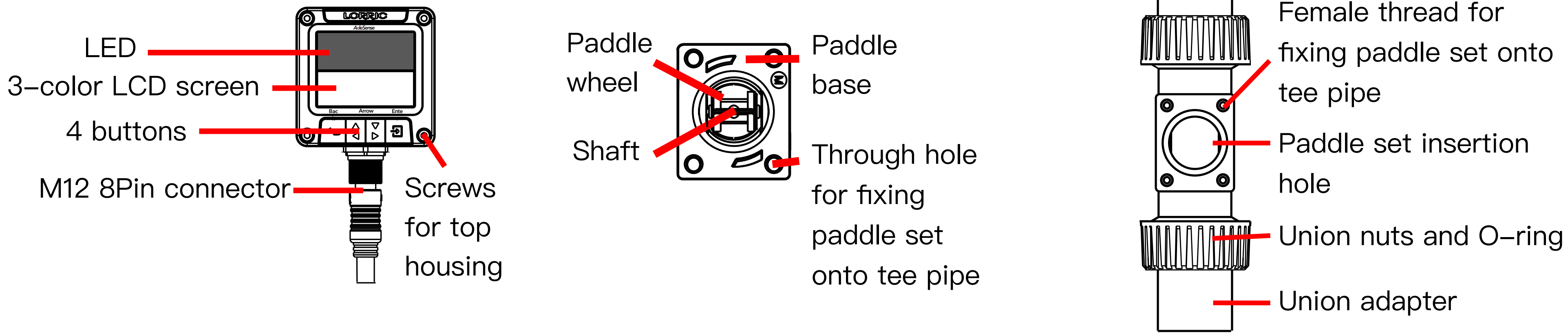


LORRIC Paddle Wheel Flowmeter Installation Guide

* Please follow all installation procedures and matters that need attention before using. This can help to prevent artificial damage which could lead to an invalid warranty.

1、Product specs and drawings



Mechanism Specs		User Interface	
Installation method	in-line (Pipe segment)	Unit	Time: second, minute, hour, day Metric: Litre, cubic meters, meters Imperial: cubic foot, foot, UK/US gallon
Fluid in pipes temperature	0~50 °C (32~122°F)		
Device working environment temperature	-25~70°C (-13~158°F)	Language	English, Traditional Chinese, Simple Chinese (Others customizable)
		Display digits	LED 5 Digits, LCD 10 Digits
Union Adaptor Types	PVC Gluing socket(ASTM, JIS, DIN), PVC internal and external thread Connector (BSPT and NPT)	Display	Double screen display : Large 5-Digit LED, 16x3 3-Color Backlit LCD display
Paddle material	PVDF with embedded magnet + ceramic bearing and shaft	Wired communication	Analog output 4-20mA (External Power Supply Required) Modbus RTU RS485 Two-line OCT switch signal (ship with 2 meter cable)
Tee pipe material	UPVC		
Power supply	DC 12V to 36V 100mA	Operation button	4 Key touch buttons
Response time	< 0.5 second	Calendar function battery	CR2032
Waterproof level	IP65		

Measurement Specs			
Applicable fluid maximum dynamic viscosity	300cSt	Measuring principle	Paddle wheel
		Flow rate range (m/s)	±(0.3~10m/s) Can extend to +/- (0.15 m ~ 10m/s)
Applicable fluid	Clear, oil or chemicals with less impurities (<1%)	Tee pipe diameter (mm)	DN20-50 (¾" to 2")
Linearity	± 0.5 % FS (>0.3m/s)	Transient data	Instantaneous flow and flowrate
Reproducibility	± 0.4 %	Cumulative data	Positive and negative net flow accumulation, past 14 days and long time accumulative net flow
OR tolerance	± 2.5 % OR		

* IP65 : The IP Code, International Protection Marking, IEC standard 60529, sometimes interpreted as Ingress Protection Marking, classifies and rates the degree of protection provided by mechanical casings and electrical enclosures against intrusion, dust, accidental contact, and water. The first digit indicates the level of protection that the enclosure provides against access to hazardous parts (e.g., electrical conductors, moving parts) and the ingress of solid foreign objects. The second digit indicates the level of protection that the enclosure provides against harmful ingress of water.
6 stands for dust tight: No ingress of dust; complete protection against contact (dust tight). A vacuum must be applied. Test duration of up to 8 hours based on air flow.
5 stands for water jets: Water projected by a nozzle (6.3 mm) against enclosure from any direction shall have no harmful effects.
* The flow rate range may be slightly different due to factors such as piping diameter and fluid coefficient.

2、Products package contains

- (1) Device package contains :
 - FP-AS510 device * 1
 - 2m 8 pin cable * 1
 - Quick starting manual * 1
 - Screws for connect device and paddle set * 1(Locking screws with your convenient side is suggested. It is unnecessary locking screws both sides)
- (2) Paddle set and Tee pipe package contains :
 - Paddle set (incl. paddle base, paddle wheel, shaft) * 1
 - Paddle set M4 screws* 4
 - Paddle set O-ring * 1
 - Tee pipe * 1
 - Union standard package contains :
 - Union nuts * 2
 - Union adapter * 2
 - Union O-ring * 2

Hardware version v1.0.0~ v1.2.1
Firmware version v1.0.0~ v1.1.0

For complete instructions, please scan the QR code on the right top corner.



3、Notices before installing

- Confirm the version of the instruction manual, hardware, and firmware(scan the QR code on the right top corner.)
- Make sure that the installation environment meets the standard for flow rate monitoring. There should be a certain distance before and after the location of the installed flowmeter. The proper position for the flowmeter should be face up horizontally or vertically depending on the flow direction.
- Confirm temperature and chemical resistance, and the size of pipes.
- Ingredients in chemicals and operating temperatures will differ according to industry. Before purchasing the flowmeter, please confirm these specifications to avoid any damage to the flowmeter.
- Please avoid measuring fluids with magnetic particles which may cause LORRIC's paddle wheel flowmeter to work improperly. The reason being, is the paddlewheel uses magnetic flow sensor technology. In addition, we suggest to place it a distance from equipment which may generate a strong magnetic field, like motors and electromagnetic valves.

4、Installation procedure

Matters that need attention before installing ! !

If any of the scenarios below occur and damage the paddlewheel, the warranty is void.

- If the device material is PC then it is not resistant to PVC glue with its strong gas and lubricant for PVC pipe. Therefore, before installing the paddlewheel flowmeter you must be sure the glue is dry between the connecting pipe and adapter.
- EPDM seal material only works with certain chemicals, but not oil.
- Please notice if chemicals are flowing vertically it could potentially damage the paddle wheel flowmeter.
- If the paddle wheel flowmeter is not able to be aligned with the main pipe or is took as supported point of pipeline, the flowmeter may bear unexpected force which may shorten usage life and cause water leakage.
- During the installation, it is better to use hands to lock the union nuts until there is no room for water leakage. Instead of using tools which could damage the flowmeter.
- Inaccurate piping may cause liquid leakage and lead to the paddle wheel flowmeter's damage.
- When valving, water hammer should be carefully avoided to prevent paddle wheel flowmeter damage.
- The operational device of the paddle wheel flowmeter is not UV resistant. Therefore, we suggest to cover it with protector if installed outdoors.
- The seller will not be responsible for free maintenance of any defect or malfunction incurred by individual causes.
- If the whole piping system is moved to another site unprotected the paddle wheel flow meter could be damaged.
- Within correct installation, the paddle wheel flowmeter can resist maximum pressure up to 10 kg/cm².
- When installing the paddle wheel flowmeter there should be an appropriate amount of spacing for union and flange installation. If not, the following accidents may occur:
 - Crack on union nut
 - Crack on adaptor
 - Stripped tee pipe thread
 - Water leakage due to insufficient compression or missing sealing
 - Sealing fail due to excessive compression

Mechanical installation steps :

- (1) Take off union adapter and nuts, paddle set, and device from tee pipe.
- (2) Install union adapter and nuts with pipe: Install the union adapter and nuts to the pipe with glue.
Before going to the next step, the glue should be completely dry.
- (3)Lock tee pipe and pipe with union adapter.
- (4)Install paddle set and seals with tee pipe: The arrow sign on the top of paddle set means the direction of flow, the top side of arrow sign means the direction of line-out. As below image, please refer to it before installation.
- (5)Install device to the paddle base and rotate it clockwise to the end. With deterioration design, please watch the installation direction and do not force it.
- (6)Fix device with paddle base through the side of it: The screws for fixing the device with the paddleseet are not leakproof. Please avoid excessive force when screwing in the device which may cause damage.

5 、Mechanical and electrical installation procedure

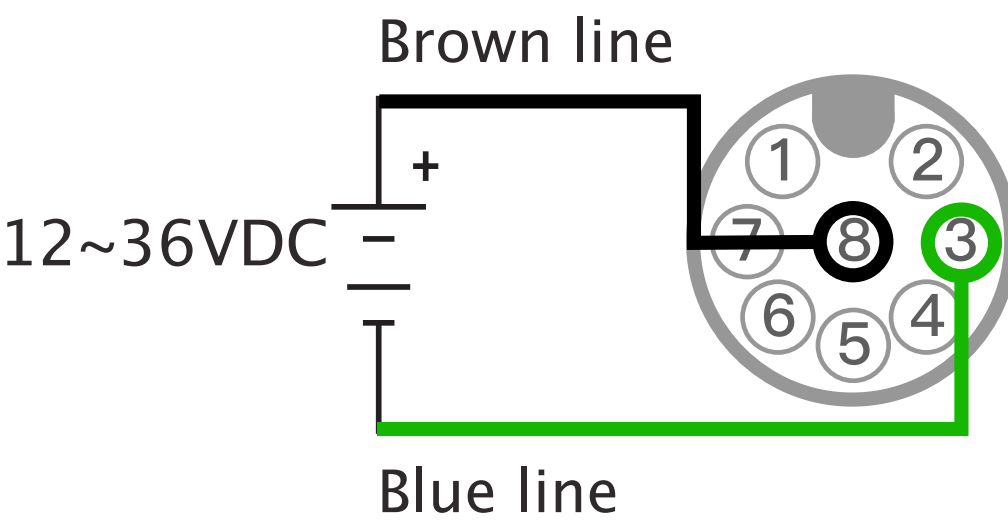
Connect the cable inside the box to the power supply and communication system. The unused color wires should be covered or protected to avoid electric leakage or short circuit. Before removing the top housing of device and wiring, the device should be powered off and the electric cable should be removed.

On the bottom left drawing you can find the M12 8pin connector with the definition of every pin and colored wire.

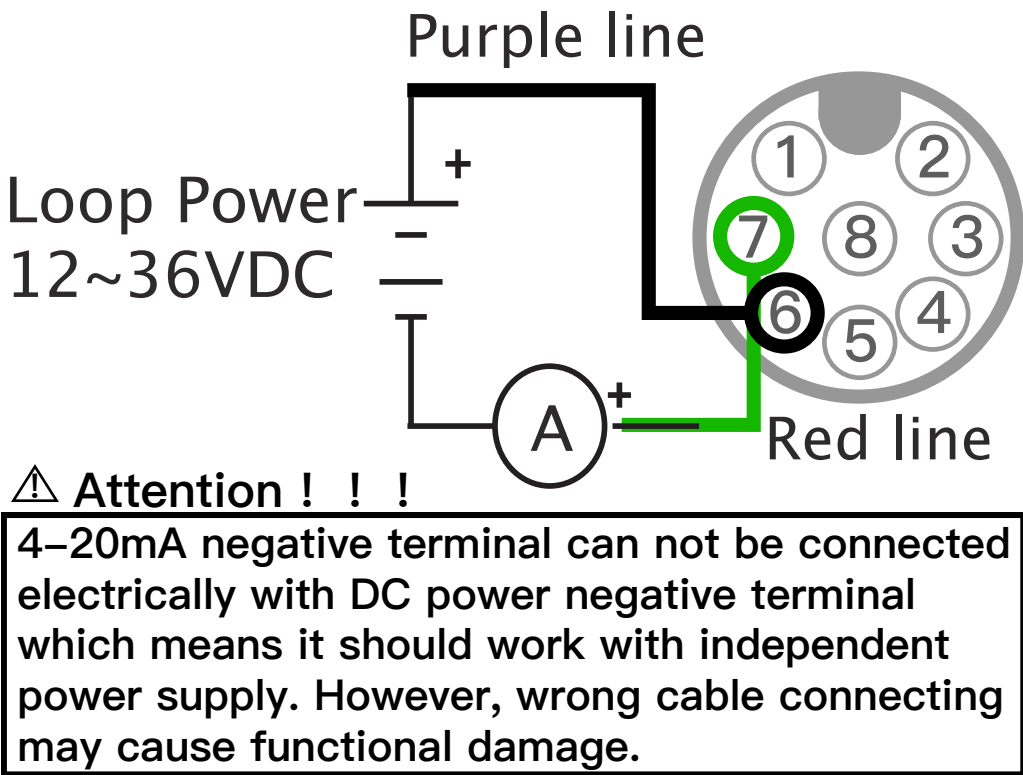
Device will only work with power supply connection through brown and blue lines. Following diagram is not showing power supply wiring for readability.

Number	Color	Function
1	Black	RS485 (B-)
2	Yellow	OCT output (-)
3	Blue	VDC (-)
4	Orange	OCT output (+)
5	Green	RS485 (A+)
6	Purple	4~20mA (+) (External power supply requested)
7	Red	4~20mA (-) (External power supply requested)
8	Brown	12~36 VDC (+)
Shielding net	Black heat-shrinkable sleeve(optional)	Shielding net, please connect to ground.

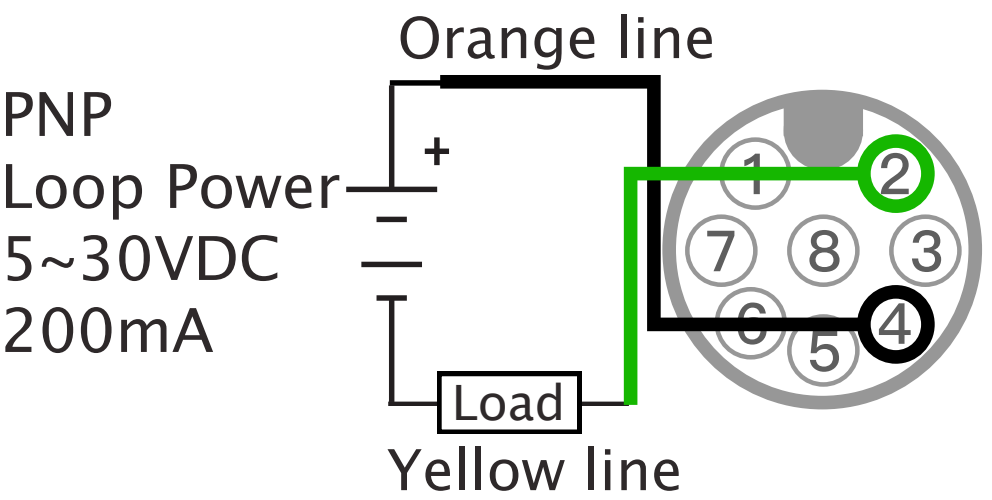
1. DC Circuit wiring diagram



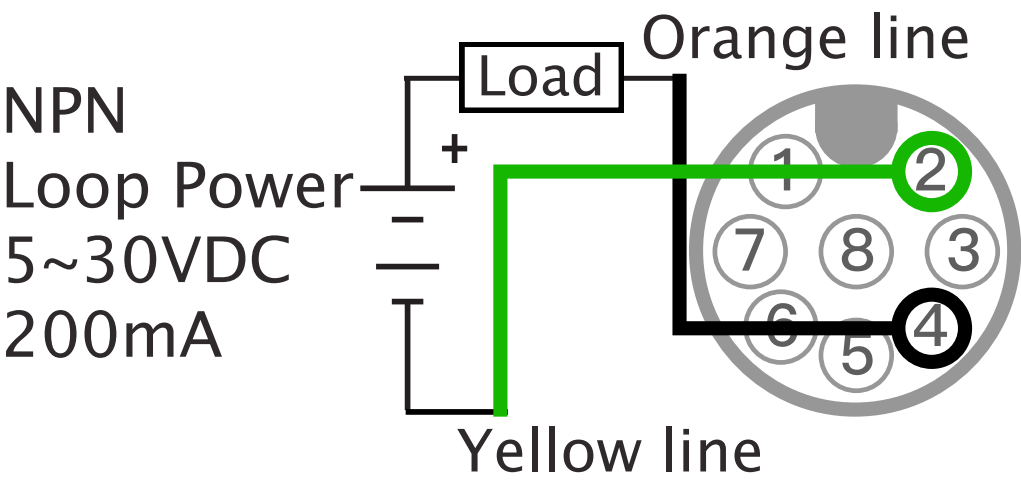
2. 4~20mA Analog output wiring diagram



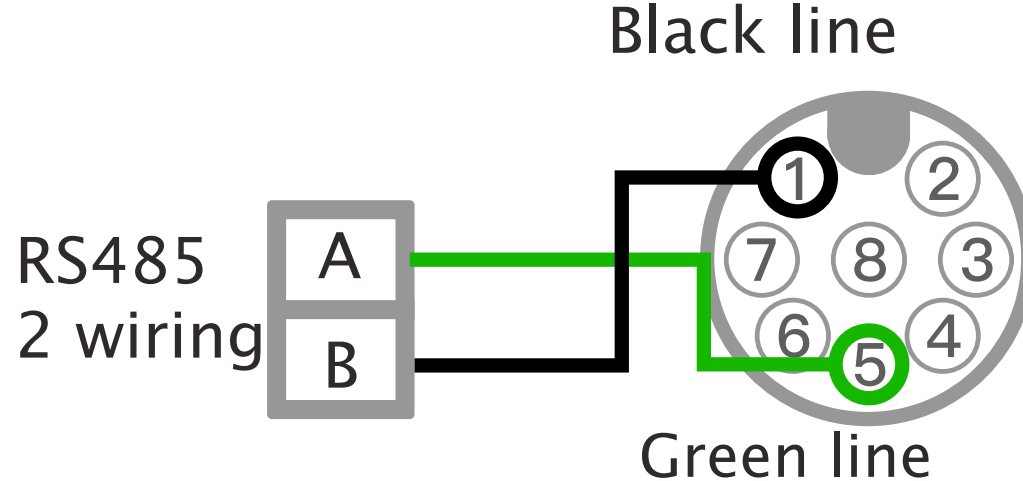
3. OCT opticalcoupler NPN output wiring diagram



4. OCT opticalcoupler NPN output wiring diagram



5. RS485 2-Wire wiring diagram



Warranty matters need attention :

- After CIP, so as not to damage the paddle wheel. The resulting damage from not doing CIP is not covered by this warranty.
- The paddle device is made from ceramic material, which is built to last longer . But it is not impact resistant. The drop of paddle set when disassembling and assembling, the rapid change of flow pressure (such as the switch of pump or valve), water hammer and the impact of foreign objects are not covered by this warranty.
- It is recommended that user gradually starts the valve system in order to avoid high water pressure change in a short period of time because it might damage the paddle. For example, start the pump inverter at lower frequency (ex:35Hz) , and then increase the frequency to desired after system is stabilized for a period of time.

Measuring range and service life:

- The working flow speed range of this flow meter is from 0.15m/s to 10m/s, but high flow rate may cause a shorter life span for the paddle. It is recommended that the customer select the suitable pipe diameter, and a long-term flow speed of below 5m/s.
- If not otherwise agreed, the warranty program of this product is as follows:
- Please confirm the condition of the product within 14 days after receiving it. If there are any defects caused during shipment, please contact the sales personnel for a product replacement.
- The product warranty is for 12 months from the delivery date. The warranty covers functional failures due to the non-human error and the non-specified environmental factors. During the warranty period, there will be no charge for product inspection, replacement of parts, or maintenance, etc. The paddle wheel is a consumable, that differs in life span according to working environment. Therefore, normal wear and tear is not covered by this warranty.
- When the product needs to be shipped back for maintenance, the packaging must be in perfect condition to avoid any additional damage during shipping.
- This product warranty only covers normal use. Any special applications, abnormal and excessive use are not covered by this warranty.

The failures under the following conditions shall not be covered by this warranty, and the expenses for inspection, parts, maintenance, etc. shall

be charged accordingly:

- Natural disasters: flood, fire, earthquake, lighting strike, typhoon, etc.
- Human caused damages: scratch, falling, tenon fracture, beating, breaking and heavy hitting.
- Human errors: use of inappropriate voltage, high humidity, water, stain, corrosion, loss, improper storage, etc.
- Other abnormal factors: The damage caused by the installation, appending, expanding, modifying and repair of the product or using an unauthorized third party for parts.

For complete instructions, please scan the QR code on the right top corner.



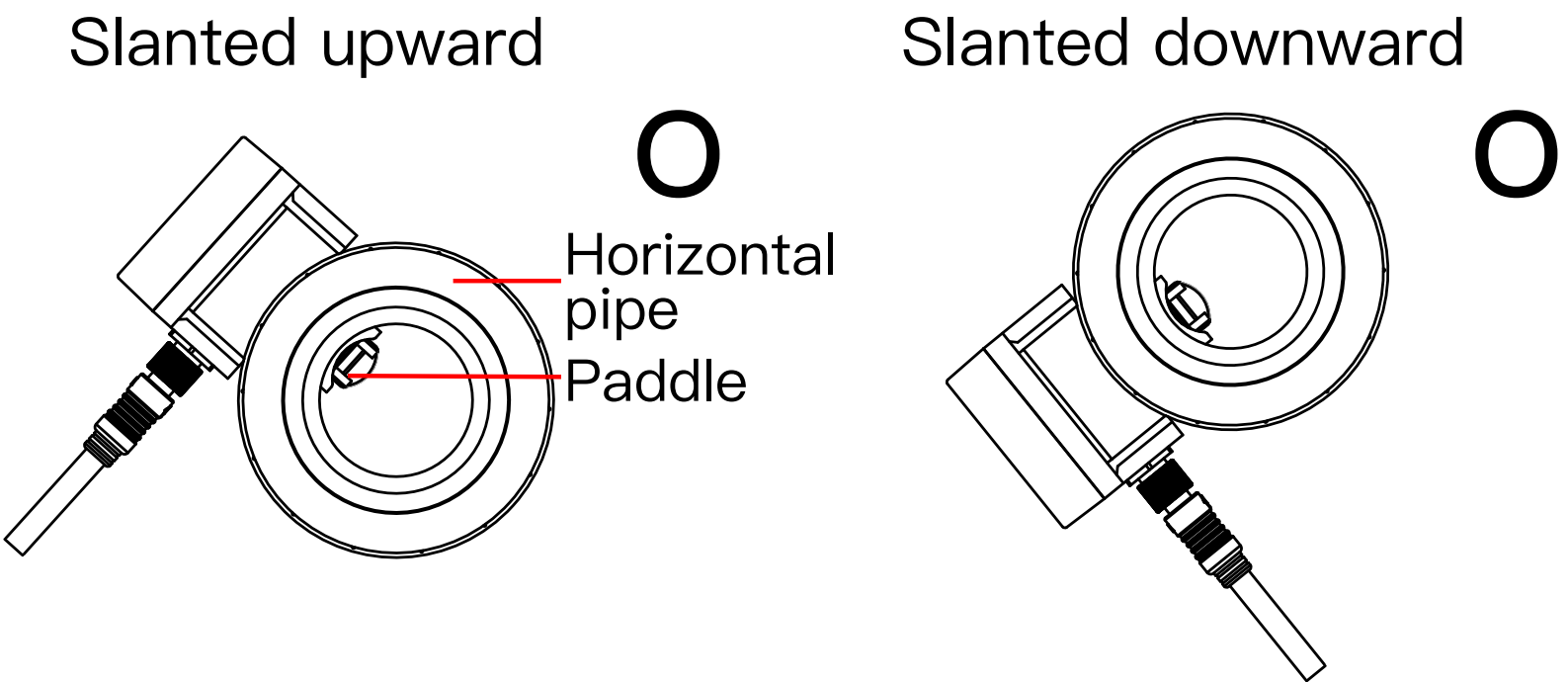
6 、Installation location

When fluid is moving through the pipe, there might be undeveloped flow movement because of a curved pipe or pipe condition. For better accuracy, we recommend the pipe should be completely full of liquid without any major interruptions. Therefore, for a stable flow field, there should be 10x the pipe diameter before and 5x the pipe diameter after the paddle wheel flowmeter. Also, there should not be valves, curved pipe or reducers at the behind paddle wheel flowmeter.

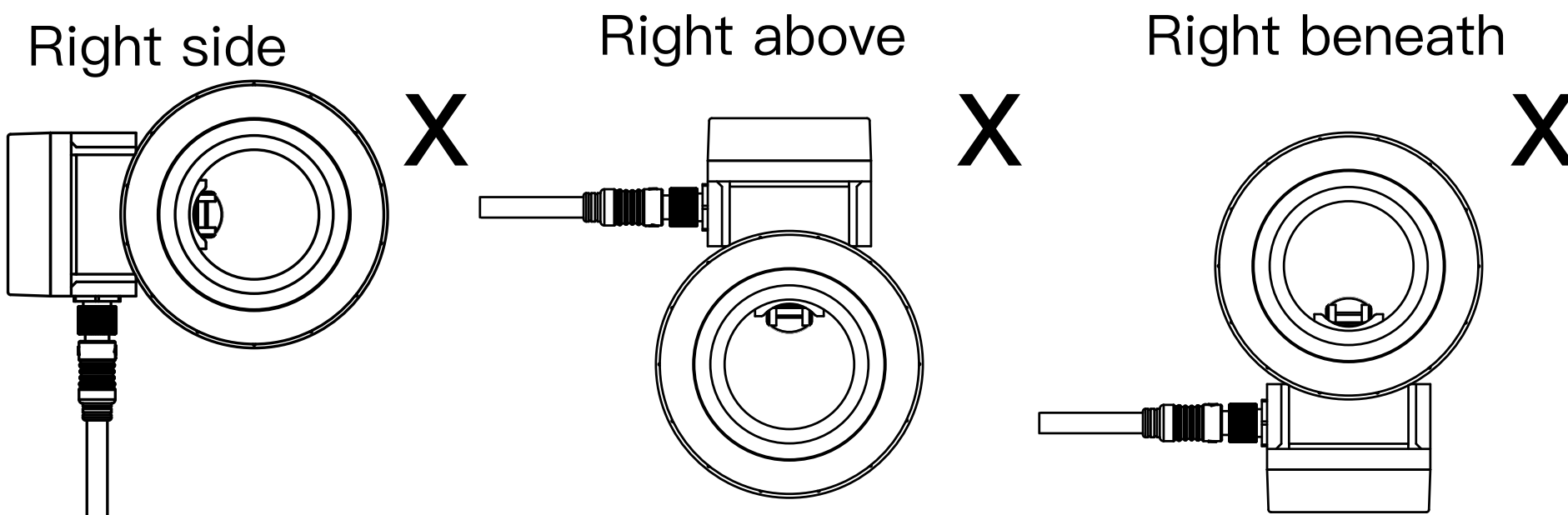
Notices for installation in horizontal pipe

1. If the paddle wheel flowmeter is installed right above or under the pipe, the rotating paddle will easily generate air bladder which may cause 5% error on the measurement accuracy . If the paddle wheel flowmeter is installed on the side, the paddle remains certain side which also affects flow measurement and cause a shorter product life. Therefore, we suggest to install LORRIC paddle wheel flowmeter at the Inclined top or oblique below of pipe.

Recommend location



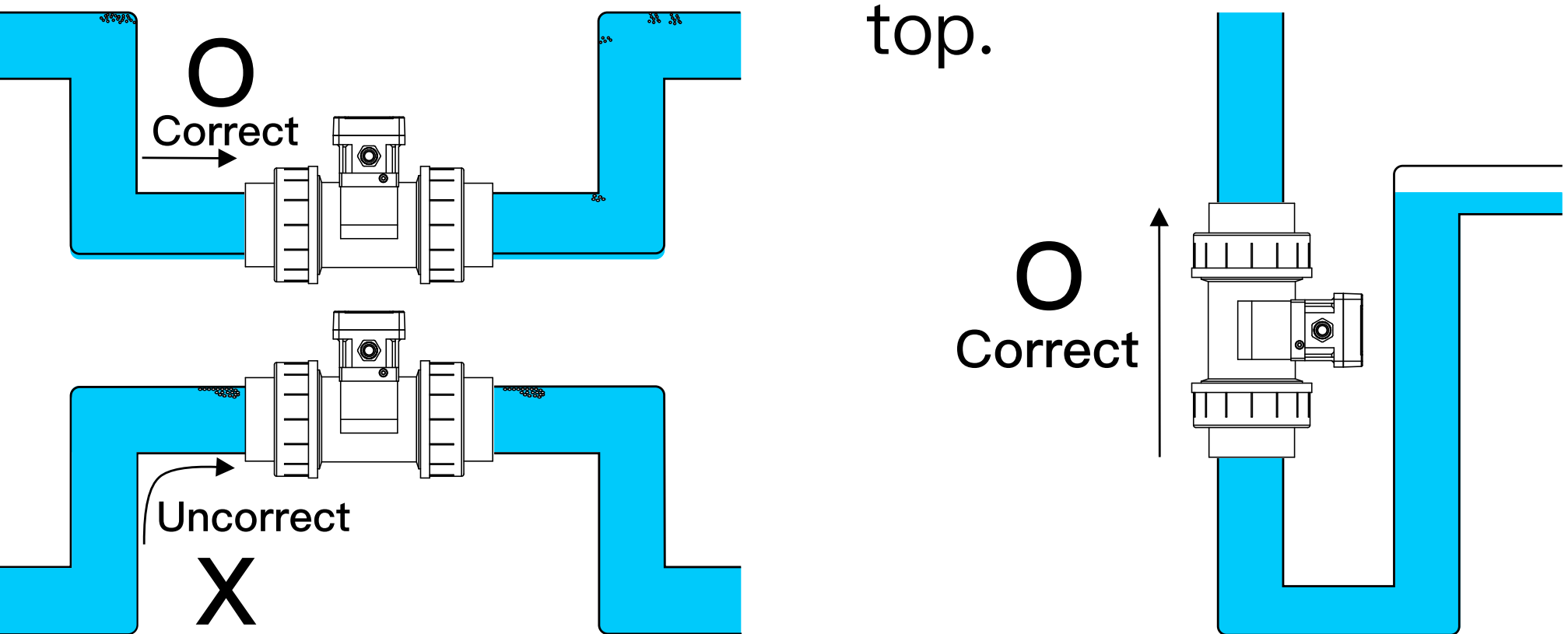
Not recommend location



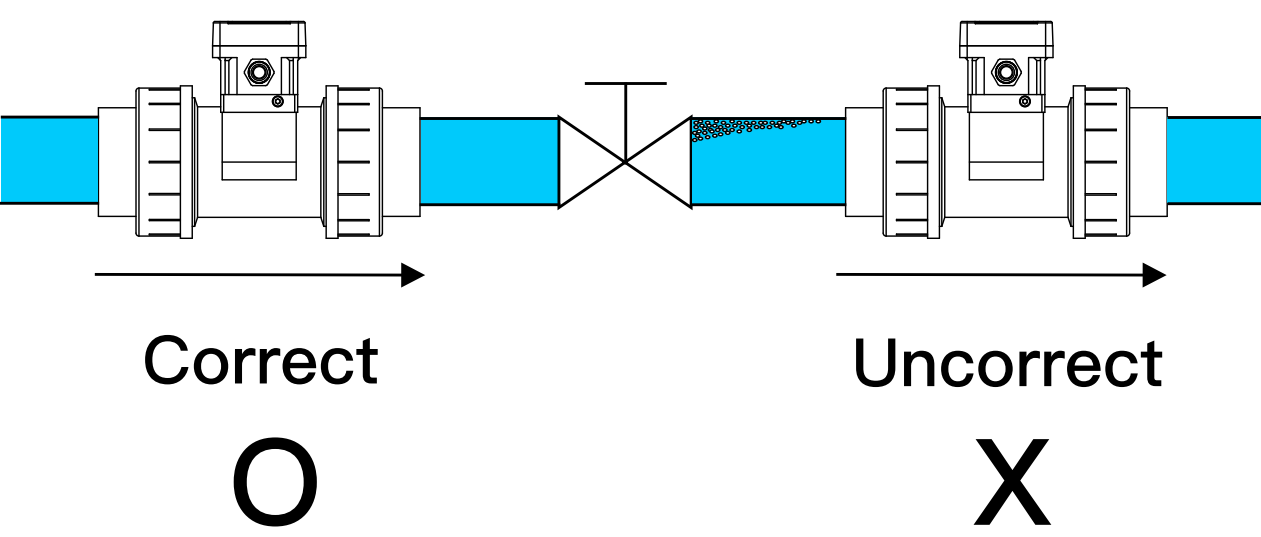
2. Paddle wheel flowmeter should be installed at the location of pipe with full liquid.

Notices for installation in vertical pipe

For installed in the full liquid vertical pipe, the flow direction should be down to top.



Whatever vertical or horizontal pipe, the paddle wheel flowmeter should be installed at the front of other pipe fittings.



7 、Quick parameter setup

Please refer parameter definition on online manual

Recommend flow of parameter set-up

- 1.Set A1 for Tee pipe type.
- 2.Set B1 for flowrate volume unit.
- 3.Set B2 for flowrate time unit.
- 4.Set B3 for cumulative volume unit.
- 5.Press ESC several times, go back to monitoring screen, check if flow direction is expected, Use A04 A05 to change flow direction display.
- 6.In monitoring screen, check if flow rate is as expected, use A02 to scale flow rate.

- 7.G01, G02, G03 are for date/ time set-up.
- 8.D type parameters are for communication set-up.
- 9.F type parameter for communication simulation.
- 10.Remove the device from Tee pipe, check if lcd back light become blinking red light. Reinstall the device and check if LCD monitor back to green light.
- 11.Leave device screen on one of 3 monitoring screens(instantaneous flowrate, instantaneous flow speed, totalizer).
- 12.Finish.