C L

Series of gear flowmeters

Mix

www.mixgauge.com

preface

First of all, thank you for using our company's gear flow sensor.

The CL gear flow sensor is accurately adjusted according to the technical data on the order. Please read the instructions carefully before use

Book, fully understand the characteristics of the gear flow sensor, master its operation method. To ensure the proper use, and give full play to its characteristics. If there is unknown

If sure, please ask the sales agent or the marketing staff of the company.

This description does not account for the different characteristics of the user. At the same time, the technical parameters, structures or components of the flowmeter are modified

As long as these modifications do not affect the function and operation of the flowmeter, not every time to make this accordingly.

1. Precautions

The CL series gear flow sensor has been fully checked before leaving the factory. Check the appearance when receiving it and confirm that it is not affected in transportation

damage.

1.1 Check the model and specifications

The model and main technical parameters of the flowmeter are indicated on the nameplate of the main body. Please check whether it is the same as when ordering.

When you need to contact the company, please specify the model and factory number on the nameplate.

1.2 Transportation and storage precautions

When the flowmeter is delivered to the place, please keep the packaging status of our delivery to avoid accidental damage. It shall be installed in time after arriving at the use place,

In case of accidental damage to the flow meter. For a long time, follow the following.

a. When storing, do not open the packaging

b. The storage place shall have the following conditions:

With rain prevention and sun protection facilities

Not susceptible to mechanical vibration or impact

The flowmeter shall be stored in a room of 5℃ ~405, relative humidity not exceeding 85% ventilation and without corrosive gas.

Note: 1. Traffic care is heavy, beware of injury during operation.

2. The important parameters of the flowmeter recorded on the certificate —— instrument constant must be properly kept.

This product implementation standard: JJG 667-2010 liquid volume type flowmeter verification procedures

The CL series gear flowmeter

summary:

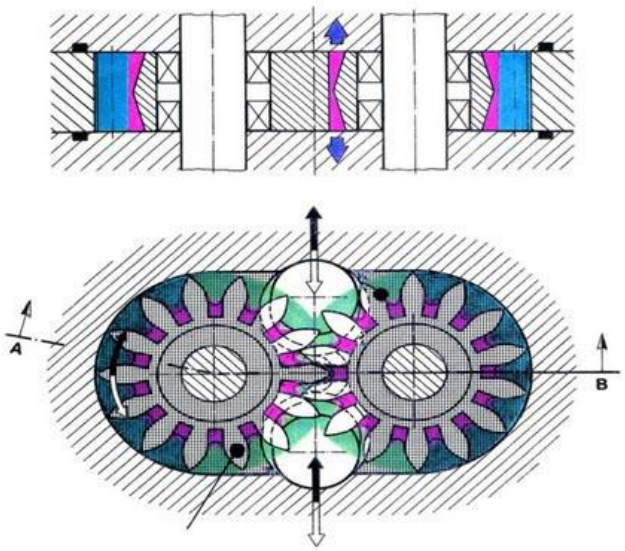
A new volumetric flowmeter developed under the principle of gear motor, used for precise continuous or intermittent measurement of the flow of liquid in the pipeline or

Instant flow rate, suitable for heavy oil, polyvinyl alcohol, resin and other high viscosity medium flow rate measurement, small flow rate can be accurately measured.

Working principle and structure:

The flowmeter cavity has a pair of engaged gears as a rotor, and the two gears and the cavity can respectively form a fixed volume, called

Standard volume and flow rate are measured by calculating the number of standard volume circulating within a certain period of time.as illustrated in following figure:



Working schematic diagram of the gear

design feature:

According to the gear motor principle, the measurement gear is driven by the hydraulic flow.

- The gear run without contact in the measuring chamber. Use low-friction ball bearings or sliding bearings.
- The movement of the gear is detected by a contactless sensor located in the cover plate. A non-magnetic compression separator is installed between the sensor chamber and the metering chamber.
- When the metering mechanism rotates a tooth, the sensor sends a signal corresponding to a tooth capacity V_{gz}。
- The signal is converted to a square wave signal through a preamplifier.

product features

- For various applications, with the help of different gaps, different bearing types and different materials, CL series gear type flowmeter can realize the measurement of different media.
- With a wide range of measurements and multiple specifications, it can meet different needs.
- Within the specified range, the measurements are not affected by the viscosity.
- Low pressure down
- High sensitivity measurement
- High work pressure
- low noise
- High-precision measurement with excellent repetition accuracy
- In a wide temperature range, the output signal is not affected by the temperature
- High precision is still maintained at the lower limit of the low flow rate measurement range
- High operational reliability of the electronic components
- The preamplifier terminal is easy to use

The CL series gear flowmeter

Typical application

apply	medium	material quality
flow measurement (hydraulic test bench)	Oil, brake fluid, special hydraulic working oil, diesel oil Good lubrication low viscosity	Gear and body 316L Ball bearing / tungsten steel sliding bearings Minimum gap
Oil quantity measurement (Measurement equipment)	gear oil Good lubrication Medium viscosity	Gear and body 316L Ball bearings / tungsten steel alloy sliding bearings The gap is slightly larger
Consumption measurement (printing machine)	lithographic ink Good lubrication high viscosity	Gear and body 316L Tungsten steel alloy sliding bearings The gap is larger
ratio control (Equipment for two ingredients)	Polyol + isocyanate, adhesive, resin, silicon Low lubrication Medium viscosity	Gear and body 316L Tungsten steel alloy sliding bearings The gap is slightly larger
job-lot control (Paint equipment)	Cleaner, wax Low lubrication Medium viscosity	Gear and body 316L Tungsten steel alloy sliding bearings The gap is slightly larger
flow measurement (Paint equipment)	dissolvant Good lubrication low viscosity	Gear and body 316L Ball bearings / tungsten steel alloy sliding bearings Minimum gap

If the fluid viscosity is low and poorly lubricated, composite ball bearings (equipped with ceramic balls) can be provided

general characteristic

- Ambient temperature: 30° C + 60° C
- Medium temperature: 60° C + 150° C
- Shell material: stainless steel 316L
- Gear material: stainless steel 316L
- Bearing: Stainless steel ball bearing, tungsten steel alloy sliding bearing
- Maximum allowable impurity particle medium size (in μ m): 20 μ m
- Measuring range: 0.005-100 L / min
- Accuracy (measured value): ± 0.5% when 20 cSt
- Viscosity: 1 ~ 100000 cSt
- Maximum loss of p_{max}: 16bar (related to medium viscosity / flow rate)
- Maximum withstand voltage: 40MPa

The CL series gear flowmeter

technical parameter

specifications / parameter	CL2	CL7	CL20	CL50	CL100
working pressure	40MPa	40MPa	40MPa	40MPa	40MPa
temperature range	-60℃~+150℃	-60℃~+150℃	-60℃~+150℃	-60℃~+150℃	-60℃~+150℃
Viscosity range	1~100,000cSt	1~100,000cSt	1~10,000cSt	1~8,000cSt	1~8,000cSt
accuracy	± 0.5% of the measured value (Viscosity> 20 cSt,)	± 0.5% of the measured value (Viscosity> 30 cSt,)	± 0.5% of the measured value (Viscosity> 30 cSt,)	± 0.5% of the measured value (Viscosity> 30 cSt,)	± 0.5% of the measured value (Viscosity> 30 cSt,)
repeatability precision	± 0.05% (same working condition)				
Flow range	0.005--2 Alitre / minute	0.05--7 Alitre / minute	0.2-- 20 Alitre / minute	0.3-- 50 Alitre / minute	0.5-- 100 Alitre / minute
Shell material	stainless steel 316L	stainless steel 316L	stainless steel 316L	stainless steel 316L	stainless steel 316L
Gear material	stainless steel 316L	De standard stainless steel 1.4122	De standard stainless steel 1.4122	De standard stainless steel 1.4122	De standard stainless steel 1.4122
bearing	440 stainless steel ball bearings	Tungsten steel alloy sliding bearings	Tungsten steel alloy sliding bearings	Tungsten steel alloy sliding bearings	Tungsten steel alloy sliding bearings
sealing material	FPM	FPM	FPM	FPM	FPM
Maximum allowable impurity particle size	20μm	30μm	30μm	30μm	30μm

Measuring specifications

series	start point [l/min]	measuring range [l/min]	impulse ratio K P/L	Connect thread inch	weight KG
CL2	0.0005	0.005 - 2	15000.00	G1/4	1.4
CL7	0.015	0.05 - 7	4000.00	G1/4	1.9
CL20	0.05	0.2 - 20	1340.00	G1/2	3
CL50	0.1	0.3 - 50	308.00	G3/4	7.7
CL100	0.3	0.5 - 100	96.50	G1	14.7

The above data were measured in the laboratory under the medium: 15 # aviation hydraulic oil temperature: 20℃ viscosity: 23 cSt.

The CL series gear flowmeter

Order examples

CL 2 G A 1

Signal type
1 Pulse
A 2 4-20 mA current
3 RS485 communication
4 Pulse / current / RS485 communication
5. Pulse / current / HART communication

Connection type
G-thread installation
F Flange installation

Converter type
A No display junction box
B No display lead plug
C stainless steel housing lead plug
D Black aluminum alloy case lead plug
E Explosion proof table head

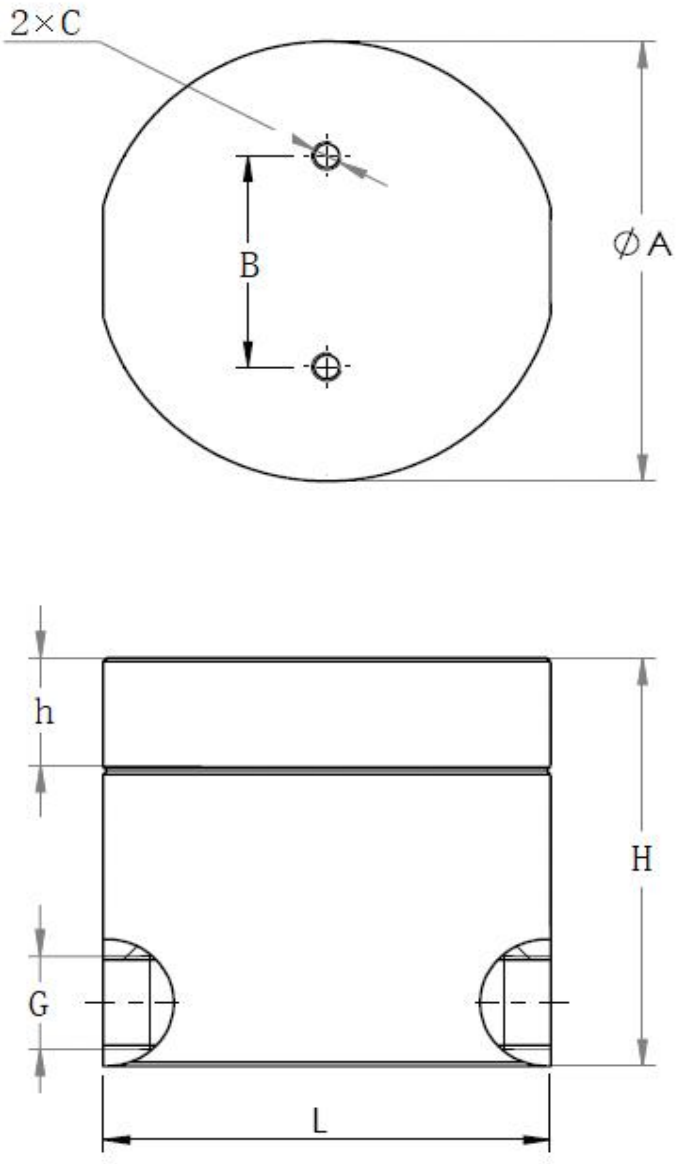
specification and dimension
2 • 7 • 20 • 50 • 100

Product

Converter Type:

A mould	B mould	C mould	D mould	E mould

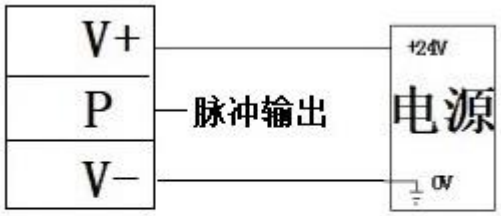
outline dimensional drawing:



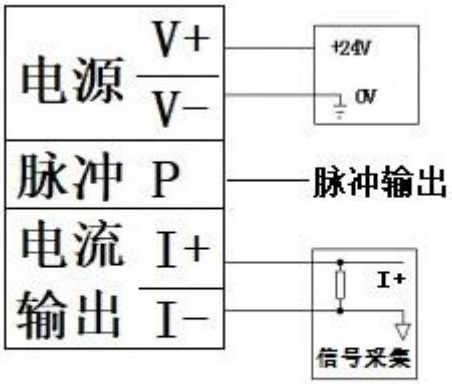
specification and dimension

model	A mm	B mm	C mm	h mm	H mm	L mm	G mm	weight (KG)
CL2	78	45	M6	16	42	72	G1/4	1.4
CL7	88	45	M6	16	43	83	G1/4	1.9
CL20	98	70	M6	22	56	93	G1/2	3
CL50	135	70	M6	26	75	129	G3/4	7.7
CL100	167	110	M10	31	95	160	G1	14.7

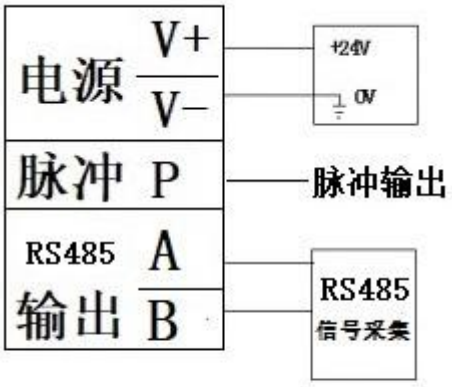
Instrument wiring



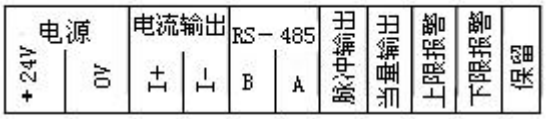
A1/B1型三线制脉冲接法



A2/B2型四线制电流接法



A3/B3型RS485通讯接法



E4型转换器接线图

Installation and operation

1. Installation of the field conversion display

The field conversion display is mounted on the main body of the turbine flow sensor through the thread of M16X1. The thread should be screwed to the end as far as possible

Lock nut gently. To change the display direction, only release the M20 * 1.5 set screw fixing the screw seat and turn the head

Move to the desired direction. Note: Do not exceed 360° at the corners.

2. Selection of connection cables

1. The connection between the amplifier and the display instrument, using a three-core stranded copper wire with an outer braided shield and coated with plastic or oil-resistant rubber,

Its effective cross-section area is 1.25~2mm^2; For the output of the conversion display in the place vulnerable to the noise of electric noise to use shielded wire.

2. In areas where the atmosphere contains corrosive gases or liquids such as oil, gas or solvents, wires or cables suitable for such conditions shall be used.

3. Wiring matters needing attention

（1） Use a complete cable line whenever possible

（2） The wiring position should be as far as possible from the electric noise sources (such as high-power transformers, motors and strong power lines), and should be avoided with power

The power cord has a parallel wiring line.

（3） It is recommended to use non-tin welded clamping clips at the end of the thick wire.

（4） For waterproof and mechanical damage, it is best to put the cable into the metal catheter, but there should not be high power transmission in the same catheter

Cable, (both cannot be installed if the maximum power delivered by a transmission cable is greater than 10 times the minimum power conveyed by a flowmeter signal cable

In the same catheter).

（5） For areas with a strong external magnetic field, the axis of the detection device should be perpendicular to the magnetic flux direction of the external magnetic field, or high conductive magnetic materials should be used

The material shields the flow sensor or the external magnetic source.

（6） The connection of explosion-proof gear flow sensor cable must strictly comply with the relevant standards of explosion-proof amplifier.

4. Ground

（1） The shielding wire can only be grounded at one end, preferably at the display instrument end.

（2） Grthing with 600V PVC insulated wire.

（3） The grounding shall be good and reliable, and the explosion-proof grounding resistance shall be less than 10 Ω.

5. Check of the flowmeter sensor before operation

（1） Verify that the filter is installed before the gear flowmeter and ensure the filtration accuracy of 20 μ m

（2） To confirm that the pipe has been cleaned and must be cleaned again, the cleaning liquid should be passed through the bypass pipe

（3） Verify that each auxiliary device is configured and installed correctly

（4） Conify the circuit wiring is correct

（5） Verify that the pipeline has no leakage, the flow meter sensor downstream regulating valve is convenient, and no leakage when closed

（6） Slowly open the downstream regulator of the meter sensor to confirm that the meter sensor is normally

（7） Confirm that pipe support is reliable and no vibration at maximum flow

（8） Confirm that the downstream pressure of the flow meter sensor is greater than P_{min}

（9） Verify that the bypass valve is not leak

6. Use and maintenance of the flowmeter sensor

（1） The flowmeter sensor shall be used under the flow range specified in the certificate, nominal pressure and flow state marked on the flowmeter.

（2） The temperature and environmental conditions of the tested liquid shall comply with the provisions of this instruction manual.

（3） Supply power to the flow volume meter, the flow rate shall be zero.

（4） When the flowmeter sensor is put into use, open all the bypass valves first, and then slowly open the downstream valve of the flowmeter sensor, however

After slowly open the upstream valve until fully open, and then slowly close the bypass valve. If there is no bypass valve, you can slowly open the upstream valve, and again Slowly open the downstream valve. Be careful not to make the impeller suddenly reach a very high rotational speed.

（5） The instrument coefficient of the flowmeter sensor is the laboratory standard with 15 # aviation hydraulic oil temperature: 20℃ viscosity: 23 cSt before delivery

Obstatically obtained. When the viscosity is low, it is recommended to use the actual tested liquid or the alternative liquid with comparable viscosity for calibration

Instrument constant or by means of correction curve.

Type E2 table header menu setting steps:

Key definition:

name		explain
operational key	setting	In the measurement state, press once to enter the setting state . When setting the state, displaying the parameter symbol, press to enter the next set of parameters or return to the measurement state
	gression	. Switch to display the instantaneous flow rate and frequency in the measured state . In the setting state: ① call out the original parameters ② Mobile Modification Bit
	confirm	. Invalid in the measurement state . In settings: Save the modified parameter value or view the next parameter
	upward	. Invalid in the measurement state . Add the parameter value or change the setting type in the setting state
	downwa	. Invalid in the measurement state . Reduce the parameter value or change the setting type in the setting state

Primary menu (default password: 0002):

L01	Instantaneous flow rate decimal point position 0~4.0~4 Order corresponds to 0.0000,00.000, 000.00,000.0,0000. This item does not care about it.
L02	Location of flow coefficient 0~4. 0~4 Order corresponds to 0.0000,00.000, 000.00,000.0,0000. This item does not care about it.
L03	Sensor flow coefficient, unit: 1 / liter;
L04	Density value of the medium in t / m^3, Default is 1.000, which acts as a traffic correction factor.
L05	Instantaneous flow measurement unit: 0~3. 0：l/m ； 1：m3/m in； 2：m3/h ； 3：l/h 。
L06	Filtering time setting (s): 1~20, the default setting is 1;
L07	Small signal excision value 0-9999, the default is 0, do not open the signal excision, can be according to the actual Situation, removal of a small flow value.
L08	Break line correction function selection: 0: OFF; 1: ON, OFF by default, the fold line correction function is not open. Non-manufacturer personnel cannot modify the parameter.
L09	Set setting of 20 mA; (dry battery supply).

If L08 (broken line correction function) is set to ON, press the segment frequency and segment coefficient modification. If the L08 is set to the 'OFF',

Press the setting key to exit the setting state.

Line correction menu:

F1	The first segment frequency value (Hz) of the flow sensor, the minimum;
C1	The first segment flow coefficient of the flow sensor (1 / l);
F2	The second segment frequency value of the flow sensor (Hz);
C2	The second segment flow coefficient of the flow sensor (1 / l);
F3	The third segment frequency value of the flow sensor (Hz);
C3	The third segment flow coefficient of the flow sensor (1 / liter);
F4	The fourth segment segment frequency value of the flow sensor (Hz);
C4	The fourth segment flow coefficient of the flow sensor (1 / liter);
F5	The fifth segment frequency value of the flow sensor (Hz);
C5	The fifth segment flow coefficient of the flow sensor (1 / l);
F6	The sixth segment frequency value of the flow sensor (Hz);
C6	The sixth segment of the flow sensor flow coefficient (1 / l);
F7	The seventh segment frequency value of the flow sensor (Hz);
C7	The seventh segment flow coefficient of the flow sensor (1 / l);
F8	The eighth segment frequency value of the flow sensor (Hz);
C8	The eighth segment of the flow sensor flow coefficient (1 / liter), the maximum.

Secondary menu (default password: 2222)

L11	External magnetic steel zero clearance permit. ON: allowed; OFF: not allowed.
L12	"Down key" zero clearance. ON: allowed; OFF: not allowed.

Three-level menu (super password fixed to 6210):

BA0	4-20 mA zero point adjustment; not concerned. Battery supply is not item.
BAI	4-20 mA full adjustment; not concerned. Battery supply is not item.
L13	Primary menu password modification (0002);
L14	Secondary menu password modification (2222);
L15	Accumulated flow integer part of zero;
L16	The cumulative flow rate small fraction is cleared.

Fault and troubleshooting method

Faults and troubleshooting methods are shown in the following table:

fault phenomenon	Possible cause	Exclusion method
The normal flow of the liquid is not shown, and the cumulative amount does not increase	1) Power supply circuit or signal circuit has open circuit or poor contact	1) Check with a multimeter to troubleshoot the fault points
	2) The circuit board and connector of the display instrument are faulty or have poor contact	2) Replace the circuit board
	3) Preamplifier fault	3) Use the iron bar to move quickly under the test head without signal output, so check the coil for broken line and solder joint dewelding
	4) The voltage supplied to the preamplifier is too low	4) Increase the power supply voltage to the specified requirements
	5) Gear, stuck not turn	5) Remove foreign bodies, and clean or replace damaged parts, which should be recolated after replacement
The flow display is gradually decreased	1) The filter is blocked, and the pressure loss gradually increases, reducing the flow rate	1) Remove the debris in the filter
	2) The valve core on the pipeline is loose, and the valve opening degree is automatically reduced	2) Repair or replace the valve
	3) The gear is hindered by debris or the foreign body enters into the bearing gap, and the resistance increases to slow down the speed	3) Clean the flowmeter
The flow rate is zero, the flow display is not zero, and the display value is unstable	1) Poor grounding of transmission line shielding and interference from external electromagnetic field	1) Check the grounding to eliminate the interference
	2) Pipe vibration, causing gear shaking	2) Strengthen the pipeline or install the support before and after the flowmeter
	3) Stop valve leakage	3) Repair or replace the valve
	4) Between the internal circuit boards of the display instrument or the electronic components are damaged, causing interference	4) Take the "short circuit method" or check one by one to find out the fault point
The display flow rate does not match the actual flow rate	1) The gear shall be corroded or damaged	1) Repair the gear or reset it after replacement
	2) Sundry hinder the rotation of gear	2) Remove debris
	3) Check the abnormal sensor output signal	3) Check the sensor insulation resistance and conduction resistance
	4) Fluid temperature is too high or too low, resulting in excessive clearance change between bearing and shaft 5) Insufficient back pressure, to produce air acupoint 6) Due to the temperature influence, the fluid viscosity becomes smaller 7) Without the check valve, the reverse flow occurs	Take targeted measures to exclude them
	8) Bypass valve leakage	8) Close the strict bypass valve and replace it if necessary
	9) The upstream flow rate distribution of the flowmeter is distorted or the pulsating flow occurs	9) Find out the cause of the distortion or pulsating flow, and take measures to eliminate it
	10) Display the instrument failure	10) Repair the display instrument
	11) The display instrument is improperly connected	11) Correct the wiring
	12) Wrong instrument setting is displayed	12) Correct the setting
	13) The actual flow rate exceeds the specified flow rate range	13) Replace the appropriate diameter flowmeter

If the flow meter sensor is faulty in use, please contact the company, please specify the

failure situation of the instrument, the operating condition,

Test fluid characteristics, fault table model, factory number, etc. If necessary, please attach the schematic diagram of the installation pipeline and the main process parameters

To help us to serve you better.

13. Order instructions

When ordering goods, it should be clear

1. The model of the flowmeter sensor, and confirm the meaning of the model and the nominal diameter, structural form, and nominal pressure you require

Force, flow range, accuracy range, temperature range, explosion-proof requirements, anti-corrosion performance, etc.

2. Accessaccessories of our company, such as cables, pipe flanges, bolts, etc.
3. To assist you in better type selection, please provide the fluid name and physical and chemical characteristics (such as viscosity, density, corrosion, etc.),

Pressure, temperature and flow of the common value, maximum value, minimum value, etc.

4. The filter screen must be installed before, and the filter accuracy is 20 μ m.
5. In the selection, if there is an unknown place, you can directly contact with the factory.

Packaging, transportation, and storage

1. The flowmeter and supporting accessories should be installed in the carton or wooden box with collision-proof and shock-proof cushion, and are not allowed to move freely in the box: move Transportation should be carefully handled lightly, do not allow brutal handling.
2. Flow meter transportation and storage according to JB / T9329-1999 "Basic environmental Conditions and test methods of Instrument transportation, Transportation and Storage"

Requirements for execution.

3. Requirements for flowmeter storage conditions
   (1) Protect it from rain and moisture
   (2) The relative humidity is not more than 80%
   (3) Free from mechanical vibration or impact
   (4) Temperature range-20℃ - - + 40℃
   (5) The environment does not contain corrosive gases

Out of the box and check

When opening the box, check the integrity of the external packaging, and then check whether the items and random documents in the box are complete according to the packing list.

random file

（1）work certificate

（2）operating instruction

As the technology is constantly improving, the software is constantly being upgraded. The Company reserves the right to change the contents of this manual without notice to its customers Sorry for the inconvenience caused. The content involved in the manual belongs to the company, without the permission of any unit and individual can not copy, reprint.capture
For more help, please consult the sales engineer who provides you.