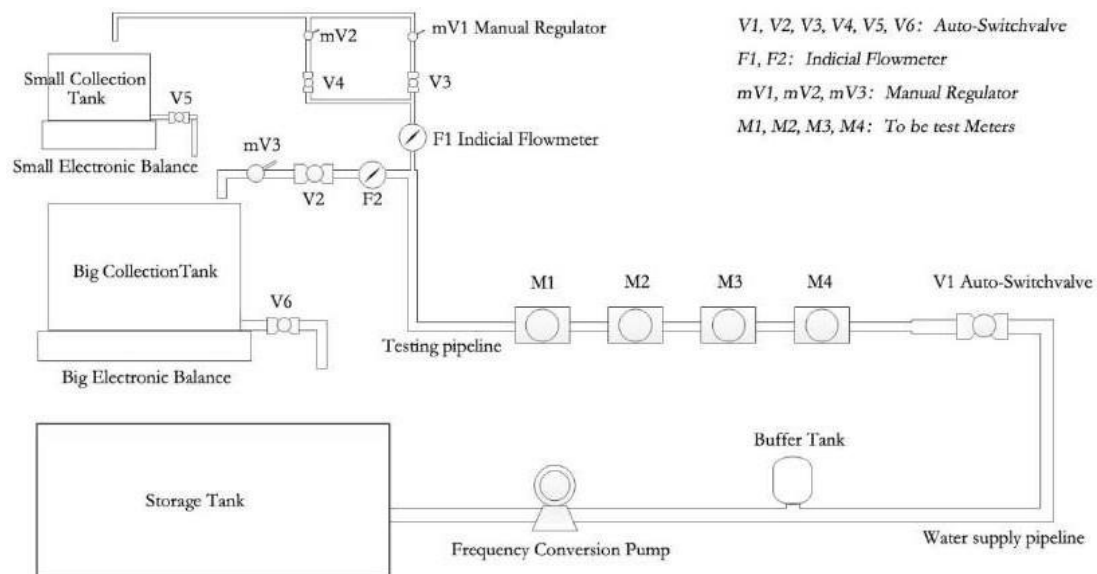


Standard Facility of Water Flow Rate

This facility was designed based on the principle of dynamic gravimetric calibration, equipped with high-precision electronic balance to transfer the measuring value. All of the executions are automatically controlled by computer systems, working task tables can be set up by operators themselves, real time of whole process's testing data can be recorded, and the flow characteristics of water meters be assessed according to the standard values. The facility is also equipped with frequency conversion pump and high speed on-off valves, which can carry out the work task at high speed and raise the work efficiency. The facility is suitable for the field of scientific research, product evaluation, industrial production and other fields of fluid measurement.

1. Schematic diagram of structure



Put the water meters (or flow-meters) on to the testing pipeline, open the cyclical pipeline that is corresponding, regulate the frequency of pumping power, make the flow rate reach a define level and keep the flow rate & pressure to steady, then start a gravimetric testing and record the quality of

collection tank and the display volume of water meters (or flow-meters), waiting for the volume that pass through the water pipeline reaches to preset target, then turn off the valve of water supply, stop the motor pumping, record the total time that water has passed & the increased value of collection tank, calculate the flow error between the value of collection tank and display value of water meter (or flow-meter), assess the error whether or not in the range that allowed with the standard document.

2. Technical Parameters

- A. Method of measurement: Dynamic gravimetric method
- B. Apparatus accuracy grade: 0.2 Class
- C. Flow rate repeatability error: $\pm 0.1\%$
- D. Weighing error of collector tank: $\pm 0.03\%$
- E. Repeatability error of weighing collector tank: $\pm 0.2\%$
- F. Timer error: $\pm 0.001\%$
- G. Imported uncertainty of turning on/off valves: $\pm 0.02\%$
- H. Working pressure: (0.2~0.5) MPa
- I. Calibrating products: water-meter, tubular flow-meter
- J. Diameter range: DN15~DN40
- K. Flow rate testing range: 2L/h~15m³/h, 8L/h~25m³/h
- L. Environmental conditions
 - Ambient temperature: 15°C ~ 30°C*
 - Relative humidity: 15%~85%*
 - Atmospheric pressure: 86KPa~106KPa*
 - Install in indoors, use clean water*
- M. Power conditions
 - Power voltage: 220V*
 - Power frequency: 50HZ*
 - Input power: 4KW, 8KW*

Working air pressure of pneumatic actuator: 0.5MPa~0.8MPa

N. Implementing standards

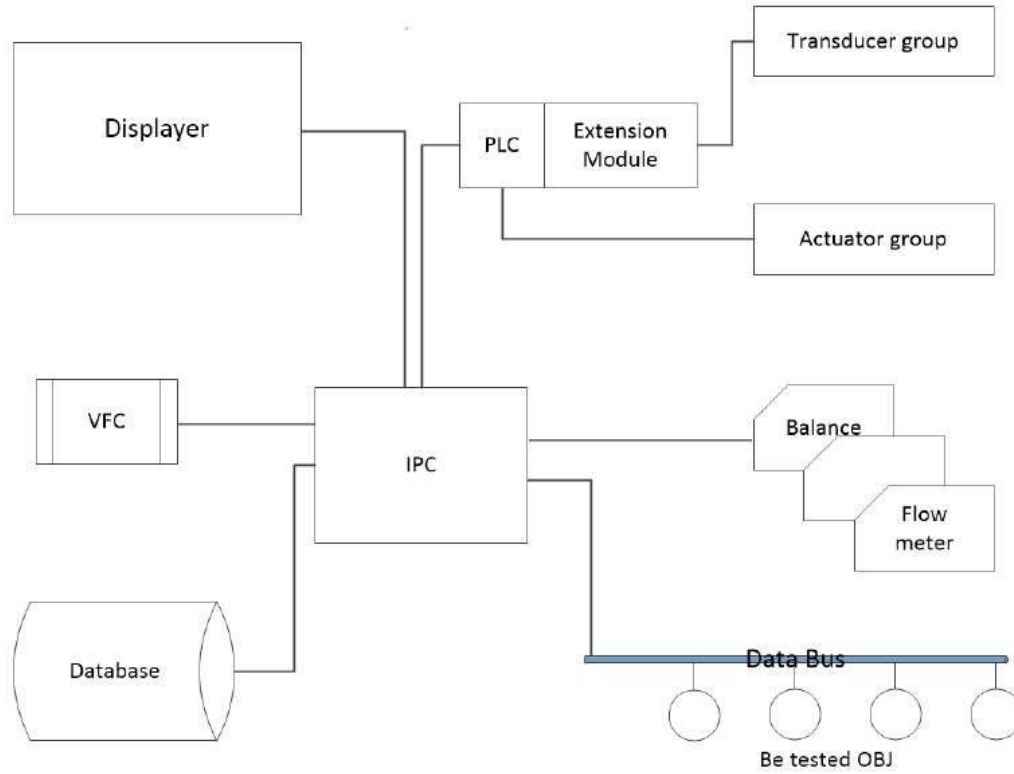
JJG164-2000 Verification Regulation of Standard Facilities for Liquid Flowrate (Chinese National Standards)

JJG1113-2015 Verification Facility for Water Meters (Chinese National Standards)

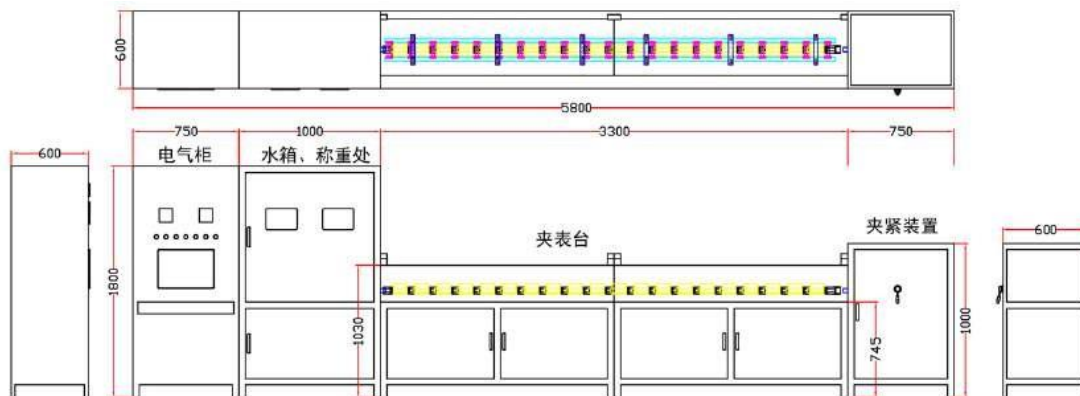
3. Main components of facility

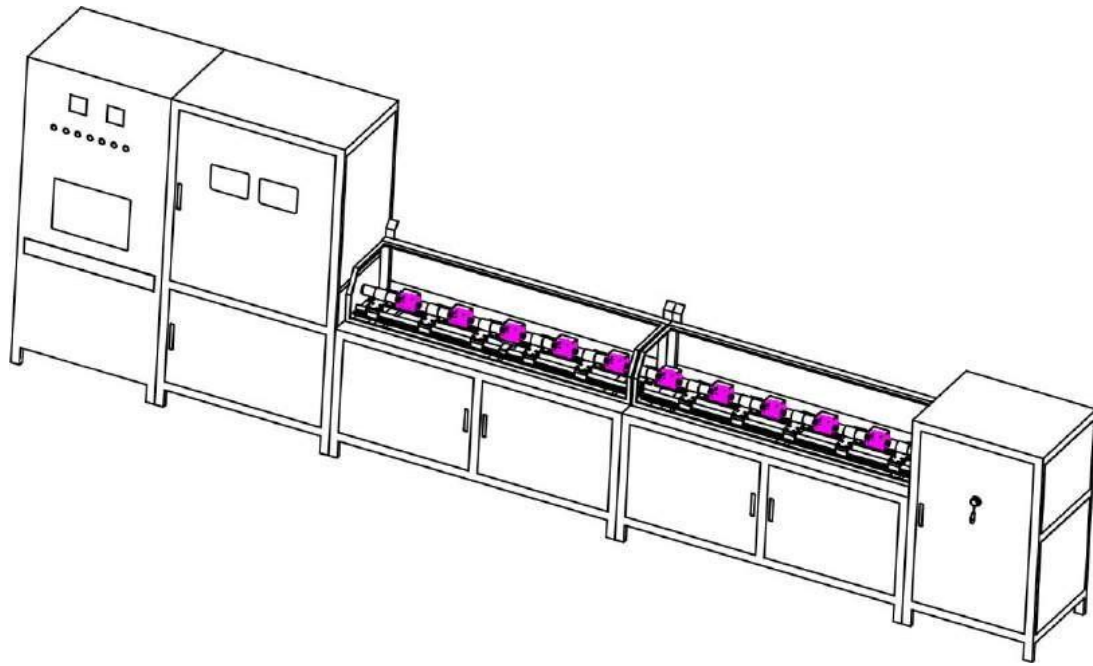
- A. Structural body : Stainless frame, Stainless pipeline, Stainless tank, etc.
- B. Controllable mechanical components: pneumatic valves, manual regulation valves, pneumatic pipe expansion joint, etc.
- C. Quality or flow-rate etalons: electronic balance, electronic flow-meter
- D. Power system components: frequency conversion pump, buffer tank, Air compressor
- E. Electrical control units: IPC, Industry inverter, Contactor, PLC & Extension Module, Relay, etc.
- F. Control management software: PLC program, Calibration business program, Database MIS

4. IPC Control System Diagram



5. Dimensions of DN15-25 Standard Flow-rate Facility

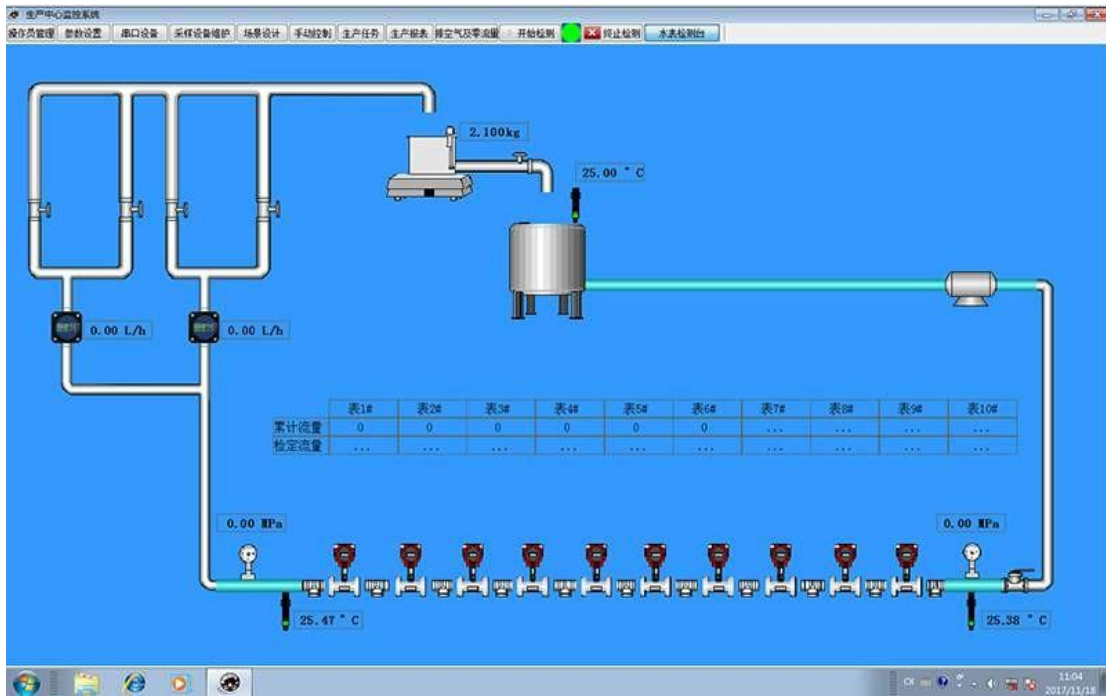




6. Physical picture of Dn15-25 Flow-rate Standard Facility



7. The Main Interface of IPC Automation Control System



1. Ultrasonic Water Meter INTU-20H/25H/32H/40H

1.1 Usage

Figuring out the water flow speed by measuring the ultrasonic wave velocity of change that caused by water flow in the pipe, then, obtain the volume of water passed by. Ultrasonic water meter is a credible instrument for trade settlement.



1.2 Features

- ✧ Low start flow, long range of measurement
- ✧ Counting forward and reverse flow, pinpoint accuracy and stability
- ✧ Low power design & long battery longevity
- ✧ Equipped with leaky detection & burst detection
- ✧ Varieties of communication model, wired M-bus network, radio ~~433~~ network, Bluetooth with smartphone APP can be selected as need, easy to access the meter's data for monitoring
- ✧ Large-capacity data storage, recording meter's running information including 36 months of time-slicing information for the district metering monitoring
- ✧ No wear & no moving parts, low head loss
- ✧ Strengthen design for waterproof, IP68 type tested, suitable for installation in meter pits
- ✧ Can be fixed in almost any direction, not must to be vertical or horizontal

1.3 Main technical parameters

- ✧ Pipe material : Copper
- ✧ Body material : PPS plus fiber glass
- ✧ Ambient temperature: 0~50°C
- ✧ Fluid temperature: 0+°C~30°C
- ✧ Working pressure: ≤1M Pa
- ✧ Installment environment: Class B
- ✧ Electromagnetic environment: E1
- ✧ Velocity sensitivity level: U10, D5
- ✧ Electron circuit: working voltage 3.6 ~3.2V, minimum current≤5μA
- ✧ Battery: 3.6V high power lithium battery, 10 years of effective

service-life at tBAT ≤30°C on base module

- ❖ Interactive button: touch-sensitive button
- ❖ Wireless reading: LoRa communication
- ❖ Wired network: M-bus, support multi-protocols
- ❖ Self-service reading: SNFC adapter plus smartphone
- ❖ Data storage: records of running in 36 months
- ❖ Implementing standards :

GB/T 778.1~3-2007 Measurement of water flow in fully charged closed conduits—Meters for cold potable water and hot water CNS

ISO 4064-1~3:2014 Water meters for cold potable water and hot water

1.4 Relative error of measurement

Low segment ($Q_1 \leq Q < Q_2$): $-5\% \leq \text{relative error } \epsilon \leq 5\%$

High segment ($Q_3 \leq Q < Q_4$): $-2\% \leq \text{relative error } \epsilon \leq 2\%$

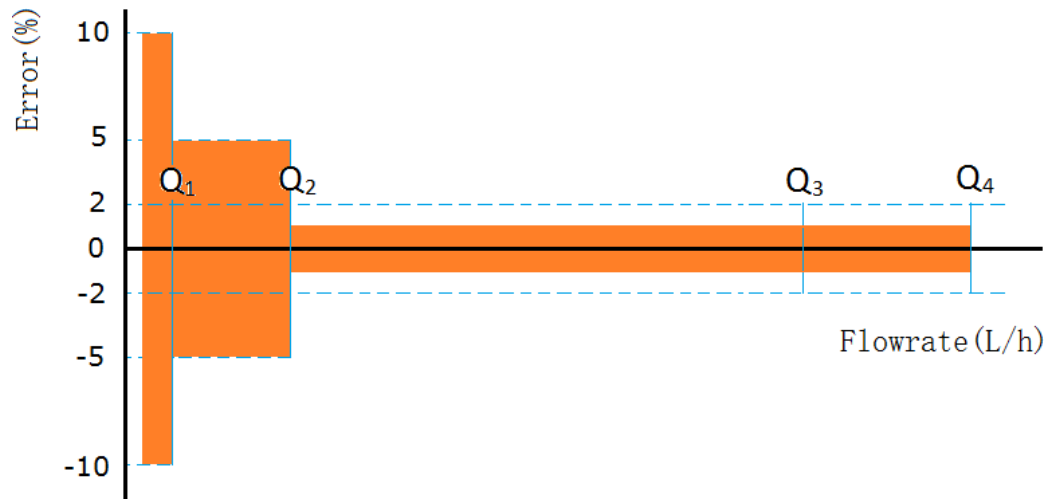
1.5 Flow technique specification

Nominal Diameter (mm)	Start-up Flowrate Q_{st} (L/h)	Minimum Flowrate Q_1 (L/h)	Transition al Flowrate Q_2 (L/h)	Common Flowrate Q_3 (m3/h)	Overload Flowrate Q_4 (m3/h)	Accuracy Class
20	4	20	32	4	4.9	2
25	6	39	62	6.3	7	
32	8	62	99	10	11.5	
40	12	80	128	16	18.3	

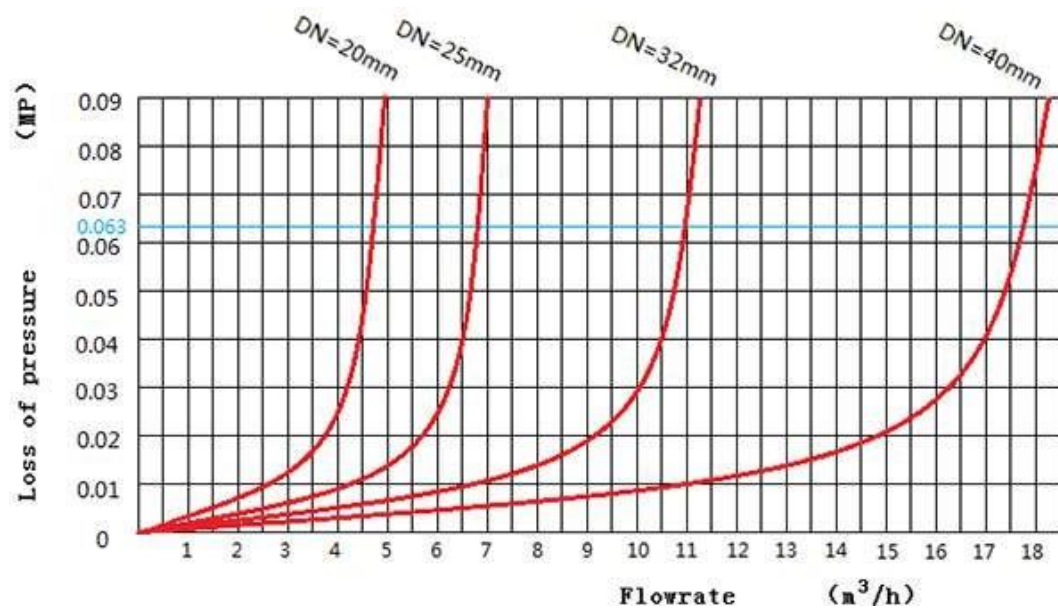
1.6 Outline dimensions

Nominal Diameter (mm)	Length (mm)	Breadth (mm)	Height (mm)	Pipe thread
20	130.0	84.0	90.0	G3/4B
25	175.0	88.0	95.0	G1B
32	200.0	96.0	115.0	G3/2B
40	245.0	100.0	120.0	G2B

1.7 Curve of flow error



1.8 Curve of head loss



2. Prepaid Ultrasonic Water Meter INTP-20H/25H/32H/40H

2.1 Usage

Measuring the velocity change of sound which travels through water, can count the capacity of water in a pipe, equip with globe valve and SNFC transmission unit for management to advance pay after use. Can be recharge online or off line, it enables remote packet number (or meter reading).



2.2 Features

- ✧ Low start flow, long range of measurement
- ✧ Counting forward and reverse flow, pinpoint accuracy and stability
- ✧ Low power design & long battery longevity
- ✧ Equipped with leaky detection & burst detection
- ✧ Varieties of communication model, wired M-bus network, radio ~~Atc~~ network, Bluetooth with smartphone APP can be selected as need, easy to access the meter's data for monitoring
- ✧ Large-capacity data storage, recording meter's running ~~information~~ information including 36 months of time-slicing information for the district metering monitoring
- ✧ No wear & no moving parts, low head loss
- ✧ Strengthen design for waterproof, IP68 type tested, suitable ~~for~~ installation in meter pits
- ✧ Can be fixed in almost any direction, not must to be vertical ~~or~~ horizontal
- ✧ Step water prices with E-wallet mode management can adjust ~~the~~ using price on preset time.

2.3 Main technical parameters

- ✧ Pipe material: Copper
- ✧ Switch valve: Stainless ball valve
- ✧ Body material : PPS plus fiber glass

- ✧ Ambient temperature: 0~50°C
- ✧ Fluid temperature: 0+°C~30°C
- ✧ Working pressure: ≤1M Pa
- ✧ Installment environment: Class B
- ✧ Electromagnetic environment: E1
- ✧ Velocity sensitivity level: U10, D5
- ✧ Electron circuit: working voltage 3.6 ~3.2V, minimum current≤5μA
- ✧ Battery: 3.6V high power lithium battery, 10 years of effective service-life at tBAT ≤30°C on base module
- ✧ Interactive button: touch-sensitive button
- ✧ Wireless reading: LoRa communication
- ✧ Wired network: M-bus, support multi-protocols
- ✧ Self-service reading & recharge: SNFC adapter plus smartphone
- ✧ IC card recharge: RF card, EM4450
- ✧ Data storage: records of running in 36 months
- ✧ Implementing standards :
 - GB/T 778.1~3-2007 Measurement of water flow in fully charged closed conduits—Meters for cold potable water and hot water CNS
 - ISO 4064-1~3:2014 Water meters for cold potable water and hot water

2.4 Relative error of measurement

Low segment ($Q_1 \leq Q < Q_2$): $-5\% \leq \text{relative error} \leq 5\%$

High segment ($Q_3 \leq Q < Q_4$): $-2\% \leq \text{relative error} \leq 2\%$

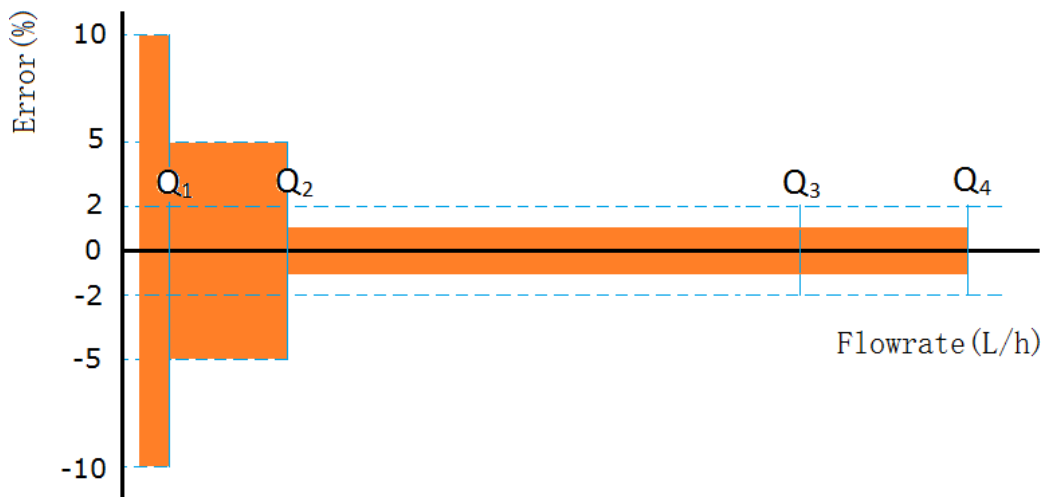
2.5 Flow technique specification

Nominal Diameter (mm)	Start-up Flowrate Q_{st} (L/h)	Minimum Flowrate Q_1 (L/h)	Transitional Flowrate Q_2 (L/h)	Common Flowrate Q_3 (m3/h)	Overload Flowrate Q_4 (m3/h)	Accuracy Class
20	8	20	32	4	4.9	2
25	12	39	62	6.3	7	
32	17	62	99	10	11.5	
40	24	80	128	16	18.3	

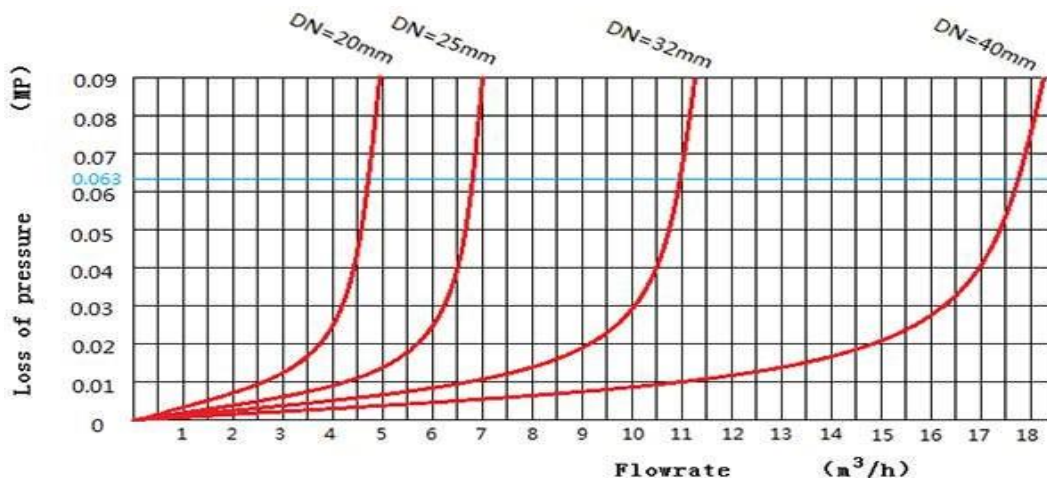
2.6 Outline dimensions

Nominal Diameter (mm)	Length (mm)	Breadth (mm)	Height (mm)	Pipe thread
20	195.0	84.0	110.0	G3/4B
25	225.0	88.0	125.0	G1B
32	230.0	96.0	142.0	G3/2B
40	270.0	100.0	150.0	G2B

2.7 Curve of flow error



2.8 Curve of head loss



3. Smart Lora/ Lorawan Network

- 1、 Process: Water meter ↔ Gateway ↔ Server;
- 2、 Meter reading: meter device real-time plus master station real-time;
- 3、 Valve-controlled : meter device real-time plus master station real-time ;
- 4、 Intelligent management : meter device real-time plus master station real-time ;
- 5、 International status : Application of LoRaWAN protocol to realize master station meter reading in real time;
- 6、 Latest technology: Intelligent management plus LoRa technology plus two-way real-time communication plus energy saving program
- 7、 Meter reading speed is slow and packet bytes is less;

