Propeller Type Velocity Meter
LS20B

ADVANTAGES

- Large rate range: 0.04 m/s ~ 15 m/s
- Excellent sealing and very suitable for highly charged wastewater
- Frictionless contact and high accuracy up to 1.5%
- Propeller in high-quality plastic, highly resistant to water beating and natural aging without being deformed
- Multiple installation ways for different depths
- Intelligent guiding module to adapt to flow directions

DESCRIPTION

The LS20B is a compact velocity meter easy to transport and to install. It has been designed to measure the flow rate in rivers, channels for hydraulic investigation and wastewater treatment, etc. With an excellent sealing, it can be used to measure the flow rate of highly charged water.

It can be used as rod equipment, as well as suspended current meter equipment with mechanical single drum winch and cable way installations. The round, streamlined meter body and the meter axle are made of non-corrosive high grade steel.

The hub of the propeller is filled with oil and moves on two very smooth running precision ball bearings. The oil-filling and a capillary seal prevents from water penetrating. A buffer stop, which can be screwed in, protects the propeller against touching the ground. Impulses are given frictionlessly and directly by the permanent magnet. For each propeller turning, one impulse is given. The contact pick-up, which is placed as plug-able unit in a watertight chamber, can be changed without problems.

TECHNICAL PARAMETERS

- Minimum rate: 0.03 m/s
- Measuring range: 0.04 m/s ~ 15 m/s
- Output: on-off signals, 2 signals / rotation
- Working depth: 0.2 to 80 m
- Working temperature: 0 to 44 °C
- Ambient temperature: -25 to 55 °C
- Humidity: ≤ 90% HR
- Solids loaded in water: ≤ 100 kg/m3
- Continuous service time: ≤ 10h
- Accuracy: ± 1.5%
- Switch contact: 1 contact per rotation, service time ≥ 10^7 times
- Rod: Ø 20 mm

FUNCTION PRINCIPLE

The propeller turns around a robust axle in stainless steel, which mobilize the rotation module to rotate. The magnets inside the rotation module stimulate the reed-switch to generate on-off signals. Above the critic speed, the flow rate is proportional to the rotation speed of the current meter, and it can be calculated by the following formula:

$$V = a + b \cdot n$$

Among which:

V = flow rate (m/s)
b = hydraulic pitch (m/s)
n = number of rotations of the propeller per seconde
a = current meter constant (m/s)

STRUCTURE

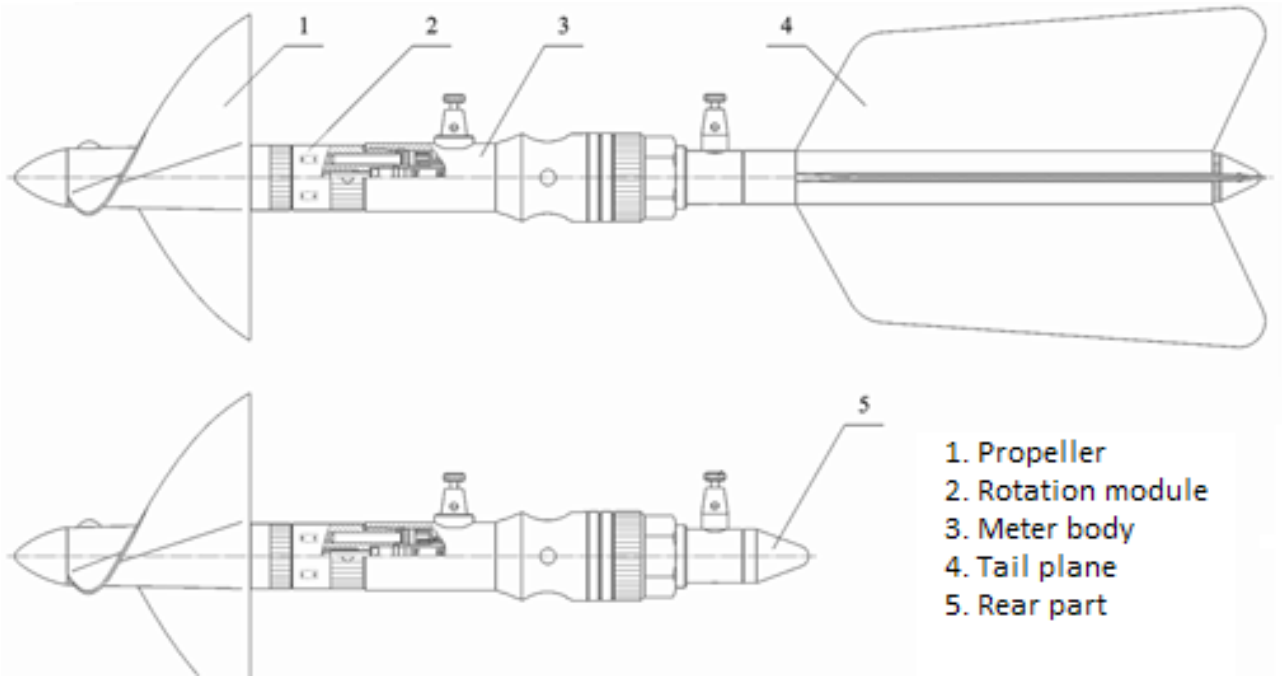

Fig 1: Structure de LS20B

Propeller

When a velocity meter is in service, the propeller turns around the horizontal axle. It decides the main features of the velocity meter: the starting speed, the critical speed, the constant of the velocity meter, the sensibility to diagonal current and reactions to turbulence.

Rotation module

It's composed of:
- Ball bearing
- Reed switch, encapsulated in a water-proof component. When the propeller is driven by current, the reed switch rotates synchronously. Every rotation of the propeller induces two magnetization

- Signal module: it transforms rotation number into electrical pulse signals and transmit them to the counter.

- Sealing elements: there are no frictions between the sealing elements and the rotation axle, which guarantees the best sensibility under small speeds and the best stability under big speeds.

Meter body

It's for installing and fixing the current meter. The diameter of the installation orifice is of Ø 20 mm

Rear part

A tail plane can be installed to replace the rear part in case of high speeds or high depths.

INSTRUMENT CASE

The current meter, the spare parts and the accessories are packed in a functional way on a thermoformed support in a metallic case.

Packing list

1. Standard pieces

a. Current meter with a propeller	1
b. Metallic case	
c. Counter HT-B	1
d. Rod in 3 sections of 1 meter	
e. Tail plane	1
f. Rear terminal for wiring(with fixation screw)	1
g. Oil (30 ml) (Without when shipped by air)	1
h. Tools	
- Clamp	1
- Screwdriver (cross)	1
- Screwdriver (flat)	1
- Watchmaker's screwdriver	1
- Adjustment needles	2
i. Spart parts	
- Reed switch	2
- O-ring in rubber 18*2	1
- O-ring in rubber 12*2	1
- O-ring in rubber 7*1.5	1

j. Documents

- Manual 1
- Calibration certificate 1
- Conformity certificate 1

2. Parts in option

a. Rotation axle 1

b. Suspension rod 1

c. Connection rod 1

d. Screw for suspension rod 1

INSTALLATION

1. On a rod Ø20 mm

In small depths, the current meter LS20B can be installed on a rod. The direction needle should be installed above water in the same direction to the flow. A tail plane can be installed to replace the rear screw in case of high speeds.

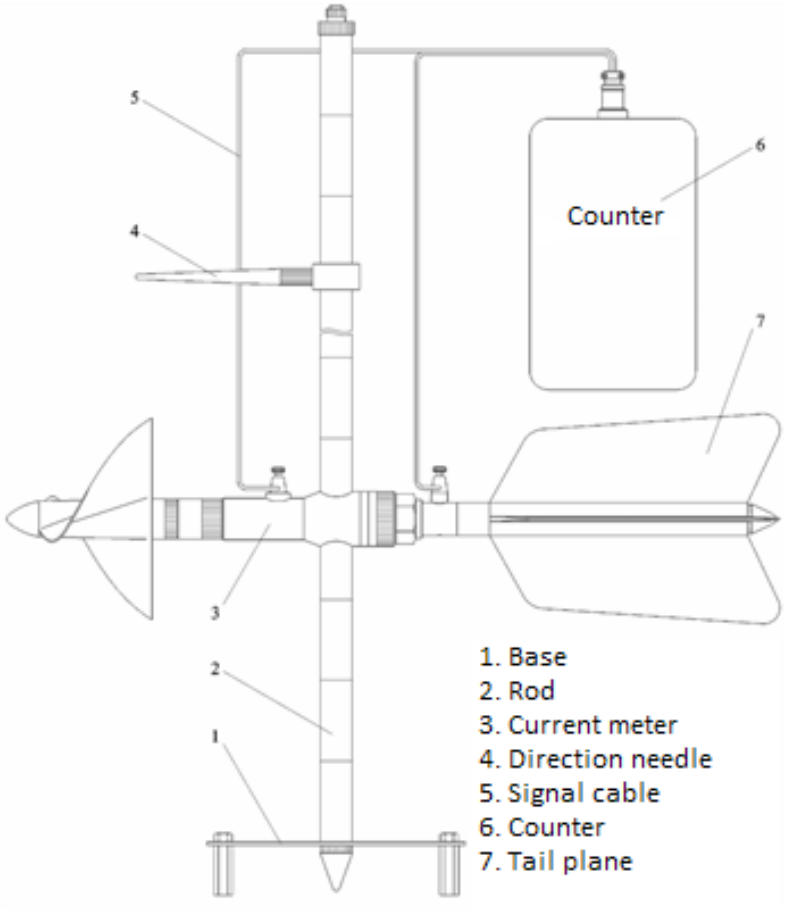

Fig 3: Rod installation

2. Hung to a cable

1) When the velocity is < 1 m/s, the LS20B can be installed like beblow (Fig 4: Rotation axle-cable) and the lead fish must be ≥ 30 kg.

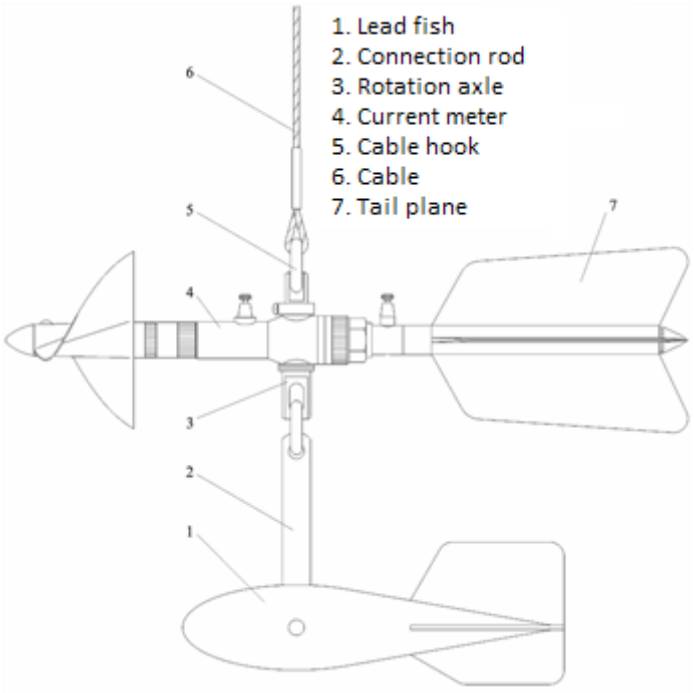

Fig 4: Rotation axle - cable

2) When the velocity is between 1m/s and 3 m/s, the LS20B can be installed like the diagram below and the lead fish should be ≥ 50 kg:

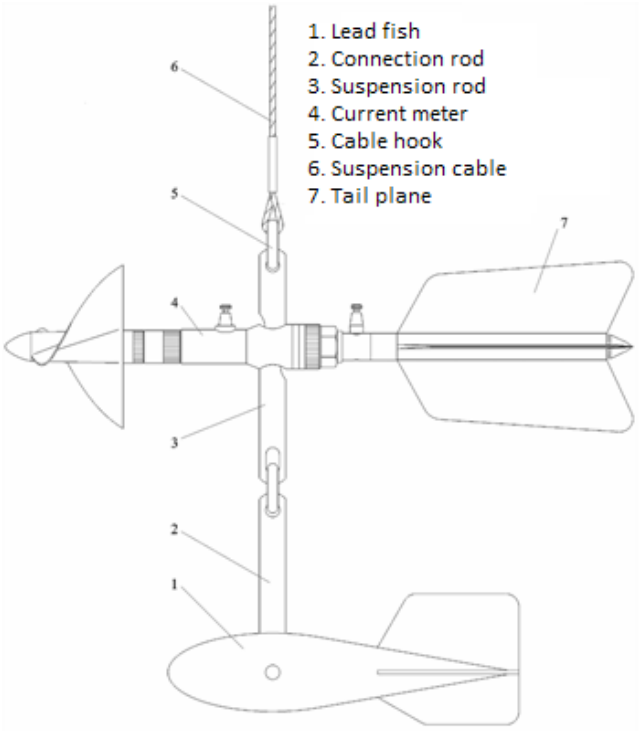

Fig 5: Connection rod and cable

3. Installation on a rod with a lead fish

When the velocity is > 3 m/s and the depth > 10 m, the LS20B can be installed like the diagram below and the lead fish should be > 100 kg (Fig 5: Installation on a rod with a lead fish).

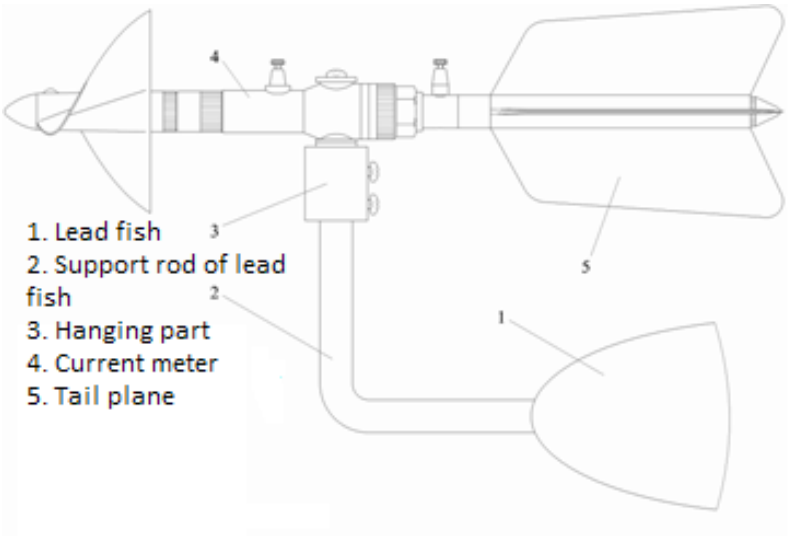

Fig 5: Installation on a rod with a lead fish