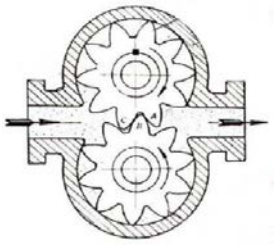
Overview

Gear flow meter belongs to a kind of volumetric flow meter and can be used for measuring liquid volumetric flow precisely. The flowing medium makes the gear engage and rotate. Under the flowing effect of the fluid, pressure difference is formed between the inlet and outlet of the gear flow sensor. One pair of gears can rotate freely without the need of power supply. The empty cavity between gears is filled with liquid, which is discharged through rotation. The liquid flowing through instrument and liquid can be known through measuring the number of revolutions of the gear.

How Gear Flow meter work?



The rotation speed of the gears is detected by the sensing coil inside the signal amplifier on the case. The signal amplifier cannot contact the measured medium. The magnetic line of force generated inside the permanent magnet inside the case due to transmitter gear cutting will lead to flux change inside the sensing coil. The sensing coil sends the signal of flux change cycle detected to the pre-amplifier so as to amplify and shape the signal. The pulse signal which is in direct ratio with flow velocity will be sent to the unit conversion and flow integration circuit to obtain and display the accumulative flow valve. At the same time, it will also send the pulse signal to frequency current conversion circuit to convert the impulse signal to simulation amperage so as to display the instantaneous flow value.

The flow meter has high processing precision and can be installed precisely. The gear rotation undergoes non-contact scanning. One pulse is generated by one gear with very high resolution. The column gear transmission can measure the liquid at very small flow and small quantitative volume.

Technical Specifications

- Aluminum alloy gear flow meter can bear max 15 Mpa pressure, stainless steel gear flow meter can bear 40Mpa
- Standard fluids operation temperature : -15-80 ° C, Special request for fluids temperature :-196° C~200° C
- High Accuracy: rangibility1:10, the accuracy is +/- 0.5%; rangibility1:100.accuracy is +/- 1.0%
- Pulse output/current output available
- Large Turn down Ratio (1: 100)
- Broad range of measurement
- Able to measure different kinds of viscous media, max can measure 10,000 mPa.s fluids
- Can be used to measure corrosive or aggressive liquid by choosing different material

Features

As a kind of new volumetric flow meter, the gear flow meter is used for measuring the flow or instantaneous flow of the liquid inside pipeline precisely, either in a continuous or discontinuous flow.

It is particularly suitable for the measurement of heavy oil. Flow measurement of media with high viscosity such as vinol and resin. (It can be used for measuring the fluid the viscosity of which is as high as 10,000 mPa.s) , Gear flow meter has small volume, light weight, small operation noise and stable operation. It can also be used for measuring the micro flow of small pipe diameter. With small startup flow and broad range ratio, it is applicable to the measurement of liquid flow with significant change and its measurement precision is not affected by either pressure or flow change. It is stable in performance, long in service life and large in circulation capacity.

Gear Flow meter Application

- Measurement of resin and glue
- Measurement of hydraulic oil, lubricating oil and grease
- Measurement of fuel oil
- Measurement of printing ink and asphalt
- Measurement of liquid nitrogen, refrigerant and solvent
- Measurement of edible oil, fish oil and food canning
- Measurement of chemical fluid or fluid with corrosion resistance requirements
- Fluid quantitative control system

Product Pictures

Thread

Tri-clamp

compression fittings

Flange

Flow Range

Table 1

Model	Flow Range Liter/h	K Factor P/L	Max Pressure Bar	
			Aluminum alloy	Stainless steel
GF02	0.6-50	11200	150	400
GF04	5-200	4780	150	400
GF06	10-500	3468	150	400
GF10	50-1200	2780	150	400
GF15	200-3000	334	150	400
GF25	1000-12000	59.9	150	400
GF32	2000-20000	39.9	150	400

Model selection

Table 2

Item	Code	Description
Product	GF	Gear flow meter
Flow Meter Size	XX	2,4,6,10,15,20,25,32mm(refer to Table 1)
Sealing Material	F	FKM
	P	PP
Process Connection	1	Thread (specify standard , female or male)
	2	Flange (specify standard and pressure rating)
	3	Tri-clamp
	4	Compression fittings (specify standard)
Output & Communication	P	Pulse output
	I	4-20mA
	RS	RS 485, MODBUS
Flow Sensor Material	I	Stainless steel 304
	2	Aluminum alloy
	3	PP
	4	Others
Digital Display	N	No display and Horseman connector
	Y	With Digital Display

Flow meter size

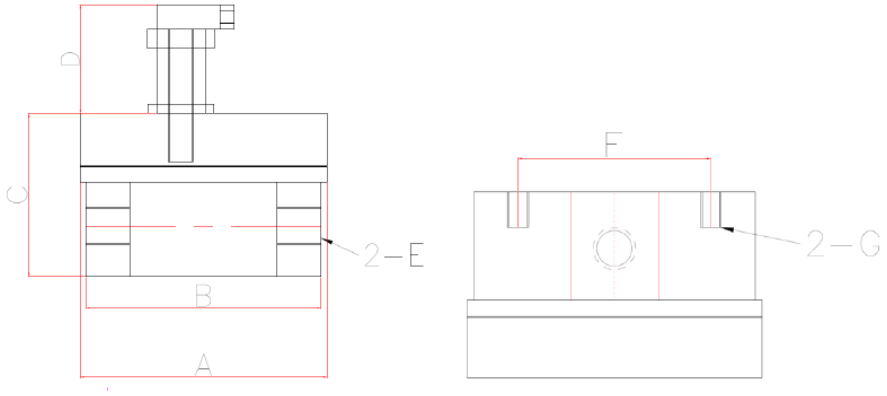


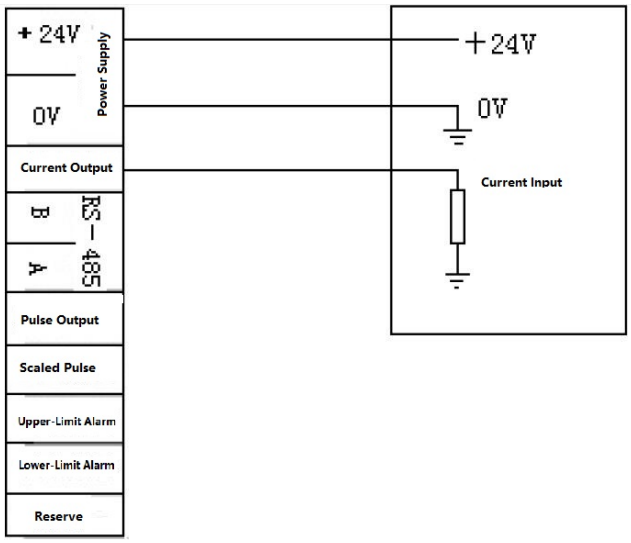
Table 3

Model	A	B	C	D	E	F	G
GF02	Φ83	80	55	70	G1/4	40	M6
GF04	Φ83	80	55	70	G3/8	55	M6
GF06	Φ83	80	62	70	G1/2	55	M6
GF10	Φ83	80	65	70	G1/2	55	M6
GF15	Φ113	110	66	70	G3/4	90	M6
GF25	Φ158	140	85	70	G1	110	M8
GF32	Φ218	160	100	70	G1-1/4	180	M8

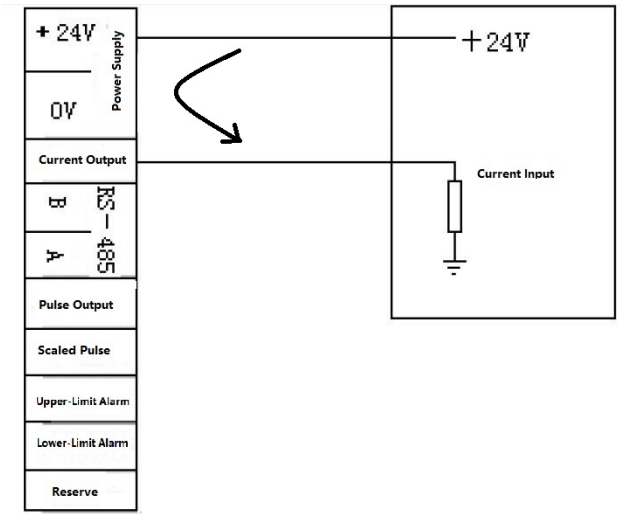
Above is standard size, we can customize according to customer's demand.

Wiring

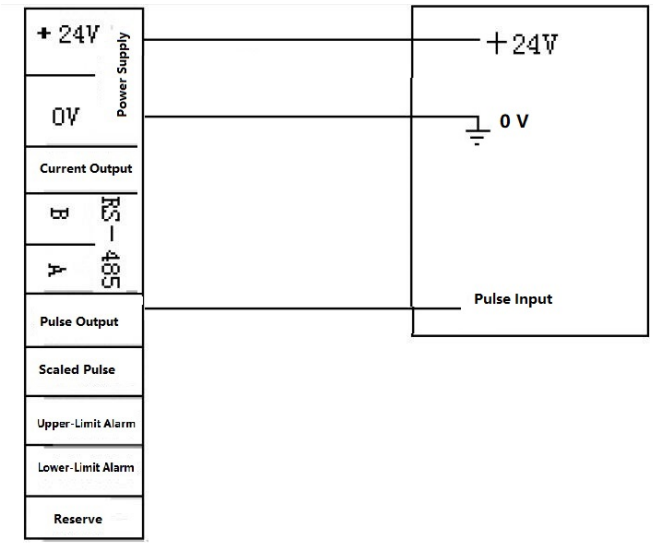
a. 3 Wire current output wiring



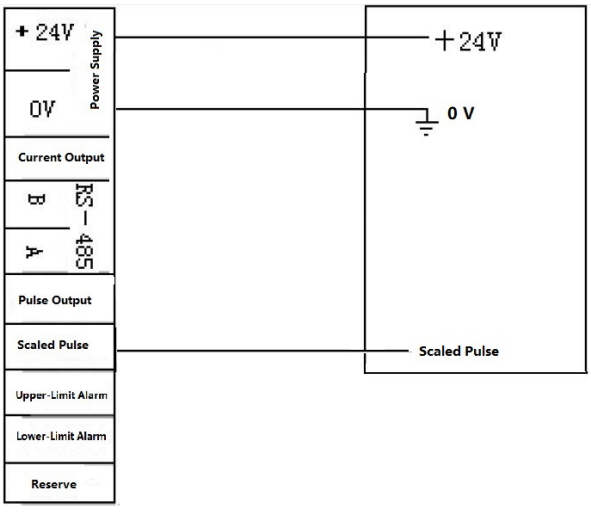
b. 2 Wire current output wiring



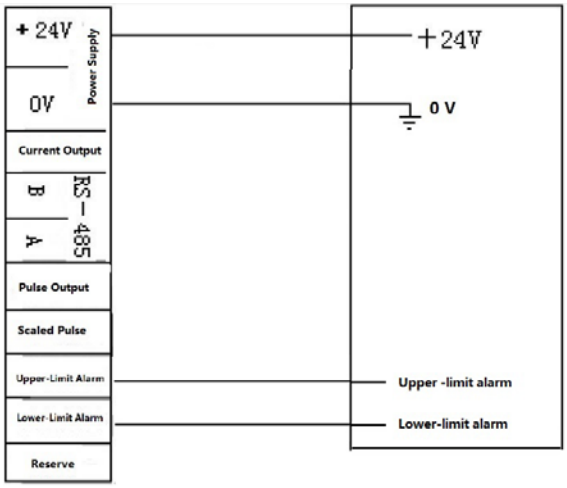
c. 3 Wire Pulse output Wiring



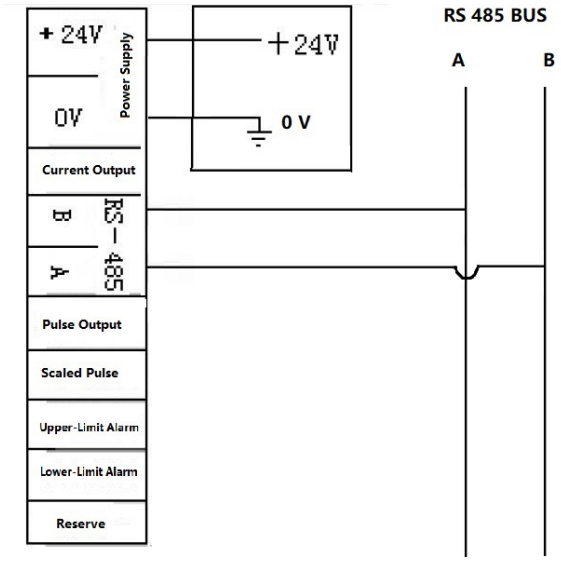
d. 3 Wire scaled pulse output



e. Alarm Output Wiring



f. RS485 Communication



Installation

1. The flow meter should be installed in the place where it is far from high temperature, high vibration, strong magnetic-field interference, aggressive environment, also select a place which is easy for future maintenance.
2. The flow sensor is normally installed horizontally, users should fix the flow meter tightly, if users have to install vertically, the flow direction should be from bottom to the top. Liquid should be filled with the pipe and no bubbles are allowed.
3. Better keep 20D straight pipeline at the upstream of the flow meter and 5D at the downstream.
4. The sealing ring should be align to the centerline of the pipeline, not into the fluids.
5. If flow control valve is needed, it should be installed at the downstream of the flowmeter
6. When install the flow meter in the new pipeline, strainer is needed at the upstream of flowsensor.
7. A by-pass pipe is needed to avoid the normal operation of the flow when the flow meter is inspected.

8. Shield cable is needed when you connect the flow meter with a flow totalizer, also grounding is needed on the flow totalizer side

Usage and Maintenance

1. The fluids should be clean, no impurities.
2. Valve open order as below when the flow meter starts operation
   a. If there is no by-pass pipe, half open the upstream valve, and then open the downstream valve slowly & keep low flow rate for around 10 minutes, then fully open the upstream valve.
   b. If there is by-pass pipe, full open the by-pass valve, half open the upstream valve, and then slowly open the downstream valve. Small open the by-pass valve and keep the flow meter running at low flow rate for around 1o minutes, then fully open the upstream valve and close the by-pass pipeline valve, finally adjust downstream valve to the normal flow rate.
   c. Open or close the valve slowly to avoid the gear broken of the flow meter
3. Regular inspection on the flow meter is needed, if there is abnormal noise from the flow meter ,more care is needed
4. Flow meter needs maintantence every 3 months.
5. When flow meter is no longer used, users should clean the flow meter and pack them well to avoid dust into the flow meter, and keep the flow meter at dry place.
6. The strainer needs regular cleaning.
7. The flow meter cable can be overhead or buried underground (plastic tube or metal tube is needed when buried underground.

Trouble Shooting

Trouble	Cause	Solution
The flow is passing but do flow displayed	1.No power supply or wiring is wrong (open circuit, short circuit or bad contact. 2.Preamplifier is broken 3.Gear is stuck	1.Check the power supply and wiring is correct ,using multimeter to check the problem 2.Check the preamplifier 3.Remove the foreign material,clean or replace the gear
There is no flow decrease but the displayed value is decreased	1.Strainer is blocked 2.Valve problem,smaller open 3.The gear is stuck by the foreign material.	1.Clean the strainer 2.Repair or change the valve 3.Clean the flow meter gear
No flow, but still shows flow or displayed value is unstable	1.Cable is poor grounded or affected by the signals 2.Pipeline vibration 3.Flow meter internal broken	1.Check the shield cable, if well grounded 2.Fix the flow sensor 3.Repair the flow meter