

LORRIC

Patented Paddlewheel Flowmeter
FP-AS Series



AxleSense

Patent Support / Excellent Quality / Market Leadership



FP-AS510 Patented AxleSense Paddlewheel Flowmeter



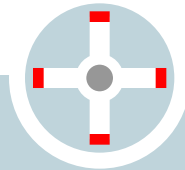
The Patented **AxleSense** Technology



LORRIC's Patented Paddlewheel Flowmeter

Introducing LORRIC AxleSense, a groundbreaking advancement in flow measurement technology. By incorporating our patented AxleSense innovation, we have transformed the traditional Hall effect, revolutionizing the way flow is measured. Our cutting-edge design strategically places induction magnets on the side of the axle, creating a continuous magnetic field that detects even the slightest rotation. This remarkable enhancement significantly boosts accuracy and empowers precise measurement of low flow rate fluids.

A revolutionary advancement in flow measurement. By strategically placing magnets on the side of the axle, our innovative solution generates a signal every **3°** and produces **120** signals per revolution.



Traditional Paddlewheel Flowmeter

Traditional paddle wheel flowmeter commonly utilizes Hall effect measurement for flow monitoring. However, it has inherent limitations, particularly when it comes to accuracy and measuring low flow rates. These limitations arise primarily from the 90-degree spacing between the blades.

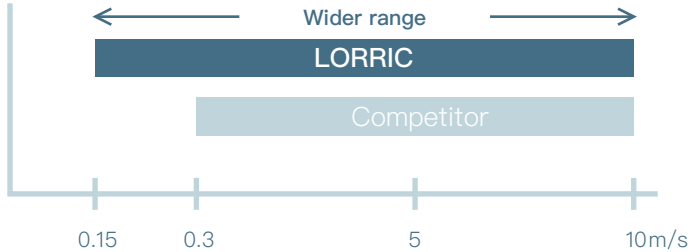
Since traditional paddle wheel flow meter utilizes this Hall effect which has the magnetic sensors placed on each blade for measurement. This design only generates a signal every **90°** and only produces **4** signals per revolution.



Wider Detection Range



Traditional paddlewheel flow meters often have significant errors or cannot detect flow at low flow rates in the fluid inside the pipe. Upgrade your flow measurement capabilities with LORRIC's AxleSense technology! No more worries about inaccurate readings or missed low flow rates. Our advanced innovation ensures enhanced accuracy and a broader measurement range, spanning from 0.15 m/s to 10 m/s—double that of competing brands.



Bi-Directional Flow Detection



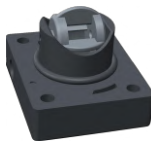
Enable bidirectional flow detection which utilizes blade rotation to accurately measure flow. Experience the benefits of simultaneous fluid flow direction information, positive/negative/net flow calculations, and a comprehensive 14-day historical log of daily accumulations. Seamlessly integrate with your factory management system for efficient on-site management. Gain complete control over your flow monitoring and streamline your operations with LORRIC's AxleSense flowmeter.



Intelligent Flow Detection



Enable bidirectional flow detection which utilizes blade rotation to accurately measure flow. Experience the benefits of simultaneous fluid flow direction information, positive/negative/net flow calculations, and a comprehensive 14-day historical log of daily accumulations. Seamlessly integrate with your factory management system for efficient on-site management. Gain complete control over your flow monitoring and streamline your operations with LORRIC's AxleSense flowmeter.



For more details and operation steps of the magnetic sensing function, please refer to the AxleSense online manual: Parameter List > H System > H05

* Restrictions on the use of paddle wheel abnormality warning function: The paddle wheel abnormality warning function serves as an auxiliary tool to assist on-site personnel in quickly identifying the cause of equipment anomalies. However, due to unforeseen environmental factors and interferences from surrounding equipment or magnetic fields in the work environment, this function may become ineffective. Please refrain from relying solely on this function as the primary or sole source of critical or safety-related signals in your equipment or facility. For detailed troubleshooting or further assistance, please contact LORRIC for additional support.



3 Piece Design

LORRIC's paddlewheel flowmeter is designed with market-leading specifications in mind. Its innovative three-component structure consists of the main unit, paddlewheel base, and pipe fitting. But here's the real game-changer: When one component wears out, you can simply replace it, without the hassle and expense of re-piping. Say goodbye to unnecessary costs and hello to seamless maintenance. LORRIC keeps your flow monitoring efficient and your budget intact. Experience the convenience and savings for yourself with LORRIC's paddlewheel flow meter.

Premium-Grade Pipe Fitting: Built to Last and Leak-Free Perfection

LORRIC



Experience the pinnacle of durability with LORRIC's precision-turned pipe fittings. Crafted from extruded rod material, these fittings offer unwavering size consistency and a flawless, wave-free inner surface. The result? Reduced disturbances and higher measurement precision. With superior strength compared to injection-molded alternatives, our machined plastic pipe fittings eliminate concerns like flash, short shots, and weld lines. Say goodbye to compromises and embrace the reliability and quality you deserve.



Other Brands

Traditional plastic injection molding methods often result in uneven surfaces and wave-like patterns on the inner walls of tee fittings. This is because the melted plastic is compressed, causing greater shrinkage in thicker areas. As a consequence, the pipe's cross-sectional area becomes inconsistent, leading to unstable fluid flow and inaccurate calculations. Additionally, injection-molded fittings are prone to issues like flash, short shots, and weak weld lines, making them more susceptible to damage over time. In contrast, LORRIC's tee fittings are manufactured using a different approach, ensuring smooth and reliable performance while overcoming the limitations of conventional techniques.

LED/LCD

Dual Screen Design

1+1>2

Large and High-Brightness
5-digit LED display

16x3 LCD Backlit Display
for more information



Green/Red/Orange Situational Backlights

GREEN

Normal operation



RED

Error detected



ORANGE

Setting mode



Screen can be switched according to vertical or horizontal piping

Adjust the viewing direction of the screen according to the piping direction, which is convenient for flow monitoring in different piping situations.



Comparison with other principle flowmeters on the market

	Variable area flowmeter	Paddle wheel flowmeters	LORRIC's Paddle wheel flowmeter	Electromagnetic flowmeter	Ultrasonic flowmeters
Pipeline loss	Low	Low	Low	No	No
Non-invasive install	No	No	No	No	Yes
Precision	Middle	Middle	Middle	High	High
Bidirectional flow detectable	No	No	Yes	Yes	Yes
Blockages	Possible	Possible	Possible	Not possible	Not possible
Applicable fluid	Air / Liquid	Liquid	Liquid	Conductive liquid	Liquid
Cost	Lowest-costs in small diameter pipe, cost increases with pipe diameter	Low-costs, cost increases with pipe diameter	Low-costs, cost increases with pipe diameter	High-costs, cost increases with pipe diameter	Middle-costs Cost does not increase with pipe diameter

Specs

	FP-P015	FP-P020	FP-P025	FP-P032	FP-P040	FP-P050	FP-P065
Installation method	in-line (Pipe segment)						
Applicable diameter	DN (mm) 15	DN (mm) 20	DN (mm) 25	DN (mm) 32	DN (mm) 40	DN (mm) 50	DN (mm) 65
	DN (inch) 1/2	DN (inch) 3/4	DN (inch) 1	DN (inch) 1-1/4	DN (inch) 1-1/2	DN (inch) 2	DN (inch) 2-1/2
T-connector adapter	UPVC / PPH / PVDF (Made to order) / 316L Stainless Steel						
Paddle material	PVDF or PPH with embedded magnet + ceramic bearing and shaft						
Applicable fluid	Various liquids, impurities (<1%)						
Applicable fluid maximum dynamic viscosity	300cSt *						
Fluid in pipes temperature **	UPVC : 0~45°C (32~122°F) / PPH : 0~80°C / PVDF : 0~100°C / ss316L : 0~100°C						
Device working environment temperature	-10~60°C (14~140°F)						
Flow velocity range	± 0.3~10m/s can extend to ± 0.15m ~ 10m/s ***						
Flow range	1.8~120.6 LPM	2.9~188.5 LPM	4.4~294.5 LPM	6.8~452.9 LPM	11.3~754.0 LPM	18.4~1225.7 LPM	32.7~2179.0 LPM
	0.47~28.4 gpm	0.83~49.86 gpm	1.35~80.81 gpm	2.33~139.86 gpm	3.17~190.36 gpm	5.23~313.77 gpm	8.77~526.29 gpm
Language	English, Traditional Chinese, Simplified Chinese (Others customizable)						
Unit	Metric: Liter, cubic meters, meters / Time: second, minute, hour, day / Imperial: foot, Cubic foot, Uk gallon, US gallon						
Display	Double screen display: Large 5-Digit LED, 16x3 3-Color Backlight LCD display						
Response time	0.5s ~ 1s						
Display resolution	Maximum resolution 0.0001 (finest)						
Measurement accuracy	±2.5% RD ****						
Linearity	± 0.5 % FS (>0.3m/s)						
Reproducibility	± 0.4 %						
Power supply	DC 12V to 36V 100mA						
Power I/O connector	M12 8-pin connector						
Input/Output	Analog output with self-powered 16-bit 4~20mA / Modbus RTU RS485 / Two-wire optocoupler switch signal (with 2 meters long signal line)						
Consumption current	<200mA@12V when starting up and working stably (not included in the communication current)						
Protection circuit	Power reverse connection protection, Power surge protection						
Waterproof level	IP66 *****						
Transient data	Instantaneous flow velocity / Flow volume						
Cumulative data	Cumulative flow (Positive flow / Negative flow / Net flow) daily cumulative flow in the past 14 days (date function activated after installing date battery)						
Display digits	LED 5 Digits (4 digits when negative value) / LCD 10 Digits (Not including sign and decimal point)						
Operation button	4 Key touch buttons						
Calendar function battery	CR2032						

* This machine is calibrated with normal temperature water before leaving the factory. Fluids with different viscosity than water will cause inaccurate calibration values and may also change the minimum and maximum flow rates.

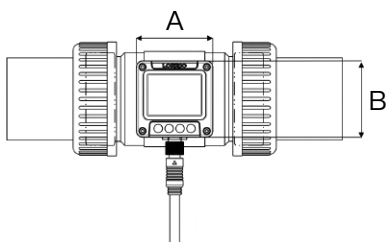
** The working temperature of each material is for reference only. Please select based on design experience for actual selection.

*** Minimum flow rate values vary slightly due to flow field factors of individual models.

**** The measurement accuracy is based on the statistical results of the laboratory test with room temperature 25 degrees C and clean water. Errors may occur due to the customer's usage environment.

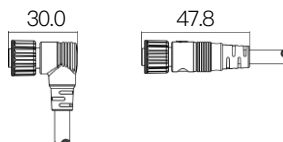
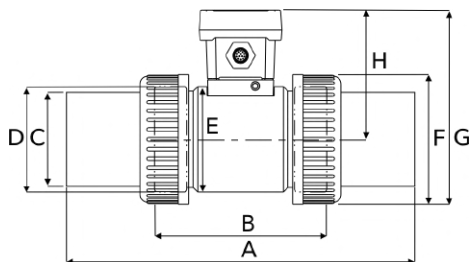
***** The IP of IP66 is the abbreviation of Ingress Protection. The IP level is the protection level of the electrical equipment shell against foreign matter intrusion. The format of the IP level is IPXX, where XX is two Arabic numerals, and the first marked number indicates contact protection, and foreign object protection level, used to indicate dust resistance, the second marked number indicates the waterproof protection level, the larger the number, the better the protection level. The first 6 of IP66 means: completely prevent dust from entering; the second 6 means: no harm caused by high-pressure water splashing.

Size



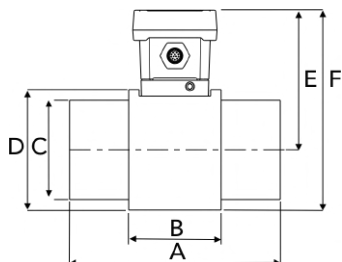
Unit: mm

Device size	
A	B
63	63



Unit: mm

UPVC pipe – union diameter size								
	A	B	C	D	E	F	G	H
1/2"	164	100	27.6	36	62.3	46.2	115.7	86.2
3/4"	168	100	32.6	41.9	62.3	50.5	115.7	85.7
1"	168	100	40.6	50	62.3	60	115.7	85.7
1 1/4"	210	114	50.2	59.6	65	75.6	127	89.2
1 1/2"	218	120	56	65.7	70	83	134	92.5
2"	269.5	133.3	72	81	81	99.7	148.8	99



Unit: mm

UPVC pipe – spigot pipe diameter size						
	A	B	C	D	E	F
2 1/2"	160	70	76	92	106.5	152.5

Please place your order according to below information

- Paddle wheel flowmeter contains: Device, Paddle set, T-connector. Users need to check the material and size of the T-connector and paddle set.
- Please refer to following order example for placing order to LORRIC.
- T-connector + paddle set (T-connector is generally shipped with a paddle set.)

T-connector + paddle set : FP-P065CSAV

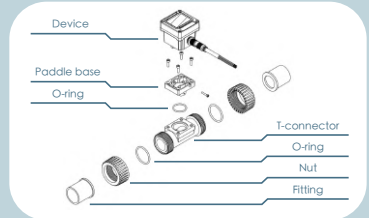
Paddle wheel flowmeter	T-connector	T-connector size	Material	T-connector fitting	Fitting spec	O-ring material
FP	P	065	C	S	A	V
		<ul style="list-style-type: none"> 015: 1/2" Pipe 020: 3/4" Pipe 025: 1" Pipe 032: 1-1/4" Pipe 040: 1-1/2" Pipe 050: 2" Pipe 065: 2-1/2" Pipe 	<ul style="list-style-type: none"> C: U-PVC P: PPH F: PVDF S: 316L Stainless Steel 	<ul style="list-style-type: none"> S: Spigot fitting U: Union + fitting F: Flange fitting 	<ul style="list-style-type: none"> T: Taiwan CNS A: ANSI/ASTM N: GB J: JIS E: DIN F: BSPT Female Thread M: BSPT Male Thread R: NPT Female Thread Q: NPT Male Thread 6: ISO 15494 (PPH) Insertion welding fitting (Default) ISO 10931 (PVDF) 5: ISO 15494 SDR11 (PPH) Butt welding fitting (Made to order) ISO 10931 SDR21 (PVDF) 	<ul style="list-style-type: none"> E: EPDM V: VITON A: FEPM

* The common specifications are listed above, please contact our sales for delivery and inventory.

- Paddle set (Please refer to following order example when you order paddle set separately.)

Paddle set : FP-W010CFV

Paddle wheel flowmeter	Paddle base	Paddle base material	Paddle material	O-ring material
FP	W101	C	F	V
		<ul style="list-style-type: none"> C: U-PVC P: PP F: PVDF S: 316L Stainless Steel 	<ul style="list-style-type: none"> F: PVDF P: PPH 	<ul style="list-style-type: none"> E: EPDM V: VITON A: FEPM



Order example and corresponding description of paddle wheel flowmeter

Serial Number	Description
FP-P020CSJV	3/4" UPVC T-connector JIS Spigot fitting · Viton oring + UPVC paddle base · PVDF paddle · Viton oring + FP-W010CFV
FP-P050CUTV	2" UPVC T-connector Union Taiwan CNS fitting · Viton oring + UPVC paddle base · PVDF paddle · Viton oring + FP-W010CFV
FP-P020CUEE	3/4" UPVC T-connector Union DIN fitting · EPDM oring + UPVC paddle base · PVDF paddle · EPDM oring + FP-W010CFE

Δ Safety instructions:

1. After the warranty, the electronic components of the product will age due to time and operating environment. Under long-term use, please replace the new product according to the condition of the product.
2. Do not operate the product under an Orange or Red LCD Backlight for a long time. Product damage and related losses may occur.

Conditions and Disclaimer:

CONDITIONS: Equipment sold by LORRIC is not intended to be used, nor shall it be used:

- (1) As a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) In medical applications or used on humans. Should any product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, LORRIC assumes no responsibility as set forth in our basic WARRANTY/ DISCLAIMER language, and, additionally, purchaser will indemnify LORRIC and hold LORRIC harmless from any liability or damage whatsoever arising out of the use of the product(s) in such a manner.

DISCLAIMER: Please be aware that magnetic fields or residual magnetism may cause interference to the flowmeter which may result in damage if they are used near the installation site. The purchaser must determine the applicability of the product for its desired use and assumes all risks in connection therewith. LORRIC assumes no responsibility or liability for any omissions or errors in connection with the use of its products.

The alarm used to detect paddle damage or loss is intended to assist on-site operators to find out what is causing equipment abnormalities. Because there are a myriad of variables involved with on-site operation and magnetic fields that come from other equipment, the alarm function is liable to fail. Please do not take the alarm function as a single source for monitoring your flow system. Please contact LORRIC for advanced help.



LORRIC

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PF-AS instruction manual



PF-AS series website