : < ± 0.027% (API MPMS, Chapter 5.8)
Velocity Range : 1.0 fps (0.3 m/s) to 40.0 fps (12.2 m/s)- higher rates available
Upper Viscosity Limit : 1000 cSt.

TYPICAL APPLICATIONS

- Custody Transfer Pipelines - Crude Oil & Refined Products
- Inlet / Outlet Storage Terminals (Tank Farms)
- Line Balance
- Leak Detection
- Allocation
- Check Metering
- LNG Cargo Loading & Offloading
- Offshore Platforms

APPLICATION PERFORMANCE

CRUDE OILS

- Wide range of viscosities, typical 1 to 1000 cSt
- Meter body design facilitates flow profile integration without software correction
- Meter body handles low Reynolds numbers < 4000 through the transition region (4,000 - 10,000) - native linearity less than 0.30% (without software)
- Meter body and installation methodology addresses thermal gradients in the fluid
- Contamination and corrosion resistent
- Optional welded pressure containment (eliminating O-ring maintenance)
- Handles two phase fluid (oil / water mixtures)

REFINED PRODUCTS

- Linearity over wide Reynolds number ranges (typically ReN = 10,000 to 1,000,000)
- Site proving repeatability with compact, small volume and ball provers
- International approvals including OIML R117 certification (pending)

CRYOGENIC PRODUCTS

- Low temp design transducers (-200 to 100 C)
- Hazardous area certifications (intrinsically safe)

TECHNICAL SPECS

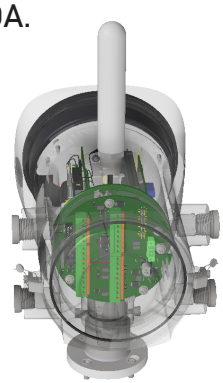
iSonic 8L Liquid - Technical Data		
Path Arrangement		8 paths– Cross Configuration
Size		4" to 24" (Standard) other sizes on request
Measurement Principle		transit time
Repeatability		≤0.05% (standard calibration)
Accuracy		Class 0.5
Pipe requirements	with flow conditioner	Upstream straight length ≥ 5D，Downstream straight length ≥ 3D
	no flow conditioner	Upstream straight length ≥ 5D，Downstream straight length ≥ 3D
Temperature Range		–40 °C to +100 °C -200 °C to +100 °C (Cryogenic Model)
Pressure Range		0 psig to 2250 psig (Standard 150#, 300#, 600#, 900#) 0 psig to 3750 psig (Extended 1500#)
Ingress protection		IP66
Environment		
Ambient temperature		–40 °C ~ +70 °C
Storage temperature		–40 °C ~ +70 °C
Ambient humidity		≤95%，non-condensing
Conformities and Haz Loc Approvals		
Conformities		OIML R 117 API 5.8 ATEX: 2014/34/EU NEC/CEC UL1203
Hazardous Approvals		ATEX/IECEx Ex db ia mb IIB+H2 T4…T6 NEC/CEC (US/CA) Explosion-proof / Intrinsically Safe: Class I, Div. 1 Groups B, C, D, T4…T6
Inputs/Outputs		
Analog Outputs	2	4 to 20mA, electrically isolated
Analog Inputs	2	4 to 20mA
Digital Outputs	4	2 x status, 2 x pulse f_{max} = 5 kHz passive, electrically isolated, internal or external power, open collector
Communication Ports	RS485	Modbus RTU 3 x RS485
	Ethernet	1 x Ethernet 1 x Wi-Fi
	Cloud communication	4G
Power		
Voltage		12-30 VDC
Power Consumption		5W, (6W during 4G communication)
Data Storage		
Archived data	Meter	Every Minute (10,000 records) Hourly (10,000 records) Daily (5,000 records)
	Cloud	Every Minute (10,000 records), on demand Hourly (no limit) Daily (no limit)
Alarm/Event Log	Meter	Event Log (10,000 events) Parameter modification Log (1,000 modifications) Alarm Log (1,000 alarms)
	Cloud	Event Log (no limit) Parameter Modification Log (no limit) Alarms Log (no limit)

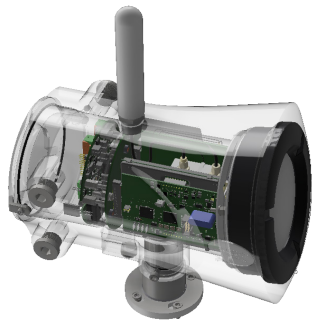
WEIGHT & DIMMENSIONS

The iSonic's body is either forged Carbon Steel or Stainless Steel machined utilizing multi-tasking CNC to ensure highest precision.

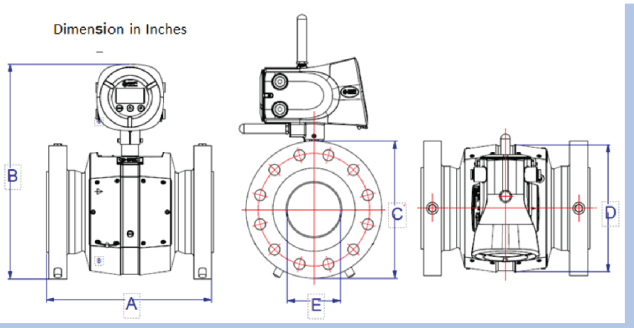
The iSonic 8L standard overall length is 3D for sizes 4 - 12 inch, making it suitable for new or existing compact skid designs. Consult the factory for other lengths to meet installation requirements.

The iSonic 8L is easily adaptable in the field and control room. With MODBUS protocol and multiple I/O facilitates seamless integration into any FC, RTU and SCADA.





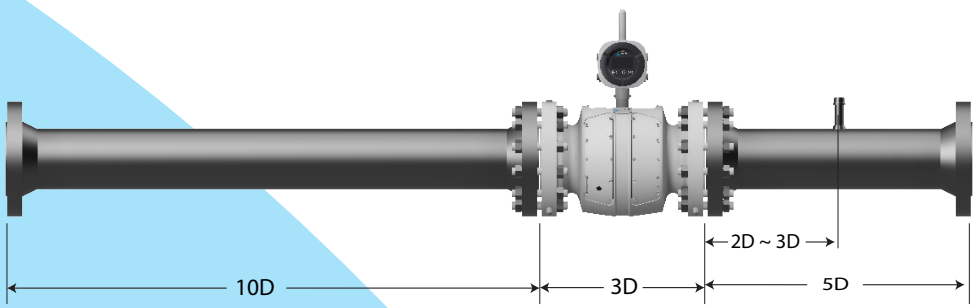
The iSonic 8L electronic enclosure - magnificent craftmanship, ergonomic, ample I/O, and easy access to facilitate maintenance and repairs



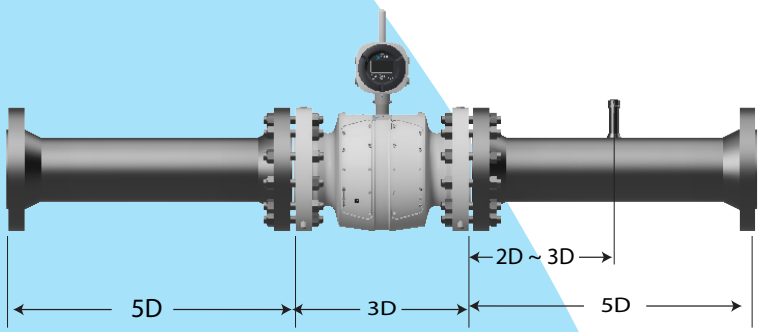
Standard	NPS	Flange	Weight	A	B	B + Antenna	C	D	E	Weight with Transmitter
ASME B16.5	4	150	116	11.8	18.5	22.3	9.0	9.8	4.0	124
ASME B16.5	4	300	130	11.8	19.0	22.8	10.0	9.8	4.0	138
ASME B16.5	4	600	147	11.8	19.3	23.2	10.8	9.8	3.8	155
ASME B16.5	4	900	204	19.7	19.7	23.6	11.5	9.8	3.8	212
ASME B16.5	6	150	355	17.7	21.5	25.4	11.0	14.0	6.1	363
ASME B16.5	6	300	386	17.7	22.3	26.1	12.5	14.0	6.1	394
ASME B16.5	6	600	435	17.7	23.0	26.9	14.0	14.0	5.8	443
ASME B16.5	6	900	567	29.5	23.5	27.4	15.0	14.0	5.8	575
ASME B16.5	8	150	561	23.6	23.8	27.6	13.5	16.5	8.0	569
ASME B16.5	8	300	612	23.6	24.5	28.4	15.0	16.5	8.0	620
ASME B16.5	8	600	694	23.6	25.3	29.1	16.5	16.5	7.6	702
ASME B16.5	8	900	797	23.6	26.3	30.1	18.5	16.5	7.4	805
ASME B16.5	10	150	829	29.5	26.1	29.9	16.0	18.8	10.0	837
ASME B16.5	10	300	905	29.5	26.8	30.7	17.5	18.8	10.0	913
ASME B16.5	10	600	1060	29.5	28.1	31.9	20.0	18.8	9.6	1068
ASME B16.5	10	900	1173	29.5	28.8	32.7	21.5	18.8	9.3	1181
ASME B16.5	12	150	1291	35.4	28.6	32.4	19.0	21.1	12.0	1299
ASME B16.5	12	300	1394	35.4	29.3	33.2	20.5	21.1	12.0	1402
ASME B16.5	12	600	1539	35.4	30.1	33.9	22.0	21.1	11.4	1547
ASME B16.5	12	900	1733	35.4	31.1	34.9	24.0	21.1	11.1	1741
ASME B16.5	14	150	1471	41.3	30.2	34.1	21.0	22.4	13.3	1479
ASME B16.5	14	300	1623	41.3	31.2	35.1	23.0	22.4	13.3	1631
ASME B16.5	14	600	1747	41.3	31.6	35.4	23.8	22.4	12.5	1755
ASME B16.5	14	900	1968	41.3	32.3	36.2	25.3	22.4	12.1	1976
ASME B16.5	16	150	1815	33.5	32.5	36.3	23.5	24.5	15.3	1823
ASME B16.5	16	300	1974	33.5	33.5	37.3	25.5	24.5	15.3	1982
ASME B16.5	16	600	2171	33.5	34.2	38.1	27.0	24.5	14.3	2179
ASME B16.5	16	900	2374	35.4	34.6	38.4	27.8	24.5	13.9	2382
ASME B16.5	18	150	2153	35.4	34.2	38.1	25.0	26.8	17.3	2161
ASME B16.5	18	300	2399	35.4	35.7	39.6	28.0	26.8	17.3	2407
ASME B16.5	18	600	2656	35.4	36.3	40.2	29.3	26.8	16.1	2664
ASME B16.5	18	900	3094	39.4	37.2	41.1	31.0	26.8	15.7	3102
ASME B16.5	20	150	2637	38.4	36.5	40.3	27.5	29.0	19.3	2645
ASME B16.5	20	300	2933	38.4	38.0	41.8	30.5	29.0	19.3	2941
ASME B16.5	20	600	3277	38.4	38.7	42.6	32.0	29.0	17.9	3285
ASME B16.5	20	900	3892	43.3	39.6	43.4	33.8	29.0	17.4	3900
ASME B16.5	24	150	3781	42.3	40.7	44.6	32.0	33.3	23.3	3789
ASME B16.5	24	300	4253	42.3	42.7	46.6	36.0	33.3	23.3	4261
ASME B16.5	24	600	4714	42.3	43.2	47.1	37.0	33.3	21.6	4722
ASME B16.5	24	900	6295	49.2	45.2	49.1	41.0	33.3	20.9	6303

INSTALLATION RECOMMENDATIONS

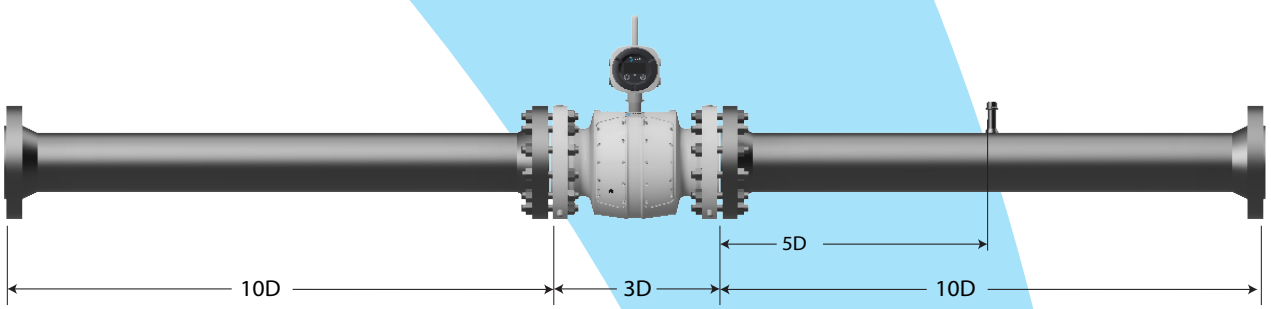
Installation – standard with or without flow conditioner



Installation – compact with or without flow conditioner



Installation– bi-directional with or without flow conditioner



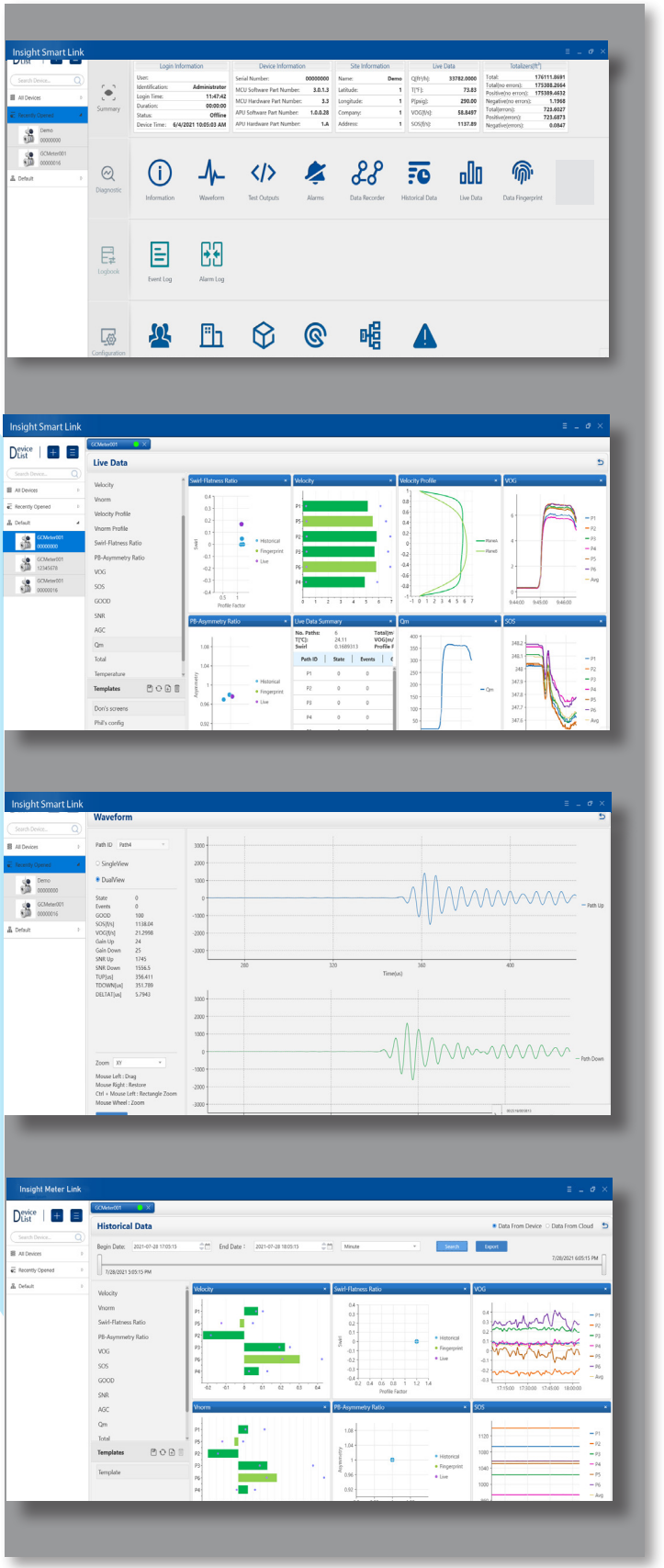
SMARTLINK SOFWARE

Insight SmartLink, an intelligent, intuitive and simplified diagnostic software designed to facilitate the meter's configuration, monitoring, and troubleshooting. It guides operators through any suspect / upset conditions before measurement is compromised. This software was created focusing on "simplicity" avoiding complex and complicated data screens. The user no longer struggles with confusing charts, too many screens and too much data.

SmartLink was designed with an Intelligent dashboard format, simplified and easily personalized by selecting graphical or numerical data and dragging in to an intuitive dashboard. Simplified adaptable to meet most user's needs for reliable, accurate and continuous flow analysis.
SmartLink provides performance-base and dynamic flow-based diagnostics to ensure continuous performance, reliability and accuracy 24/7.

Performance-Based diagnostics for each path include; fluid velocity,
signal to noise ratios, speed of sound, gain, percent-performance and more.

Dynamic-Based diagnostics include; turbulence, swirl, cross-flow, profile factor and other disturbances in the pipeline.



FLOW RANGE

ID (mm)	NPS	Extended Q_{min}	Standard Q_{min}	Q_t	Q_{max}	$Q_{overrange}$
		BPH	BPH	BPH	BPH	BPH
95.0	4	48.1	80.2	100	2,006	2,407
140	6	69.7	174	218	4,357	5,228
185	8	122	304	380	7,608	9,129
235	10	196	491	614	12,276	14,731
270	12	259	648	810	16,204	19,445
310	14	342	854	1,068	21,361	25,634
355	16	448	1,121	1,401	28,013	33,616
400	18	569	1,423	1,778	35,565	42,678
450	20	720	1,800	2,251	45,012	54,015
540	24	1,037	2,593	3,241	64,818	77,781

ID (mm)	NPS	Extended Q_{min}	Standard Q_{min}	Q_t	Q_{max}	$Q_{overrange}$
		m^3/hr	m^3/hr	m^3/hr	m^3/hr	m^3/hr
95.0	4	7.7	12.8	15.9	319	383
140	6	11.1	27.7	34.6	693	831
185	8	19.4	48.4	60.5	1210	1452
235	10	31.2	78.1	97.6	1952	2342
270	12	41.2	103	129	2576	3092
310	14	54.3	136	170	3396	4076
355	16	71.3	178	223	4454	5345
400	18	90.5	226	283	5655	6786
450	20	115	286	358	7157	8588
540	24	165	412	515	10306	12367

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