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ANHUI HUINING ELECTRIC METER & APPLIANCE GROUP CO., LTD.

FLOW METER SERIES

徽宁集团
HUINING GROUP

FLOW METER SERIES



ANHUI HUINING ELECTRIC METER & APPLIANCE GROUP CO., LTD.

(Tianchang Huining Electrical Instrument Factory)

COMPANY INTRODUCTION



Anhui Huining Electric Meter & Appliance Group Co., Ltd. is located in Tianchang, Anhui, with the historic city of Nanjing to the south and Slender West Lake in Yangzhou to the east. National Highway 204 runs through the area, with convenient access to the Beijing-Shanghai high-speed railway and Nanjing Lukou Airport. With a history of more than 30 years, Huining Group occupies 150,000 m², including 61,000 m² of factory buildings, and has 896 employees. It is a high-tech enterprise integrating the design, manufacture, sales and servicing of industrial instruments, wire and cable, valves and cable trays. The company has strong technical capabilities, advanced production and testing equipment, and established manufacturing and inspection procedures.

The company was among the first approved suppliers to CNPC, Sinopec and CNOOC, and has maintained cooperation with these three oil groups for nearly 30 years as a Class A supplier. It is also an approved supplier to Sinochem, Shenhua, Hengyi, CNNC, Datang Power, China Guodian, China Huadian, Formosa Plastics and Nine Dragons Paper. In response to the Belt and Road Initiative, it has participated in major overseas-related projects, including Hengyi Brunei PMB, the Liaoyang Petrochemical Russian crude-oil processing optimization project, the Tianjin Dagang Oilfield Niger project, and the China-Russia East-Route Natural Gas Pipeline. Its products have performed well, with no product-quality accidents, and have received favorable customer feedback. Offices have been established in more than 30 cities, including Beijing, Shanghai, Lanzhou, Urumqi, Guangzhou, Jiujiang and Dongying.

Quality is the foundation of the business. The company has established a comprehensive quality-assurance system in accordance with ISO standards. The company has obtained quality, environmental, occupational health and safety, CNAS laboratory, measurement management system (A), after-sales service, intellectual property, national military-standard equipment quality-management and API certifications, together with CCC, CB, CE, TUV, EAC, GOST-R, STL, CQC, PCCC, RoHS, marine-product and mining-product safety approvals. Some products have been recognized as Anhui Famous Brand Products, Anhui Industrial Premium Products, new products and high-tech products. The company holds 34 invention patents and 98 utility-model patents.

The company has received support and recognition from local government. Its honors include National High-Tech Enterprise; National Specialized and Innovative "Little Giant" Enterprise; National Contract-Honoring and Creditworthy Enterprise; National Outstanding Enterprise for Quality and Service Integrity; Anhui Recognized Enterprise Technology Center; Anhui Postdoctoral Research Station; Anhui Private Technology Enterprise; Anhui Innovative Pilot Enterprise; Anhui Famous Trademark; Class A credit enterprise recognized by the Agricultural Bank of China in Anhui; Class A taxpayer credit status recognized by Anhui state and local tax authorities; Anhui Class A Integrity Enterprise; Chuzhou Mayor's Quality Award; Chuzhou Top Ten Excellent Enterprises; Chuzhou Standardized Work-Safety Enterprise; Chuzhou Civilized Unit; Chuzhou Engineering Technology Research Center; Chuzhou Industrial Design Center; Tianchang Top Ten Enterprises; Tianchang Outstanding High-Tech Enterprise; Tianchang Safe Enterprise; and the Tianchang Science and Technology Progress Award.

Huining is committed to serving society through quality products, service and honest business practices. Its philosophy of integrity, steady growth and reinvestment has enabled the company to maintain a low debt ratio. It values sincere cooperation and open communication with employees, partners and customers, sharing opportunities for growth. Guided by integrity, mutual benefit, efficiency and excellence, Huining continues to develop its industrial-instrument and wire-and-cable businesses, working with partners toward shared progress.

CRAFTED WITH CARE - HUINING INSTRUMENTS



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HNLD Smart Electromagnetic Flowmeter

HNLD series intelligent electromagnetic flowmeter



Overview

The smart electromagnetic flowmeter measures the volumetric flow of conductive media by electromagnetic induction. Based on Faraday's law, a pair of sensing electrodes is fitted to the tube wall perpendicular to both the measuring-tube axis and the magnetic field. As conductive liquid moves along the tube, it cuts the magnetic field and induces a voltage. The electrodes detect this voltage, which is proportional to flow rate.
In addition to ordinary conductive liquids, the instrument measures highly corrosive liquids such as strong acids and alkalis, and homogeneous liquid-solid suspensions such as sludge, mineral slurry and pulp.
Applications include petroleum, chemicals, metallurgy, textiles, papermaking, environmental protection, food processing, municipal services, water projects and river dredging.

Features

1. Measurement is independent of velocity profile, pressure, temperature, density and viscosity.
2. Multiple electrodes help maintain measurement accuracy.
3. No moving or flow-obstructing components; virtually no additional pressure loss.
4. Clear backlit LCD with Chinese menus for straightforward operation.
5. High-speed CPU for rapid, accurate calculation; low-frequency square-wave excitation improves stability with low power consumption.
6. Fully digital processing provides interference resistance and reliable, accurate measurement.
7. Ultra-low-EMI switching supply accepts a wide voltage range and offers good electromagnetic compatibility.
8. EEPROM and a battery-backed clock record power-loss times and protect measurement data.
9. Bidirectional measurement of forward and reverse flow.
10. Password protection restricts parameter changes after power-up.
11. Converter self-diagnostics, alarm output and empty-pipe detection alarm.
12. Insertion construction is easy to install without stopping flow. Hot tapping below 1 MPa is possible, making it economical for medium and large pipes.
13. Adjustable low-flow cutoff can be set from the display panel to suppress interference.
14. Automatic zero calibration eliminates zero drift.

HNLD Smart Electromagnetic Flowmeter




Technical Data

Nominal size: DN15-3200; insertion type: DN200 and above. Special sizes on request.
Flow direction: forward, reverse and net flow.
Repeatability: ±0.1% of reading.
Accuracy: in-line type, Classes 0.2, 0.5, 1.0 and 1.5 (depending on size); insertion type, Classes 2.5 and 1.5.
Medium temperature by liner:
Ordinary rubber: -20°C to +60°C.
High-temperature rubber: -20°C to +90°C.
PTFE: -30°C to +180°C.
High-temperature ethylene liner: -30°C to +200°C.
Specify when ordering if medium temperature exceeds 120°C.
Rated operating pressure, in-line type:
DN10-DN50: ≤10 MPa;
DN65-DN400: ≤4.0 MPa;
DN450-DN600: ≤2.5 MPa;
DN650 and above: ≤1.6 MPa.
Insertion type: DN80 and above, 0.25-25 MPa.
Specify special pressure requirements.
Measuring velocity range: 0.5-10 m/s.
In-line: 0.5-10 m/s, recommended 1-5 m/s.
Insertion: 0.5-10 m/s.

Ambient temperature: sensor -40°C to +80°C; converter -25°C to +60°C; insertion type -25°C to +60°C.
Communications: RS232, RS485, HART.
Medium conductivity: ≥5 μS/cm. Most water-based media with conductivity of 200-800 μS/cm can be measured.
Current output: 4-20 mA, fully isolated; load <750 ohms.
Pulse frequency: 0-1 kHz; load ≥3000 ohms; optically isolated open-collector transistor (OCT), external supply ≤35 V.
Electrodes: molybdenum-bearing stainless steel, titanium, tantalum, Hastelloy, platinum, or other special materials.
Protection: submersible IP68; other types IP65.
Supply: 220 VAC 50 Hz, 24 VDC or battery.
Straight pipe: upstream ≥5D, downstream ≥2D.
In-line connection: GB9119-2000 flanges; other flange standards on request.
Insertion connection: threaded, DN50 ball valve.
Explosion protection: ExdIIBT4.
Relative humidity: 5-95% RH.
Total power consumption: ≤20 W.
Electrical entry: M20 × 1.5 thread.

Selection Guide

1. Confirm the measuring range.
(1) Correct selection is critical. The company attributes two-thirds of application faults to incorrect selection or installation; operating conditions require particular attention.
(2) Select liner and electrodes according to fluid type and maximum, normal and minimum temperatures.
(3) Select pipe size from maximum, normal and minimum flow.
(4) The range must exceed the expected maximum flow; normal flow should be slightly above 50% of full scale.
(5) Actual maximum operating pressure must be below the meter's rated pressure.
(6) Confirm additional functions and accessories with the manufacturer.
(7) Economical clean-water velocity is 1.5-3 m/s. For crystallizing liquids, 3-4 m/s promotes self-cleaning and prevents deposits. For abrasive slurry, 1-2 m/s reduces liner and electrode wear. In practice, velocities seldom exceed 7 m/s and rarely exceed 10 m/s. Below 0.5 m/s, a reduced-bore installation is recommended.
(8) Keep the sensor-converter separation as short as possible. Excessive cable length and distributed capacitance can cause interference; generally do not exceed 100 m.

Liner Material Selection

Liner	Principal properties	Applications
Neoprene	Abrasion resistance, elasticity and tensile strength; resists ordinary dilute acids, alkalis and salts.	<80°C; water, wastewater, mud and mineral slurry.
Polyurethane	Excellent abrasion resistance; limited acid and alkali resistance.	<60°C; neutral, highly abrasive mineral slurry, coal slurry and sludge.
PTFE (F4)	Chemically stable; resists boiling hydrochloric, sulfuric and nitric acids, aqua regia, concentrated alkalis and organic solvents; not chlorine trifluoride or high-temperature oxygen difluoride.	<180°C; concentrated acids, alkalis and other highly corrosive or sanitary media.
FEP (F46)	Chemical stability, insulation, lubricity, non-stick and non-flammable properties similar to PTFE. Better strength, aging resistance, temperature performance, low-temperature flexibility, metal adhesion, abrasion and tear resistance.	<180°C; hydrochloric acid, sulfuric acid, aqua regia, strong oxidants and sanitary media.
Fluoropolymer (Fs)	Lower maximum operating temperature than PTFE, with lower cost (as stated in the original).	Concentrated acids, alkalis, other highly corrosive and sanitary media.

Electrode Material Selection

Select electrodes for the medium's corrosiveness and abrasiveness. Consult corrosion-resistance references for ordinary media; use coupon tests for mixtures such as mixed acids.

Material	Corrosion resistance
316L	Good resistance to nitric acid, <5% sulfuric acid at room temperature, boiling nitric acid, alkalis, sulfurous acid under specified pressure, seawater and acetic acid.
Hastelloy B	Resists hydrochloric, sulfuric, hydrofluoric and organic non-oxidizing acids below their boiling points, alkalis and non-oxidizing salts.
Hastelloy C	Resists oxidizing acids, including nitric acid, mixed acids or chromic/sulfuric acid mixtures, oxidizing salts and seawater.
Titanium	Resists seawater, chlorides, hypochlorites, oxidizing acids (including fuming nitric acid), organic acids and alkalis. Not resistant to pure reducing acids such as sulfuric or hydrochloric acid; oxidants or Fe/Cu ions can greatly reduce attack.
Tantalum	Excellent glass-like corrosion resistance to most chemicals except hydrofluoric and concentrated sulfuric acids; resists boiling hydrochloric and nitric acids and sulfuric acid below 175°C. Not resistant to alkalis.
Platinum/iridium	Resists almost all chemical media, but is unsuitable for aqua regia and ammonium salts.
Tungsten-carbide-coated stainless steel	For non-corrosive, highly abrasive media.

Protection Rating Selection

Enclosure protection is classified under GB4208-84 and IEC529-76 for enclosure protection.
(1) IP65: water-jet protection from any direction; stated test pressure 30 kPa (0.3 bar), flow 12.5 L/min, nozzle 3 m from the instrument.
(2) IP67: temporary full immersion; the highest point at least 150 cm below water for at least 30 minutes.
(3) IP68: continuous underwater operation; maximum immersion depth is agreed between manufacturer and user.
(4) Select the rating for actual installation conditions. Use IP68 where the instrument is below ground and frequently flooded; IP65 may be selected above ground.

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Ordering Codes

Brand	Sep.	Model	DN	Config.	Electrode	Liner	MPa	Supply	Output	Temp.	Grounding	Range	Description
HN													Company code
	-												Undefined separator
		LD											Smart electromagnetic meter
			-XXX										Example: 100 = DN100
				None									Compact in-line
				Z									Remote in-line
				C									Compact insertion
				CF									Remote insertion
					L								316L
					Pt								Platinum (Pt)
					HB								Hastelloy B
					Ta								Tantalum
					Ti								Titanium
					HC								Hastelloy C
					W								Other
						L							Neoprene
						J							Polyurethane
						S							F4 (PTFE)
						Y							F46 (FEP)
						P							PFA
							4.0						DN10-400
							1.6						DN10-600
							1.0						DN10-1000
							0.6						DN10-2000
							0.25						DN10-2200
								E1					220 VAC
								E2					24 VDC
								E3					Battery
									I1				4-20 mA DC, pulse, RS485
									I2				HT
										T1			Standard temperature ≤80°C
										T2			High temperature >80°C
											A		None
											B		Required for lined or non-metallic piping
												XXX	2000 = 20 mA at 2000 m³/h
HN	-	LD	-XXX	Z	L	J	4.0	E1	I1	T1	A	XXX	Complete model example

HN-080 Vortex Flowmeter

HN-080 series piezoelectric/capacitive vortex flowmeters



Overview

The vortex flowmeter is based on Karman vortex theory. Vortex-shedding frequency is proportional to velocity, so instantaneous flow can be calculated from this frequency. Alternating vortices apply stress to the sensing probe; a piezoelectric crystal or differential-capacitance element detects the resulting signal.
Piezoelectric type: a crystal senses the vortex frequency produced as fluid passes a triangular bluff body. The simple, robust construction has no moving wear parts and offers long service life, high accuracy, a wide range and low pressure loss.
Capacitive type: alternating vortex forces act on the two sides of the probe, changing the differential capacitance. An amplifier converts this into electrical flow pulses. The internal construction improves vibration resistance and low-flow measurement. Imported ceramic capacitor substrates are formed at temperatures above 1000°C for high-temperature capability and reliability. The smart sensor is suitable for gases and liquids, automatically tracks the passband, and needs no potentiometer or switch adjustment of frequency band or sensitivity. It provides zero-drift-free operation, freely configurable ranges, on-site operation without tuning, vibration-frequency suppression and linearization.
Used for process metering and energy management of single-phase low-viscosity liquids, gases and steam in petroleum, chemicals, metallurgy, machinery, food, papermaking, district heating, water and gas supply.

Features

Low-power CPU and LCD.
Easy installation and maintenance; verification interval generally two years.
Simple, robust construction with no moving components for reliable long-term service.
Normal turndown 10:1; up to 15:1.

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HN-080 Vortex Flowmeter



Low pressure loss and operating costs improve energy efficiency.
Within a specified Reynolds-number range, the output is independent of changes in medium properties or composition. The meter factor depends only on bluff-body shape and dimensions; replacing parts generally does not require recalibration.
Local display, remote transmission and computer-control networking are available.
The sensing probe does not directly contact the medium, improving stability.
Integrated temperature/pressure compensation and optically isolated current output provide common-mode interference rejection.

Technical Data

Temperature: piezoelectric -25°C to +350°C; capacitive -40°C to +450°C.
Connection: DN15-DN300 wafer or flanged; DN300-DN1000 insertion; larger than DN1000 by special order.
Velocity: steam 7-70 m/s; liquids 0.7-7 m/s; gases 5-35 m/s.
Pressure: PN1.6, 2.5 or 4.0 MPa; higher ratings on request.
Pressure-loss coefficient: Cd ≤2.6.
Accuracy: wafer/flanged Classes 0.5, 1.0 or 1.5; insertion Classes 1.5 or 2.5.
Supply: sensor 12 or 24 VDC; transmitter 24 VDC; local-display type 24 VDC, 12 VDC or 3.6 V lithium battery.
Sensor output: 2-3000 Hz pulses, low level ≤1 V, high level ≥6 V.
Transmitter output: two-wire 4-20 mA DC.
Vibration resistance: piezoelectric ≤0.2g; capacitive ≤2.0g.
Ambient temperature: sensor -30°C to +65°C; local-display transmitter -10°C to +50°C.
Relative humidity: 5-85% RH.
Remote transmission: ≤500 m.
Straight pipe: upstream ≥10D; downstream ≥5D.
Explosion protection: ExiaIICT2-T5, intrinsically safe.
Protection: standard type IP65.
Materials: aluminum-alloy housing and 304 stainless-steel body; special materials on request.

Selection Guide

1. Specify the pipe inside diameter, medium, phase, operating pressure and temperature, and minimum, normal and maximum actual flow (m³/h). Other reference-condition requirements can be configured from the supplied data.
2. Use these parameters and the flow-range table to select the size. The maximum service flow should be at least 50% of the meter's rated maximum flow.

Ordering Codes

Brand	Sep.	Model	Config.	DN	Sensor	T/P comp.	Output	Medium	Mount	Body	Supply	MPa	Temp.	Acc.	Description
HN															Company code
	-														Undefined separator
		080													Smart vortex flowmeter
			Y												Compact
			F												Remote
				-XXXmm											50 = DN50
					B										Piezoelectric
					E										Capacitive
						Y									With temperature/pressure compensation
						N									Without compensation
							F1								Isolated 4-20 mA (load ≤750 ohms)
							F2								Pulse
							F3								RS485/232
							F4								Other
								J1							Liquid
								J2							Gas
								J3							Saturated steam
								J4							Superheated steam
									L1						Wafer
									L2						Flanged
									L3						Simple insertion
									L4						Ball-valve insertion
										C					Carbon steel
										F					Stainless steel
											D1				12 VDC
											D2				24 VDC
											D3				Internal 3.6 V battery
												P1			1.6 MPa / 2.5 MPa / 4.0 MPa — Other pressures: append pressure value after P.
												P2			
												P3			
													T1		Standard: -20°C to +250°C
													T2		High: 100°C to +380°C
														E-XX	E0.5 = Accuracy Class 0.5
HN	-	80	Y	-xxxmm	B	Y	F1	J1	L1	C	D1	P1	T1	E-XX	Complete model example

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HN-060 Liquid Turbine Flowmeter

HN-060 series liquid turbine flowmeter



Overview

The HN-060 turbine flowmeter incorporates advanced domestic and overseas flow-measurement technology in an optimized design. It is simple, light, accurate, repeatable, responsive and easy to install and maintain. It measures liquids in closed pipes that do not attack stainless steels 1Cr18Ni9Ti/2Cr13, corundum (Al2O3) or cemented carbide, contain no fibers or particles, and have operating kinematic viscosity below 5 × 10^-6 m²/s. Higher-viscosity liquids require calibration with the actual liquid. With a suitable display instrument, batch control and overrange alarms are available for flow metering and energy management.

Features

High accuracy: typically ±1% FS or ±0.5% FS.
Short-term repeatability 0.05-0.2%; regular or online calibration can yield high accuracy, supporting custody-transfer use.
Pulse-frequency output for totalization and computer interfacing; no zero drift and strong interference resistance.
High-frequency signals (3-4 kHz) provide high resolution.
Wide range: up to 20:1 for medium/large sizes and 10:1 for small sizes.
Compact and light, with easy installation/maintenance and high flow capacity.
Suitable for high pressure; no openings are needed in the body, simplifying high-pressure construction.

Specifications

1. Basic Parameters

Size / connection	Threaded: DN4, 6, 10, 15, 20, 25, 32, 40. Flanged: DN15, 20, 25, 32, 40, 50, 65, 80, 100, 125, 150, 200.
Accuracy	±1% FS; ±0.5% FS
Turndown	10:1; 15:1; 20:1
Body material	304 or 316(L) stainless steel, etc.
Medium temperature	-20°C to +120°C
Ambient conditions	-10°C to +55°C; 5-90% RH; atmospheric pressure 86-106 kPa
Output	Sensor: frequency pulses, low ≤0.8 V/high ≥8 V. Transmitter: two-wire 4-20 mA DC, three-wire pulses, or four-wire 4-20 mA DC + RS485.
Supply	Sensor: +12 VDC or +24 VDC; transmitter: +24 VDC; local display: internal 3.0 V lithium battery or external +24 VDC.
Signal cable	STVPV 3 × 0.3 (three-wire), 2 × 0.3 (two-wire)
Transmission distance	≤1000 m
Cable entry	Standard: connector or three-core cable; flameproof: M20 × 1.5 female thread
Explosion protection	Standard: non-hazardous type; flameproof: ExdIIBT6
Protection	IP65

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HN-060 Liquid Turbine Flowmeter





Flow Range and Operating Pressure

Size (mm)	Normal flow (m³/h)	Extended flow (m³/h)	Standard connection / pressure	Special flanged pressure (MPa)
DN4	0.04 ~ 0.25	0.04 ~ 0.4	Threaded / 6.3 MPa	10、16、25
DN6	0.1~ 0.6	0.06~ 0.6	Threaded / 6.3 MPa	10、16、25
DN10	0.2~1.2	0.15 ~ 1.5	Threaded / 6.3 MPa	10、16、25
DN15	0.6~ 6	0.4 ~ 8	Threaded / 6.3 MPa Flanged / 2.5 MPa	4.0、6.3、10、16、25
DN20	0.8 ~ 8	0.45 ~ 9	Threaded / 6.3 MPa Flanged / 2.5 MPa	4.0、6.3、10、16、25
DN25	1 ~10	0.5 ~10	Threaded / 6.3 MPa Flanged / 2.5 MPa	4.0、6.3、10、16、25
DN32	1.5 ~15	0.8 ~ 15	Threaded / 6.3 MPa Flanged / 2.5 MPa	4.0、6.3、10、16、25
DN40	2 ~20	1 ~20	Threaded / 6.3 MPa Flanged / 2.5 MPa	4.0、6.3、10、16、25
DN50	4~40	2~ 40	Flanged / 2.5 MPa	4.0、6.3、10、16、25
DN65	7~70	4 ~70	Flanged / 2.5 MPa	4.0、6.3、10、16、25
DN80	10 ~100	5 ~100	Flanged / 2.5 MPa	4.0、6.3、10、16、25
DN100	20 ~ 200	10 ~200	Flanged / 2.5 MPa	4.0、6.3、10、16、25
DN125	25~250	13 ~250	Flanged / 1.6 MPa	2.5、4.0、6.3、10、16
DN150	30 ~300	15 ~300	Flanged / 1.6 MPa	2.5、4.0、6.3、10、16
DN200	80 ~ 800	40 ~ 800	Flanged / 1.6 MPa	2.5、4.0、6.3、10、16

Instrument Types

1. By function, the HN-060 series includes turbine flow sensors/transmitters and smart compact turbine flowmeters.
2. Sensors/transmitters have no local display. They remotely transmit either pulses or a 4-20 mA flow signal. Their low cost, high integration and compact size suit secondary displays, PLCs, DCSs and other computer-control systems.
Depending on output, the types are HN-060-□N and HN-060-□A.
HN-060-□N sensor: 12-24 VDC supply, three-wire pulse output, high level ≥8 V and low level ≤0.8 V; signal transmission ≤1000 m.
HN-060-□A transmitter: 24 VDC supply, two-wire 4-20 mA output; transmission ≤1000 m.
Both are available in standard and flameproof (ExdIIBT6) versions, as illustrated below.



Standard sensor/transmitter



Flameproof sensor/transmitter



智Smart compact turbine flowmeter

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Smart Compact Turbine Flowmeter

This smart instrument combines a turbine sensor, display and totalizer using an ultra-low-power microcontroller. The dual-line LCD provides clear local readings in a compact, reliable, interference-resistant and lightning-resistant design with low cost. A three-point meter-factor correction and smart nonlinearity compensation are provided, with on-site adjustment. The backlit LCD displays instantaneous flow (four significant digits) and total flow (eight significant digits). Data are retained for ten years after power loss. Explosion-protection rating: ExdIIBT6.
Versions by supply/output are HN-060-□B and HN-060-□C. The B type uses a 3.2 V, 10 Ah lithium battery for more than two years of continuous operation and has no remote output. The C type uses external 24 VDC and provides standard two-wire 4-20 mA output; RS485 or HART can be added to meet site requirements.

Ordering Codes

MODEL									DESCRIPTION
HN									
Nominal size	4								4mm
	6								6mm
	10								10mm
	15								15mm
	20								20mm
	25								25mm
	32								32mm
	40								40mm
	50								50mm
	65								65mm
	80								80mm
	100								100mm
	125								125mm
	150								150mm
	200								200mm
Type		N							Sensor: +12/24 V; three-wire pulses
		A							Transmitter: +24 V; two-wire 4-20 mA
		B							Smart: lithium battery, local display, no output
		C							Smart: +24 V; local display + two-wire 4-20 mA
		C1							Smart: +24 V, local display, RS485
		C2							Smart: +24 V, local display, HART
Accuracy class			05						Accuracy Class 0.5
			10						Accuracy Class 1.0
			02						Class 0.2 (by agreement; longer lead time)
Turbine range				W					Extended range
				S					Standard range
Material					S				304 stainless steel
					L				316(L) stainless steel
Explosion protection						N			Non-hazardous version
						E			Flameproof, ExdIIBT6
Pressure rating							N		Standard pressure (see Table 2)
							H(x)		High pressure (see Table 2)

Note: DN15-DN40 are normally threaded. Add (FL) after the nominal size for flanged connection. Example: a flameproof DN40 diesel meter with local display, remote current output, Class 0.5 accuracy, 304 stainless steel, 16 MPa rating and standard range is HN-060-40(FL)/C/05/S/S/E/H16.

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HN-050 Metal-Tube VA Flowmeter

HN-050 series metal tube float flowmeter



Overview

The standard metal-tube variable-area flowmeter consists of a measuring tube and a local indicator, with optional electrical accessories. It measures liquids and gases.
The variable-area measuring assembly contains a tapered tube and a float. The float moves freely up or down as flow changes, varying the flow area. Magnetic coupling transfers its vertical position to the indicator scale for local reading, with optional remote signals and control.
Used in petroleum, chemicals, power generation, pharmaceuticals, food and water treatment, including difficult environments and a wide range of media.

Features

For small pipes and low flow velocities.
Modular design for easy servicing; normally maintenance-free.
Single-shaft indicator and non-contact magnetic coupling improve signal stability.
Dual-line large LCD shows instantaneous/total flow with optional backlight.
Power-loss protection, data backup and recovery.
All-metal construction resists vibration, pressure, heat and corrosion.
Short straight-pipe requirements.
Suitable for flammable/explosive environments.
Supply options: 24 VDC, 220 VAC or battery.

Technical Data

Flow: water at 20°C, 6-150,000 L/h; air at 101.3 kPa and 20°C, 0.05-4000 m³/h.
Turndown: 10:1 (special type 20:1). Accuracy: Classes 1.5 and 1.0.
Operating pressure: DN15-DN50 PN4.0 MPa (special type 25 MPa); DN80-DN100 PN1.6 MPa (special type 16 MPa). Jacket rating: 1.6 MPa.
Medium temperature: standard -80°C to +220°C; high-temperature type 400°C; PTFE-lined type ≤85°C.
Ambient: pointer type -40°C to +120°C; remote type -30°C to +65°C.

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HN-050 Metal-Tube VA Flowmeter



Medium viscosity: DN15 ≤5 mPa·s (H15.1-H15.3), ≤30 mPa·s (H15.4-H15.9); DN25 ≤250 mPa·s; DN50-DN150 ≤300 mPa·s.
LCD: instantaneous flow 0-50,000; total flow 0-99,999,999.
Output: two-wire 4-20 mA; pulse output minimum interval 50 ms.
Alarms: high/low instantaneous flow. Standard: open collector, maximum 100 mA at 30 VDC, internal impedance 100 ohms. Special: relay contacts, maximum 5 A at 250 VAC.
Supply: standard 24 VDC (10.8-36 VDC); AC type 220 VAC (85-265 VAC).
Connection: standard DIN2501 flanges; special flange standards supplied by user. Threaded type: DIN11851 or specified by user.
Electrical entry: M20 × 1.5, PG11, 1/2-inch NPT.
Protection: IP65.
Explosion protection: intrinsically safe ExiaIICT3-6; flameproof ExdIIBT3-6.

Ordering Data

1. Flow Range Table

Size (mm)	Float No.	Float materials: 1□ = R0, R1, RL, HC, Ti			2□ = PTFE		
		Water (L/h)		Air (m³/h)	Pressure loss (kPa)		
口径(mm)	浮子号	1□	2□	1□	Water 1□	Water 2□	Air 1□
DN15	15BF-1	25		0.7	6.5		7.1
	15BF-2	40	25	1.1	6.5	5.5	7.2
	15BF-3	60	40	1.8	6.6	5.5	7.3
	15BF-4	100	60	2.8	6.6	5.6	7.5
	15BF-5	150	100	4.0	6.8	5.6	8.0
	15BF-6	250	150	7.0	7.2	5.6	10
	15BF-7	400	250	10	8.6	6.1	10.8
	15BF-8	600	400	16	11.1	7.3	14.0
DN25	25BF-1	1000	600	30	7.0	5.5	7.7
	25BF-2	1500	1000	45	8.0	5.6	8.8
	25BF-3	2500	1500	70	10.8	6.4	12.0
	25BF-4	4000	2500	110	15.8	6.8	19
	25BF-5	6000	4000	180	20.0	10.0	25.0
	25BF-6	10000	6000	250	24.2	14	29.5
DN50	50BF-1	6000	4000	180	8.1	6.8	8.6
	50BF-2	10000	6000	280	11.0	8.8	10.4
	50BF-3	15000	10000	500	17.0	13.7	15.5
	50BF-4	25000	15000	1000	28.0	18.5	22
DN80	80BF-1	25000	15000	1000	8.1	6.3	8.0
	80BF-2	40000	25000	1200	9.5	7.2	14.0
	80BF-3	60000	40000	1800	10.0	7.9	25.0
DN100	100BF-1	60000	40000	2000	15.0	12.0	38.0
	100BF-2	100000	60000	2500	16.2	12.8	40.5
DN150	150BF-1	100000	80000	4000	19	16	42
	150BF-2	150000	100000	4500	22	17.3	44
DN200	200BF-1	150000			25	20	56
	200BF-2	200000			28.5	24	62

2. Ordering Codes

Brand	Sep.	Model	Tube	Wetted	DN	Option	Display	Supply	Ex	Alarm	Description
HN											Company code
	-										Undefined separator
		050									Metal-tube variable-area flowmeter
			11								Bottom inlet / top outlet
			12								Bottom inlet / side outlet
			13								Side inlet / side outlet
			14								Right inlet / left outlet
			15								Left inlet / right outlet
				R0							0Cr18Ni12Mo2Ti
				R1							1Cr18Ni9Ti
				RL							316L
				RP							PTFE liner
				HC							Hastelloy C
				Ti							Titanium alloy
					XX						50 = DN50 mm
						None					None
						T					Jacketed
						Z					Damped
						G					High-temperature
						Y					High-pressure
							M1				Local indicator, square housing, mechanical pointer
							M2				Powered, square housing, pointer + LCD instantaneous/total flow
							M3				Powered, round housing, LCD instantaneous/total flow; no pointer
								None			M1 only
								A			220 VAC; 4-20 mA, optional backlight
								D			Battery; no signal output
								C			24 VDC, two-wire 4-20 mA, no backlight
								D			24 VDC, three/four-wire 4-20 mA; optional backlight
									None		Standard, non-hazardous
									1		Intrinsically safe iaIICT5, square housing
									2		Flameproof dIIBT4, round housing
										None	No alarm or pulse output
										K1	High alarm or one pulse output
										K2	Low alarm or one pulse output
										K3	High/low alarms or two pulse outputs
											M1: reed switch and transistor relay provide alarms
HN	-	050	11	R0	xx	Y	M1	A	1	K1	Complete model example

3. Optional Construction Codes

Code	Construction	When to select
Z	Damped	Gas measurement or unstable inlet pressure
T	Jacketed	Heating or cooling required
G	High-temperature	Temperature ≥220°C
Y	High-pressure	Above the standard pressure rating

4. Wetted Measuring-Tube Materials

Code	Material	Applicable construction
R0	0Cr18Ni12Mo2Ti	11, 12, 13, 14, 15
R1	1Cr18Ni9Ti	11, 12, 13, 14, 15
RL	316L	11, 12, 13, 14, 15
RP	PTFE	11
Ti	Titanium alloy	11
HC	Hastelloy alloy	11

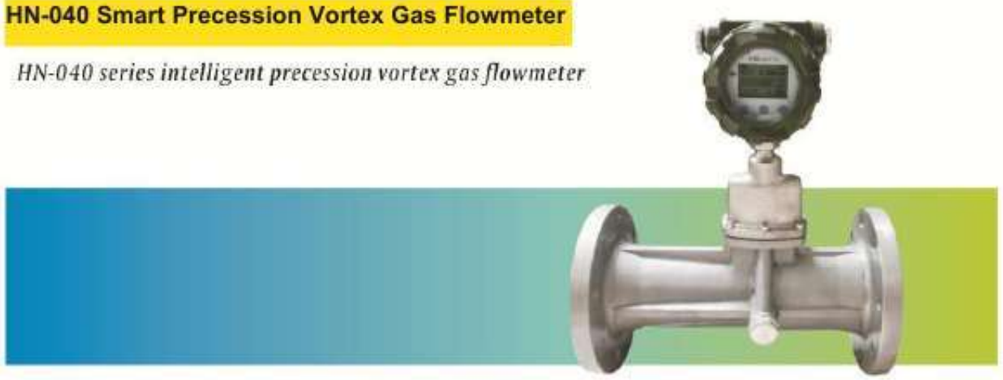
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HN-040 Precession Vortex Gas Flowmeter



HN-040 Smart Precession Vortex Gas Flowmeter

HN-040 series intelligent precession vortex gas flowmeter



Overview

The HN-040 smart precession vortex gas flowmeter uses microprocessor technology for broad functionality, a wide flow range and easy operation, maintenance and installation. Its principal technical specifications are stated to match advanced overseas products. Applications include gas and liquid metering in petroleum, chemicals, power, metallurgy and coal industries.

Features

1. Built-in pressure, temperature and flow sensors in a compact design.
2. Local display of temperature, pressure, instantaneous flow and total flow.
3. Signal-processing amplifiers and filtering suppress interference from pressure fluctuations and pipe vibration, improving stability at low flow.
4. Time display and real-time data storage retain internal data permanently.
5. Very low power consumption allows long-term internal-battery operation without external power.
6. Password protection prevents unauthorized parameter changes.

The series is approved by the National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation (NEPSI) and complies with GB3836.1-2000 and GB3836.2-2000. Flameproof marking: ExdIIBT4.

Specifications

1. Models, Basic Parameters and Performance

Model	DN (mm)	Flow (m³/h)	Pressure (MPa)	Accuracy Class	Notes
HN-040-25	25	2.5~30	1.6;2.5;4.0	1.5	PN ≤1.6 MPa: aluminum-alloy housing. PN ≤4.0 MPa: cast-steel or stainless-steel housing. PN >4.0 MPa: special specification; specify when ordering.
HN-040-32	32	4.5~60			
HN-040-40	40	6~100			
HN-040-50	50	10~150			
HN-040-65	65	17~250			
HN-040-80	80	28~400			
HN-040-100	100	50~800			
HN-040-125	125	100~1500			
HN-040-150	150	150~2250			
HN-040-200	200	360~3600			

Notes: 1. Factory-verified ranges are for air at ambient temperature and pressure, density 1.205 kg/m³.
2. The measuring range increases as operating pressure rises.

2. Reference conditions: P = 101.325 kPa; T = 293.15 K.
3. Operating conditions: ambient -30°C to +60°C; medium -20°C to +80°C; relative humidity 5-95% RH; atmospheric pressure 86-106 kPa.
4. Electrical specifications:
External supply +24 VDC; internal supply 3.6 V lithium battery.
Power consumption: external <1 W; internal <0.3 mW. Battery life exceeds two years.
Outputs: frequency signal and 4-20 mA current signal, corresponding to 0-Qmax; the flow corresponding to 20 mA is user-configurable.
RS485 transmits temperature, pressure, instantaneous flow and total flow.
5. Explosion protection: ExdIIBT4.
6. Protection: IP65.

Selection Guide

1. Select the size for nominal pipe diameter, flow range, nominal pressure, maximum medium pressure, medium temperature and ambient conditions. State the explosion-protection requirements for hazardous areas.
2. The standard version has actual-flow pulse output and RS485; specify other outputs or accessories when ordering.
3. An HN-XMJA-9000 totalizer can provide remote display over RS485 at ≤100 m.
4. Complete the following model specification accurately.

Code	Size (mm)	Flow range (m³/h)
HN-040-25	DN25	2.5~30
HN-040-32	DN32	4.5~60
HN-040-40	DN40	6~100
HN-040-50	DN50	10~150
HN-040-65	DN65	17~250
HN-040-80	DN80	28~400
HN-040-100	DN100	50~800
HN-040-125	DN125	100~1500
HN-040-150	DN150	150~2250
HN-040-200	DN200	360~3600

Code	Output signal
N	No temperature/pressure compensation
Y	Automatic temperature and pressure compensation

Code	Function 1
F1	4-20 mA output (two-wire)
F2	4-20 mA output (three-wire)
F3	RS485 communication interface

Code	Function 2
E1	Class 1.0
E2	Class 1.5
T	Normal temperature
P1	1.6 MPa
P2	2.5 MPa
P3	4.0 MPa
D1	Internal 3.6 V supply
D2	24 VDC supply
D3	12 VDC supply
B1	Stainless steel
B2	Aluminum alloy

HN-040-25 Y F1 E1TP2D2B1

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HN-070 Ultrasonic Flowmeter




HN-070 Ultrasonic Flowmeter

HN-070 series ultrasonic flowmeter

Fixed Remote Ultrasonic Flowmeter



Overview

High accuracy: linearity better than 0.5%, repeatability better than 0.2%, and measurement accuracy better than ±1%.
Wide size range: different sensors cover DN15-DN6000 pipes.
High protection: fully potted waterproof primary unit, rated up to IP68, can operate 2 m underwater.
Easy operation: browse parameters at the primary unit with a magnetic wand, or use the secondary unit's Chinese menus for parameter setting and display.
Multiple displays: the primary unit performs measurement locally and cycles through total flow, instantaneous flow and velocity. The secondary unit provides more than 100 Chinese-language menu items.
Long-distance transmission and easy networking: RS485 connects the primary unit to the secondary unit or a computer using ordinary cable, over distances exceeding 1000 m. This improves interference resistance and addresses the high cable cost, poor noise immunity and short transmission range of conventional remote ultrasonic systems.

System Configuration

Optional main unit



Wall-mounted HN-070SB
Dimensions: 70 × 180 × 56 mm

Clamp-on Measurement



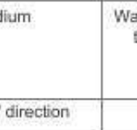
Dedicated ultrasonic cable



Optional main units



Panel-mounted HN-070SS
84 × 168 mm



Flameproof HN-070SD
D IIBT4 installation
285 × 265 × 90 mm

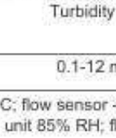
Insertion Measurement



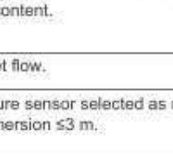
Dedicated ultrasonic cable



In-line Measurement



Dedicated ultrasonic cable



Basic Specifications

Item	Performance / Parameters
Principle	Transit time; low-voltage multipulse transmission and dual-balanced differential reception.
Accuracy	Flow better than ±1%; repeatability 0.2%; measurement cycle 500 ms.
Display	Backlit LCD simultaneously shows instantaneous/total flow, velocity and time.
Outputs	4-20 mA or 0-20 mA; impedance 0-1 kohm, accuracy 0.1%. OCT: forward/reverse/net-total pulses or instantaneous-flow frequency, 1-9999 Hz. Relay: nearly 20 sources including no-signal and reverse-flow status. Audible high/low flow alarms.
Inputs	Three analog current inputs, e.g. temperature, pressure or level.
Logging	Automatically records flow for the previous 64 days, 64 months and 5 years. Records 64 power-on/off events and flow, with manual/automatic compensation, and 64 days of operating status.
Communications / control	RS232, RS485; programmable batch controller.
Dedicated cable	Custom twisted pair, normally <20 m; individual pairs may extend to 500 m in specified conditions (not recommended). RS485 range up to 1 km or more.
Pipe	Steel, stainless steel, cast iron, cement, copper, PVC, aluminum, fiberglass and other dense pipes; liners permitted. Inside diameter 15-6000 mm. Straight pipe: ≥10D upstream, ≥5D downstream; ≥30D from pump outlet.
Medium	Water, seawater, industrial wastewater, acids/alkalis, alcohol, beer and oils: homogeneous liquids that transmit ultrasound. Standard sensor -30°C to +90°C; high-temperature sensor -30°C to +160°C. Turbidity 10,000 ppm with little gas content.
Velocity / direction	0.1-12 m/s; forward, reverse and net flow.
Environment	Main unit -30°C to +80°C; flow sensor -40°C to +160°C. Temperature sensor selected as required. Main unit 85% RH; flow sensors suitable for immersion ≤3 m.
Supply	220 VAC, 8-36 VDC or 7-30 VAC.
Power / protocols	<1.5 W; Modbus, M-Bus, Fuji and other protocols.

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HN-070 Ultrasonic Flowmeter




Fixed Remote Ultrasonic Meter - Ordering Codes

HN-070S
- B Wall-mounted
- S Panel-mounted
- D Flameproof

- 1 Standard TS-1
- 2 Standard TM-1
- 3 Standard TL-1

Example: HN-070S31
Fixed remote ultrasonic meter, wall-mounted display with small TS-1 sensor.

(2) Portable Ultrasonic Flowmeter

Features

High accuracy: better than ±1%; linearity better than 0.5%; repeatability better than 0.2%.
Non-contact measurement: magnetic sensors attach to the outside pipe wall.
Different sensor models cover DN15-DN6000 pipes.
Built-in high-capacity rechargeable nickel-metal-hydride battery supports more than 20 hours of continuous operation.
Built-in printer provides immediate screen printing or scheduled printing of over 20 preset measured values.
The data logger uploads more than 20 preset measurement parameters to a computer or network.



Technical Data

Item	Performance / Parameters
Main unit	2 × 20-character backlit dot-matrix LCD, -20°C to +60°C. Optional 24-column micro thermal printer; 4 × 4 + 2 touch keypad; RS485 data interface.
Sensors	1 TS-1: DN15-100; 2 TM-1: DN50-1000; 3 TL-1: DN300-6000. Fluid temperature <110°C.
Medium	Ultrasound-transmitting liquids: water, seawater, industrial wastewater, acids/alkalis and oils.
Velocity	0.1-12 m/s
Accuracy	Better than ±1%
Supply	NiMH battery for >20 h continuous operation, or 220 VAC
Consumption	2 W
Charging	Smart charging from 220 VAC; stops automatically when full, with green indicator.
Weight	Main unit: 2.0 kg net
Notes	High-strength protective case for outdoor, underground and other harsh locations.

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Portable Ultrasonic Meter - Ordering Codes

HN-070P
- 1 Standard TS-1
- 2 Standard TM-1
- 3 Standard TL-1

Example: HN-070SB1
Portable ultrasonic flowmeter; standard configuration. Optional small TS-1 sensor.

(3) Handheld Ultrasonic Flowmeter

Features

High accuracy: linearity better than 0.5%, repeatability better than 0.2%, accuracy up to ±1%.
Small and light: 210 × 90 × 30 mm; only 0.5 kg.
Non-contact measurement: attach the magnetic sensors to the outside pipe wall.
Different sensors cover DN15-DN6000 pipes.
Built-in high-capacity rechargeable NiMH battery provides more than 12 hours of continuous operation.
Large LCD simultaneously displays total flow, instantaneous flow, velocity and operating status.



Technical Data

Item	Performance / Parameters
Linearity	0.5%
Repeatability	0.2%
Accuracy	±1% of reading at velocity >0.2 m/s
Response time	0-999 s, user-selectable
Velocity range	0.1-12 m/s
Pipe size	15-6000 mm
Totalizer	7-digit forward, reverse and net totals
Liquid	Homogeneous single-phase liquids that transmit ultrasound
Security	Settings locked; unlocking required to change data
Display	4 × 8 Chinese characters or 4 × 16 English characters
Communications	RS232; compatible with Fuji ultrasonic meters and other products on request
Sensor cable	Standard 5 m × 2; optional 10 m × 2
Supply	Three internal AAA NiMH cells; 12 h per charge; 100-240 VAC adapter
Data logger	Built-in logger stores 2000 data rows
Manual totalizer	7 digits; key-start for calibration
Housing	Flame-retardant ABS
Dimensions	210 × 90 × 30 mm
Main-unit weight	0.5 kg

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Handheld Ultrasonic Meter - Ordering Codes

HN-070H
- 1 Standard TS-1
- 2 Standard TM-1
- 3 Standard TL-1

Example: HN-070H1
Handheld ultrasonic flowmeter, standard configuration, with optional small TS-1 sensor.

Sensor Specifications

Sensor option		Size range	Fluid temp.	Accuracy	Supply	Input	Output	Protocol
Clamp-on 	TS-1 (small)	DN15-100mm	-30 ~ 90℃	±1%	Primary: 8-36 VDC Secondary: 220 VAC or 24 VDC	3 analog 4-20 mA inputs 2 three-wire Pt100 inputs	Isolated RS232/RS485 2 isolated OCT outputs 1 isolated passive 4-20 mA output	METER-BUS MODBUS Fuji extended protocol Simple water-meter protocol
	TM-1 (medium)	DN50-1000mm						
	TL-1 (large)	DN300-6000mm						
High-temp. clamp-on 	THS-1 (small)	DN15-100mm	30 ~ 160℃					
	THM-1 (medium)	DN300-1000mm						
Insertion 	TC-1 (standard)	DN80-6000mm	-40 ~160℃					
	TLC-2 (hot tap)							
In-line 	Standard in-line	DN15-1000mm	-40~ 160℃	±0.5%				

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ISO CE MC SIL3

HN Orifice-Plate Flowmeter

HN series orifice plate flowmeter



Overview

The orifice-plate flowmeter combines a standard orifice plate with a multivariable differential-pressure transmitter, or separate differential-pressure, temperature and pressure transmitters. This high-turndown differential-pressure system measures gases, steam and liquids for process control in petroleum, chemicals, metallurgy, power, heating and water supply. It consists of a primary restriction element and secondary transmitter/display instruments, offering simple construction, convenient maintenance and stable performance.

Applications

Applications include petroleum, chemicals, metallurgy, power, heating, water supply, coal, transport, construction, textiles, food, pharmaceuticals, agriculture and environmental protection. Flow instruments serve both process control and material totalization, supporting energy savings, product quality and production management.
The meter can measure single-phase flows and some mixed-phase flows. Two-phase flow may introduce measurement error and water hammer that can damage pipework. With an annular orifice, condensate passes along the edge and the minimum flow area is an annulus next to the pipe wall; a standard concentric orifice has its minimum opening at the center. Impurities often travel along the wall at lower speed. New primary-element designs and improved differential-pressure transmitters and displays have broadened applications.
If a sharp, square-edged orifice inlet becomes bell-mouthed, the discharge coefficient changes and significant errors result, requiring replacement. The product is suitable for high-temperature flow measurement.

Features

Flow contracts locally as it passes the restriction, increasing velocity and creating a static-pressure difference between the upstream and downstream sides. The primary element is simple, robust, reliable, long-lived and economical. Manufacture follows international standards with strict inspection and verification.
As velocity rises, static pressure falls. Greater flow produces greater differential pressure, allowing flow to be determined from the measured pressure difference. This method is based on conservation of energy and continuity of flow.

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Orifice-plate meters measure liquids, gases and steam in pipelines and are widely used in petroleum, chemicals, metallurgy, light industry and coal mining.
The static-pressure difference across the plate increases with flow. A differential-pressure transmitter converts it into a 4-20 mA DC signal for a flow totalizer. A smart mass-flow system compensates for operating temperature and pressure to calculate mass flow.
Hot-blast installations often have short pipe runs and several bends between the stove and blast furnace, making standard orifice measurement inaccurate. The annular design described here uses a pressure-equalizing ring and multiple pressure taps, requiring only 2D of straight pipe. Satisfactory service is reported on more than 30 hot-blast stoves over three years without failure.

Technical Data

High accuracy: ±0.075%.
Stability: better than 0.1% FS/year.
High static pressure: 40 MPa.
Five years of continuous operation without adjustment.
Negligible temperature and static-pressure effects.
High overpressure resistance.

Operating Principle

For known parameters, continuity and Bernoulli's equation establish the relationship between differential pressure and flow. The basic equations are shown below.

$$q_m = \frac{C}{1-\beta_4}\varepsilon\frac{\pi}{4}d^2\sqrt{2\Delta P\times\rho}$$

$$q_v = \frac{q_m}{\rho}$$

C: discharge coefficient, dimensionless.
d: restriction-orifice or throat diameter at operating conditions.
D: upstream pipe inside diameter at operating conditions.
qm: mass flow, kg/s.
qv: volumetric flow, m³/s.
d/D: diameter ratio, dimensionless.
ρ: fluid density, kg/m³.
ε: expansibility factor, dimensionless.

Operating Range

1. Nominal size: 15 mm ≤ DN ≤1200 mm for the orifice steam flowmeter.
2. Nominal pressure: PN ≤40 MPa.
3. Operating temperature: -50°C ≤t ≤550°C.
4. Turndown: 10:1 or 15:1.
5. Accuracy: Classes 0.5 and 1.0.

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Technical Data

Primary element	Pipe DN (mm)	β (d/D)	Application features	Discharge coeff. uncertainty E (%)	Design standard
Corner-tap standard orifice: annular chamber	50–500 50–500	0.2–0.75 0.2–0.75	Clean media; GD construction suits high-temperature/high-pressure service.	0.6–0.75%	ISO5167 GB/T2624–93
Corner-tap standard orifice: clamping ring	50–500	0.2–0.75	Easy to clean; suitable for somewhat dirty fluids.		
Corner-tap standard orifice: inclined drilled taps	450–1000(3000)	0.2–0.75			
Flange-tap standard orifice	50–1000	0.2–0.75	Easy to clean; suitable for various media.	0.6–0.75%	ISO5167 GB/T2624–93
D and D/2-tap standard orifice	50–1000	0.2–0.75			
Corner-tap standard nozzle (ISA1932)	50–500	0.3–0.8	Low pressure loss and long life; especially suitable for steam.	0.8–1.2%	ISO5167 GB/T2624–93
Long-radius nozzle	50–630	0.2–0.8	Low pressure loss and long life; LGP long-radius nozzle for high-parameter water and steam.	2.0%	ISO5167 GB/T2624–93
Classic Venturi: machined	100–800	0.2–0.8	Lower pressure loss and shorter straight-pipe requirements than orifices or nozzles.	1.0%	ISO5167 GB/T2624–93
Classic Venturi: rough welded sheet	200–1200(2000)	0.4–0.7		1.5%	
Venturi nozzle	65–500	0.316–0.77	Lower pressure loss and shorter straight-pipe requirements than orifices or nozzles.	1.2–1.75%	ISO5167 GB/T2624–93
Quarter-circle orifice	25–150	0.245–0.6	Low Reynolds-number service.	2.0–2.5%	DIN BS
Conical-entrance orifice	25–250	0.1–0.316	Low Reynolds-number service.	2.0%	BS
Segmental orifice	50–1500	0.32–0.8	Dirty fluids, gas evolution or suspended solids.	1.5%	DIN
Eccentric orifice	100–1000	0.46–0.84		1–2%	ASME
Small-bore orifice	12.5–40	0.2–0.75	Small-bore pipes.	0.75%	ASME
Lens orifice	12.5–150	0.2–0.75	High-pressure, ambient-temperature small pipes.	0.6–0.75%	ISO5167ASME
End orifice	≥15	0.2–0.62		1.5–2.0%	
Double orifice	25–400	0.2–0.8	High flow rates.		

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Technical Data

Model	Description
HN6150	Differential-pressure primary element (orifice flowmeter)

Code	Two basic structural categories
K	Orifice plate
P	Nozzle, etc.

Code	Nominal pressure (10^5 Pa)
2.5	2.5
10	10
16	16
25	25
64	64
100	100
200	200

Code	Size (mm)
10~1600	10~1600mm

Code	Primary-element configuration
H	Standard orifice (annular chamber)
Y	Standard orifice (flange taps)
K	Standard orifice (drilled taps)
I	ISA1932 nozzle
L	Long-radius nozzle
W	Venturi nozzle
G	Classic Venturi
S	Double orifice
Q	Segmental orifice
Z	Conical-entrance orifice
R	Quarter-circle orifice
P	Eccentric orifice
N	Integral (built-in) orifice
X	Wedge primary element
T	Other special primary elements

Code	Medium
1	Liquid
2	Gas
3	Steam
4	High-temperature liquid

Code	Compensation
N	No pressure/temperature compensation
P	Pressure-compensated output
T	Temperature-compensated output
Q	Pressure/temperature-compensated output

Code	Transmitter DP range
0	Micro DP
1	Low DP
2	Medium DP
3	High DP

Code	Local display
W	Primary-element sensor
X	Smart primary-element flowmeter

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HN Glass-Tube Variable-Area Flowmeter

HN series glass rotameter



Overview

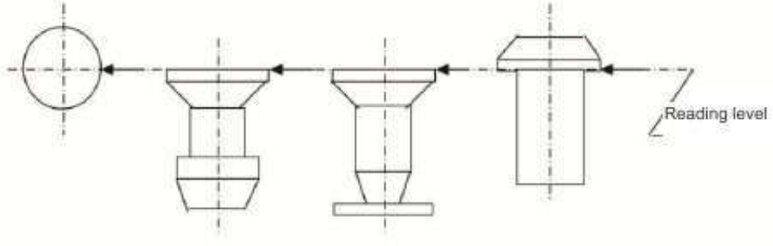
The glass-tube variable-area flowmeter measures clear liquids, gases and other single-phase media. It offers simple construction, convenient operation and maintenance, and low cost. Applications include chemicals, petroleum, light industry, pharmaceuticals, fertilizers, synthetic fibers, power, metallurgy, food, sugar, fuels, papermaking, environmental protection and research.

Applications

The HN series measures single-phase, non-pulsating liquid or gas flow in chemicals, light industry, pharmaceuticals, food, papermaking, environmental protection, metrology/testing and research.

Operating Principle

The measuring assembly consists of a vertically mounted tapered glass tube and a float. The wider end faces upward. Fluid flowing upward creates a pressure difference across the float and lifts it. The float stabilizes when this upward force balances the resultant of gravity, buoyancy and viscous force. Float height then corresponds to flow rate.
Read the flow scale on the tapered tube at the positions indicated in the diagram.



Glass-tube flowmeter reading positions

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The company's flowmeters are available in panel, replaceable-tube and fixed-tube constructions, depending on size.
Panel type (Figure 2): DN4, DN6 and DN10. The support plate (2), lower base with needle valve (9), and upper base (3) form the main supports. The valve adjusts flow. Inlet/outlet nipples connect to hoses, and two threaded holes in the support plate secure the meter.
Replaceable type (Figure 3): DN15, DN25 and DN40. Flanged bases (1), packing (8), two support plates (6) and compression covers (7) hold and seal the tube. Stainless-steel or plastic sleeves improve corrosion resistance. Remove eight bolts (9), four at each end, to take out the tube for cleaning or replacement.
Fixed type (Figure 4): DN50, DN80 and DN100. Similar to the replaceable type, but without internal sleeves and with no separately removable tube. A central guide rod stabilizes float movement at high flow and protects the tube.

Basic Parameters

1. Applicable standard: ZBY138-83, Glass-Tube Variable-Area Flowmeters.
2. Ambient conditions:
(1) Temperature: -10°C to +50°C.
(2) Relative humidity: ≤95%.
(3) No strongly corrosive gases around the meter.
3. Normal operating conditions:
(1) Single-phase, steady, non-pulsating flow filling the pipe.
(2) Maximum deviation of the meter axis from vertical: 2° for Classes 1.0 and 1.5; 5° for accuracy classes below 1.5.
(3) Fluid temperature: -20°C to +60°C (standard); 0°C to +120°C (high-temperature). Operating pressure: see the table.
(4) No mechanical vibration.

Nominal size (mm)	4、6、10	15~100
Accuracy	1.5%、2.5%、4%	1.5%、2.5%

Performance Data

Model	DN (mm)	Liquid (L/h)	Gas (m³/h)	Pressure (MPa)
HN-4	Φ4	1~10	0.016~0.16	≤1
		1.6~16	0.025~0.25	
		2.5~25	0.04~0.4	
HN-6	Φ6	2.5~25	0.04~0.4	
		4~40	0.06~0.6	
		6~60	0.1~1	
HN-10	Φ10	6~60	0.1~1	
		10~100	0.16~1.6	
		16~160	0.25~2.5	
HN-15	Φ15	16~160	0.25~2.5	≤0.6
		25~250	0.4~4	
		40~400	0.6~6	

Model	DN (mm)	Liquid (L/h)	Gas (m³/h)	Pressure (MPa)
HN-25	Φ25	40~400	1~10	≤0.6
		60~600	1.6~16	
		100~1000	2.5~25	
HN-40	Φ40	160~1600	4~40	
		250~2500	6~60	
HN-50	Φ50	400~4000	10~100	≤0.4
		600~6000	16~160	
HN-80	Φ80	1000~10000	50~250	
		1600~16000	80~400	
HN-100	Φ100	5000~25000	120~600	
		8000~40000	200~1000	

HN Mass Flowmeter

HN series mass flowmeter



Overview

The mass flowmeter directly measures the mass flow of the medium, measures density, and indirectly measures temperature. Its microcontroller-based smart transmitter derives more than ten additional parameters from these three basic quantities, with flexible configuration, broad functionality and good value.
When pressure and temperature vary widely, volumetric flow alone can cause large errors because density changes. In positive-displacement and differential-pressure measurement, for example, a 30% density change causing a 30-40% flow error. Greater automation has increased demand for mass measurement. Chemical reactions depend on material mass rather than volume; the heating and cooling effects of steam and air are proportional to mass flow. Strict product-quality control, precise cost accounting, and aircraft and missile fuel control also require accurate mass-flow measurement.

Measuring Principle

The meter uses thermal sensing to determine flow from the mass of molecules carrying away heat. Gas temperature and pressure changes do not affect the result. It is accurate, fast, reliable, efficient, stable and flexible, with broad applications in petroleum processing and chemicals.
A mass flowmeter measures liquid or gas mass flow and transmits the value as analog voltage, current or serial data. A mass-flow controller both measures and controls flow: an electromagnetic control valve or piezoelectric valve forms a closed control loop with the measuring section. Its setpoint can be supplied by analog voltage/current or by a computer or PLC.

Features

1. Suitable for multiple media.
2. High measurement accuracy.
3. No straight-pipe requirement.
4. High reliability.
5. Low maintenance requirement.
6. Core processing unit.

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Technical Data

Main Parameters
Mass-flow accuracy: ±0.002 × flow ± zero drift.
Density accuracy: ±0.003 g/cm³.
Density range: 0.5-1.5 g/cm³.
Temperature accuracy: ±1°C.

Sensor
Ambient temperature: -40°C to +60°C.
Medium temperature: -50°C to +200°C.
Explosion-protection type: iBIIBT3.
Associated apparatus: matching transmitter.

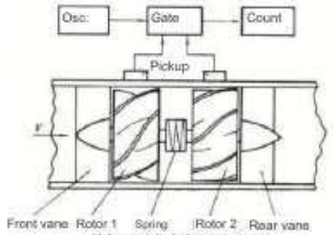


Fig. 3 Dual-impeller mass meter

Transmitter
Operating temperature: 0°C to +60°C.
Relative humidity: below 95%.
Supply: 220 VAC ±10%, 50 Hz, or 24 VDC ±5%; 40 W.

Calorimetric mass flowmeter: with the fluid stationary, thermocouples arranged symmetrically on both sides of a heat source indicate equal temperatures. A bypass design divides the main passage into many fine channels and routes one channel past a sensor mounted outside the bypass tube. This isolates the sensing element from the medium, but response and accuracy are somewhat lower. Improved manufacturing has increased accuracy and repeatability.
Dual-orifice differential-pressure mass flowmeter: two identical orifices are installed at A and B. Two identical constant-flow pumps in bypass branches produce equal, opposite volumetric flows q. The differential-pressure relationship is $\Delta P = P1 - P3 = 4K\rho Qq$, proportional to density ρ and volume flow Q; ρQ is mass flow, and K is constant.
Figure 3 shows a dual-impeller mass flowmeter. Two coaxial impellers with different blade angles are joined by a spring. Their torque difference twists the spring through angle α, proportional to the product of mass flow M and angular frequency ω: α is proportional to Mω. Measuring the time associated with angular displacement gives M. Two electromagnetic pickups are mounted on the housing: a pulse from the first impeller starts counting and a pulse from the second stops it. The reference counter frequency determines time t and thus M.
Indirect mass-flow measurement has three main forms: velocity meter plus density meter; restriction (or target) meter plus positive-displacement meter; and restriction (or target) meter plus density meter.
A microcomputer-based mass-flow instrument, also called a mass-flow computer, accepts density, flow (from turbine or restriction meters), specific gravity, temperature, pressure and heat signals.

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HN Balanced Flowmeter

HN series balanced flowmeter



Overview

The balanced flowmeter is a differential-pressure instrument. The design originated from NASA's 2003 liquid-oxygen measurement work for the Space Shuttle main engine, using flow-simulation techniques. A distinctive equal-Reynolds-number design, increased primary-element thickness and precise machining provide Venturi-like flow behavior in a simple, safe construction. A relatively low permanent pressure loss produces a large, stable differential pressure with short straight-pipe requirements, supporting accurate long-term measurement.
Unlike a conventional single-opening restriction, the balanced design also conditions the flow. Its operating principle remains differential-pressure measurement. From 2003, NASA commissioned A+ Flow to develop industrial and commercial applications; balanced meters subsequently entered natural gas, refining, chemicals and power applications in the United States. At the end of 2006, A+ Flow and a Chinese instrument company established an Asia-Pacific manufacturing base in Shanghai and obtained a Chinese utility-model/invention patent.
The principle is energy conversion in a closed pipe. For ideal flow, flow rate is proportional to the square root of differential pressure, and Bernoulli's equation gives the flow.
The sensor is a perforated disk installed across the pipe. Each opening's size and distribution are determined by special equations and test data; these are called functional openings. As fluid passes through them, the flow is balanced and conditioned, vortices are minimized, and a stable differential-pressure signal is obtained for calculating volumetric and mass flow.

Applications

Balanced meters improve on conventional restriction devices where accuracy, production requirements or calculation methods limit performance. They can measure gases, liquids, gas-liquid two-phase flows, liquefied gases, bidirectional flows, dirty media and slurries.
They do not completely replace conventional restriction devices. Their multiple functional openings balance and condition the flow more effectively than a single-opening restriction, making fuller use of differential-pressure measurement.
The design is broadly applicable to industrial flow measurement, including automation, process control, petroleum and petrochemicals, metallurgy, thermal power generation, natural gas and water treatment.

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HN Balanced Flowmeter



Features

1. High measurement accuracy
The perforated sensor balances the flow field and reduces vortices, vibration and signal noise. Precision pipework and dedicated pressure taps improve accuracy by a factor of 5-10 over conventional restrictions. Actual-flow calibration achieves ±0.3% or ±0.5% for custody-transfer applications; dimensional verification achieves ±0.5% or ±1.0% for process control. High manufacturing repeatability permits dimensional verification based on actual-flow calibration data.

2. Short straight-pipe requirements
The sensor balances and stabilizes flow, with pressure recovery twice as fast as conventional restrictions. Straight runs can often be as short as 0.5D-2D, reducing costs for special or expensive piping.

3. Low permanent pressure loss
The symmetrical design reduces vortices, turbulent friction and kinetic-energy loss. Under comparable conditions, pressure loss is 70% lower than conventional restrictions and close to a Venturi, reducing operating costs.

4. Wide turndown
For Reynolds numbers above 50,000, suitable opening parameters allow a very broad measuring range. Standard turndown is 10:1; selected configurations can achieve 30:1 or more.

5. Repeatability and long-term stability
A stable flow field supports repeatability up to ±0.1%. The openings distribute loads and avoid sharp-edge wear, keeping β stable over time. With no moving parts, service life is 5-10 times that of conventional restrictions.

6. Fouling resistance
The perforated, symmetrical design reduces turbulent shear, vortices and dead zones. Dirty media can pass through several openings, reducing blockage risk.

7. Broad measuring range
Test results cover low velocities up to sonic velocity, with minimum Reynolds numbers as low as 200 and maximum values above 10^7. Selectable β: 0.25-0.9.

8. Operating range
Temperature and pressure limits depend on pipe/flange materials and ratings, up to 850°C and 42 MPa. Suitable cryogenic media include LNG, liquid air, liquid ammonia, liquid oxygen, liquid argon, liquefied ethylene, liquid hydrogen and liquid chlorine. The design helps prevent vaporization. Gas-liquid two-phase flow, slurry and even solid particles can be measured. Left-right symmetry also permits bidirectional measurement.

Operating Principle

The balanced flowmeter is a differential-pressure instrument with improved design and performance, retaining the energy-conversion principle used by other differential-pressure meters. For ideal flow in a closed pipe, flow is proportional to the square root of differential pressure and is calculated using Bernoulli's equation.
A perforated disk spans the pipe. Opening sizes and distribution are customized from special equations and test data. The openings balance and condition the flow, minimize vortices and provide a stable differential-pressure signal for calculating volumetric or mass flow. Balanced meters and conventional restriction devices continue to coexist as industrial requirements develop.

Technical Data

Size: DN15-DN3000.
Accuracy: ±0.3%, ±0.5% or ±1%.
Straight pipe: 0.5D-2D.
Permanent pressure loss: 1/3-1/4 of an orifice plate.
Turndown: 10:1; wider for suitable conditions.
Repeatability: 0.1%.
Reynolds number: 200-10^7.
β: 0.25-0.9.
Temperature: pipe-material limit; up to 850°C.
Pressure: pipe-material limit; up to 42 MPa.
Fouling resistance: specialized design/calculation.
Bidirectional measurement.

Ordering Codes

Nominal size		100 = DN100	
Installation	PP	In-line	
	HF	Wafer	
	FW	Welded	
	DF	Double-flanged	
	SP	Square duct	
Nominal pressure	A	0~0.6MPA	
	B	0~1.0MPA	
	C	0~1.6MPA	
	D	0~2.5MPA	
	E	0~4.0MPA	
	F	0~6.4MPA	
	G	0~10MPA	
	H	0~16MPA	
	J	0~40MPA	
Pipe material	0	Carbon steel	
	1	304 stainless steel	
	2	12CrMOV	
3	Other		
Input signal	A	No output	
	B	4~20MA	
	C	RS485 / Modbus	

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HN Oval-Gear Flowmeter





HN Oval-Gear Flowmeter

HN series oval-gear flowmeter



Overview

The oval-gear flowmeter is a precision direct-reading positive-displacement instrument for total liquid volume in pipelines. Mechanical or electronic counters can show total flow, instantaneous flow and resettable readings, with local display or remote control. Materials such as cast steel, stainless steel and 316 can be selected for acids, alkalis, organic liquids, oils and food products. Applications include chemicals, petroleum, pharmaceuticals, power, metallurgy and food. Signal-output versions work with the company's HB-908 totalizers for centralized monitoring, standard signal output, automatic control, data processing and computer networking.
This compact meter combines pointer indication, mechanical totalizing wheels and a reset mechanism. It is used for liquid-flow control, including crude oil, diesel and gasoline, offering broad range, high accuracy and convenient operation/maintenance. Different materials suit petroleum, chemicals, pharmaceuticals, food, metallurgy, power and transport.
A measuring chamber, two oval gears and upper/lower covers form crescent-shaped cavities. These are not completely sealed during rotation. The inlet-outlet pressure difference turns the gears and transfers measured liquid to the outlet. Total liquid volume equals the number of gear revolutions multiplied by four times the individual cavity displacement.

Operating Principle

Also known as a positive-displacement (PD) meter, the oval-gear meter is especially suitable for high-viscosity liquids. Mechanical elements repeatedly divide the flow into known volumes; counting successive filling and emptying cycles gives total volume.
Measurement is independent of flow profile because the liquid's pressure head drives the gears. Higher viscosity reduces leakage through gear/chamber clearances, decreasing leakage error and improving measurement.
The meter provides high accuracy for viscous liquids, but is unsuitable for liquids containing solid particles, which can jam the gears. Entrained gas also causes measurement errors.

Features

1. High accuracy: Classes 0.2 and 0.5.
2. Simple, robust and reliable mechanism.
3. Particularly suitable for high-viscosity media; relatively insensitive to changes in liquid viscosity.
4. Easy installation; no straight runs are needed, even near valves, bends, reducers or expanders.
5. HN-a cast-iron type: oils and other liquids that do not attack cast iron.
6. HN-e cast-steel type: high-pressure, low-corrosivity media.
7. HN-b type: corrosive liquids such as acids, alkalis, salts and organic compounds.
8. Fit an upstream filter to prevent impurities from jamming the gears.
9. Explosion protection: ExiaIICT6.

Materials

Housing options: aluminum, stainless steel, cast steel, PPS and bronze.
Rotor options: aluminum, cast iron, stainless steel, copper, Hastelloy and graphite.
Bearing options: graphite, ceramic, cemented carbide, bronze and sealed stainless-steel bearings.
O-ring options: VITON, neoprene, stainless steel and PTFE.
Mechanical or electronic counters; pulse, 4-20 mA, RS485 and HART outputs.

Flow Range and Operating Pressure

Nominal size (mm)	8-250
Accuracy	Classes 0.2 and 0.5
Pressure loss	80 kPa at 0-1000 mPa·s
Operating pressure	1.6, 2.5, 4.0, 6.3, 10, 16, 25 or 42 MPa
Temperature	-20°C to +300°C
Medium viscosity	0.1-1000 mPa·s
Ambient	-30°C to +70°C; 5-95% RH; 86-106 kPa
Flanges	National standard; other standards as specified by user
Explosion protection	Intrinsically safe iaIICT4; flameproof dIIBT4

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Standard cast iron (A), cast steel (E), stainless steel (B)

Model	HQLC-A cast iron		HQLC-E cast steel		HQLC-B stainless	
Nominal pressure (MPa)	1.0 1.6		2.5 4.0 6.4		1.0 1.6	
Liquid viscosity	2 — 200 mPa.s					
Liquid temperature	-20℃ ~ +100℃					
Flow range (m³/h)						
DN (mm)	0.5	0.2	0.5	0.2	0.5	0.2
10	0.04 ~ 0.4	0.1 ~ 0.4	0.04 ~ 0.4	0.1 ~ 0.4	0.1 ~ 0.5	0.1 ~ 0.5
15	0.25 ~ 1.5	0.3 ~ 1.5	0.6 ~ 3	1.2 ~ 6	3 ~ 15	4.8 ~ 24
20	0.5 ~ 3	0.25 ~ 1.5	0.5 ~ 3	1 ~ 6	2.5 ~ 15	4 ~ 24
25	1 ~ 6	0.3 ~ 1.5	0.6 ~ 3	1.2 ~ 6	3 ~ 15	4.8 ~ 24
40	2.5 ~ 15	0.3 ~ 1.5	0.6 ~ 3	1.2 ~ 6	3 ~ 15	4.8 ~ 24
50	4 ~ 24	0.3 ~ 1.5	0.6 ~ 3	1.2 ~ 6	3 ~ 15	4.8 ~ 24
65	5 ~ 40	8 ~ 40	5 ~ 40	8 ~ 40	8 ~ 40	8 ~ 40
80	10 ~ 60	12 ~ 60	10 ~ 60	16 ~ 100	32 ~ 190	34 ~ 340
100	16 ~ 100	20 ~ 100	12 ~ 60	20 ~ 100	38 ~ 190	68 ~ 340
150	32 ~ 190	38 ~ 190	12 ~ 60	20 ~ 100	38 ~ 190	68 ~ 340
200	34 ~ 340	68 ~ 340	12 ~ 60	20 ~ 100	38 ~ 190	68 ~ 340

Nominal pressure (MPa)	1.0 1.6		2.5 4.0 6.4		1.0 1.6	
Liquid viscosity	2 -200 mPa.s					
Liquid temperature	-20℃ ~ +100℃					
Flow range (m³/h)						
Model	LC-A cast iron		LC-E cast steel		LC-B stainless	
DN (mm)	0.5	0.2	0.5	0.2	0.5	0.2
10	0.04 ~ 0.4	0.1 ~ 0.4	0.04 ~ 0.4	0.1 ~ 0.4	0.1 ~ 0.5	0.1 ~ 0.5
15	0.25 ~ 1.5	0.3 ~ 1.5	0.25 ~ 1.5	0.3 ~ 1.5	0.3 ~ 1.5	0.3 ~ 1.5
20	0.5 ~ 3	0.6 ~ 3	0.5 ~ 3	0.6 ~ 3	0.6 ~ 3	0.6 ~ 3
25	1 ~ 6	1.2 ~ 6	1 ~ 6	1.2 ~ 6	1.2 ~ 6	1.2 ~ 6
40	2.5 ~ 15	3 ~ 15	2.5 ~ 15	3 ~ 15	3 ~ 15	3 ~ 15
50	4 ~ 24	4.8 ~ 24	4 ~ 24	4.8 ~ 24	4.8 ~ 24	4.8 ~ 24
65	5 ~ 40	8 ~ 40	5 ~ 40	8 ~ 40	8 ~ 40	8 ~ 40
80	10 ~ 60	12 ~ 60	10 ~ 60	12 ~ 60	12 ~ 60	12 ~ 60
100	16 ~ 100	20 ~ 100	16 ~ 100	20 ~ 100	20 ~ 100	20 ~ 100
150	32 ~ 190	38 ~ 190	32 ~ 190	38 ~ 190	38 ~ 190	38 ~ 190
200	34 ~ 340	68 ~ 340	34 ~ 340	68 ~ 340	68 ~ 340	68 ~ 340

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HN Density Flowmeter

HN series density flowmeter



Overview

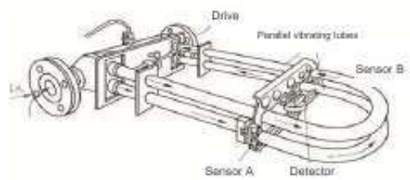
The density/mass flowmeter uses the Coriolis effect: fluid mass flow modulates the oscillation of vibrating tubes. Normally comprising a sensor and transmitter, it measures mass flow and total mass, density, volumetric flow and total volume, temperature, water content, alcohol strength, the concentration of a well-mixed two-liquid blend, and process-material proportions.

Features

Direct measurement of liquid mass flow provides high accuracy and repeatability over a wide range; mass-flow accuracy is 0.1-0.2%.
Stable and reliable: no obstructions or moving parts inside the measuring tubes, supporting long service life.
Broad fluid compatibility: measures ordinary and high-viscosity homogeneous fluids, such as honey and oil slurry, and can measure single solutions and multiphase flows. Laminar or turbulent flow does not affect the stated accuracy.
Applications include petrochemicals, chemicals, metallurgy, pharmaceuticals, paper, food, energy and environmental protection for process monitoring/control and custody transfer.
Real-time online measurement includes density and temperature as well as mass flow. The smart transmitter provides multiparameter display and control.

Operating Principle

1. High accuracy and repeatability.
2. Turndown 10:1 without software correction.
3. Self-conditioning: 1-3D upstream, 0-1D downstream; low pressure loss.
4. Self-cleaning for dirty fluids, particles, low-pressure fluids and wet gases.



5. Self-protection prevents wear of critical primary-element parts and maintains long-term stability.
6. Resistant to high temperature, high pressure, corrosion and vibration.
7. Wide media and flow coverage: liquids, gases and steam; DN15-DN3000.

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Technical Data

Measurement functions: instantaneous and total mass flow, instantaneous and total volumetric flow, temperature, density, and concentration of two-component liquids. Values can be displayed, output, stored and transmitted remotely.
Accuracy: ±0.1% to ±0.2%.
Repeatability: ±(1/2) × [0.2% (zero stability / instantaneous mass flow × 100%)].
Ambient temperature: -20°C to +50°C.
Medium temperature: -20°C to +250°C.
Temperature accuracy: ±1°C.
Density range: 0.2-3.5 g/cm³.
Density accuracy: ±0.002 g/cm³.
Supply: 24 VDC / 220 VAC.
Current output: 4-20 mA for industrial control.
Frequency output: 0-10 kHz for industrial control.
Batch control: normally open relay contact, rated 24 V / 0.1 A.
Communications: RS485 for computer data exchange and network control.

Flow Range

Model	Size (mm)	Flow range (kg/h)
HN-003	3	0~150~180
HN-006	6	0~600~720
HN-008	8	0~960~1200
HN-010	10	0~1800~2100
HN-015	15	0~3600~4500
HN-020	20	0~6000~7200
HN-025	25	0~9000~12000
HN-032	32	0~18000~21000
HN-040	40	0~30000~36000
HN-050	50	0~48000~60000
HN-080	80	0~150000~1800000
HN-100	100	0~240000~280000
HN-150	150	0~480000~560000
HN-200	200	0~900000~1200000

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HN Thermal Gas Mass Flowmeter

HN series thermal gas mass meter



Overview

The thermal gas mass flowmeter measures gas flow by thermal diffusion. Its sensor has two reference-grade resistance temperature detectors (RTDs): RH senses velocity and RMG senses gas temperature. RH is heated; RMG measures the gas temperature. As gas velocity increases, more heat is carried away and RH cools.
King's law relates heating power P, temperature difference ΔT (TRH - TRMG), and mass flow Q: P/ΔT = K1 + K2 f(Q)K3. K1, K2 and K3 are constants related to gas properties.
The temperature-difference method overcomes zero drift caused by water, oil and impurities when constant-temperature-difference instruments measure coal gas. It can also measure wet-gas mass flow, including real-time gas extraction, ventilation supply and exhaust in mines.

Features

No temperature or pressure compensation is required for gas mass flow or standard volumetric flow.
Turndown exceeds 100:1; suitable for leak detection, large pipes, low velocities, widely varying flow and very low flow.
Vibration-resistant measurement.
Long-life sensor without moving or pressure-sensing parts; easy installation and maintenance.
Fast response, low pressure loss and good repeatability.
Digital design and circuitry with a clear LCD.
RS485 or HART supports centralized computer management.

Operating Principle

Thermal flow measurement uses the relationship between flow and heat lost from a heated body. Two standard-grade RTDs serve as the heat source and fluid-temperature sensor. As fluid flows, their temperature difference is related to flow; electronic control converts this relationship into a linear flow output.

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Applications

1. Utilities: electricity, gas and water-treatment monitoring; pipeline gases, general systems, biogas, coal gas, natural gas, LPG and boiler preheated air.
2. Oil and gas: energy exchange, landfill-gas recovery, fuel-gas metering, gas-quality analysis, leak testing, natural-gas measurement and flare monitoring.
3. Power: fuel-gas distribution, boiler and auxiliary gases, gas furnaces, hydrogen, and primary/secondary air for power-plant furnaces.
4. Chemicals: flue-gas recirculation, sample-system gas flow, induced-draft fans, ammonia in fertilizer plants, and battery-plant gases.
5. Metallurgy: steelworks gas, blast-furnace gas, coke-oven gas, reheating-furnace fuel control (blast-furnace gas, coke gas and natural gas), and hydrogen/oxygen/nitrogen for heat-treatment furnaces.
6. Pulp and paper: wastewater-treatment gases, stack-flow monitoring, recovery-boiler secondary/tertiary air, boiler fuel gas and combustion air.
7. Food and pharmaceuticals: fresh process air, brewery CO2, bottle-sterilizer hot air, thermal-oxidation gases, ventilation, boiler intake/exhaust and process control.
8. Environmental protection: biogas, chlorine treatment, sewage aeration, and stack/flue emissions monitoring for SO2 and NOx.
9. Other industries: factory compressed air, pulverized-coal fuel/air ratio control, and hot-air flow from cement-industry vertical mills.

Technical Data

Media: gases compatible with stainless steel.
Velocity range: 0.05-120 m/s.
Operating temperature: -40°C to +510°C.
Ambient: -40°C to +85°C, humidity <90% RH.
Pressure drop: negligible for pipe diameters ≥3 inches.
Supply: 18-30 VDC, maximum 600 mA; 180-230 VAC, maximum 2.5 W; or 100 VAC, maximum 3.15 W.
Outputs: linear 4-20 mA proportional to mass flow, and linear 4-20 mA proportional to temperature.
Accuracy: 1% of reading + 0.5% of full scale.
Repeatability: ±0.2% FS. Pressure rating: 4.2 MPa.
Response time: <850 ms.
Housing: die-cast aluminum, A2/A4 optional.
Probe: 316L, tantalum or titanium, etc.
Ball valve: 316L. Compression fitting/flange: 316L or 304.
Alarm: normally open relay, 220 VAC / 3 A or 24 VDC (flow alarms); temperature output is available.
Display: wide LCD; password-protected panel keys configure parameters and variables.
Protection: IP65 (rating varies by manufacturer).

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HN Rotary-Lobe Flowmeter

HN series rotary-lobe flowmeter



Overview

The rotary-lobe flowmeter measures flow in pipelines continuously or intermittently. It is a high-accuracy positive-displacement instrument with reliable operation, low weight, long service life, and convenient installation and use.
The meter provides large-pipe gas, liquid and steam measurement, low pressure loss, a wide range and high accuracy, with little influence from density, pressure, temperature or viscosity. It has no moving mechanical parts. The insertion version uses a piezoelectric stress sensor at -20°C to +250°C, with analog and digital pulse outputs. The RY-LUCB insertion vortex flameproof version complies with GB3836-83, with marking ExdIIBT6.

Features

The compact, light design provides high accuracy and easy installation/use.
1. HN standard: cast-iron housing, aluminum-alloy oval gears; round pointer display or square display without pointer.
2. HN-HL resettable: cast-iron housing, aluminum-alloy oval gears, dual counters with one resettable total.
3. HN-TN high-temperature/high-viscosity: 0-200°C; viscosity 200-1000 mPa·s.
4. HN-B stainless: all liquid-contacting housing and rotor parts are stainless steel.
5. HNB output type: sensor added to the HN type for pulse output.

Technical Data

Pipe size: 300-3000 mm.
Velocity: 0.1-10 m/s.
Accuracy: 0.1-0.5 m/s, ±2.0% FS; 0.5-10 m/s, ±1.5% FS; 0.1-10 m/s, ±2.5% FS.
Conductivity: >5 μS/cm.
Straight pipe: 5DN upstream, 3DN downstream.
Medium: -20°C to +130°C.
Ambient: -20°C to +60°C.
Pressure: 1.6 MPa.

Protection: compact IP65; remote IP68.
Electrodes: 316L stainless steel.
Outputs: 4-20 mA; RS485; HART; Modbus.
Sensor material: stainless steel.
Supply: 220 VAC ±15%; or 24 VDC with ripple ≤5%.
Power consumption: 6.5 W.
Pressure rating: ≤1.6 MPa.

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Operating Principle

DN (mm)	Flow range (m³/h)	Starting flow (m³/h)	Max. pressure loss (Pa)	Nominal pressure (MPa)	Temperature (°C)	Connection
32	0.8-16	0.05	120	1.0	-20~80	Flanged
	1-20	0.05	120	1.0	-20~80	Flanged
40	1.5-30	0.07	130	1.0	-20~80	Flanged
	1.5-40	0.07	180	1.0	-20~80	Flanged
50	1-60	0.07	180	1.0	-20~80	Flanged
	1.2-85	0.07	210	1.0	-20~80	Flanged
80	1.4-100	0.07	220	1.0	-20~80	Flanged
	1.2-140	0.08	220	1.0	-20~80	Flanged
	2.9-200	0.15	220	1.0	-20~80	Flanged
100	3.1-250	0.11	240	1.0	-20~80	Flanged
	2.7-300	0.11	280	1.0	-20~80	Flanged
	4.1-450	0.11	300	1.0	-20~80	Flanged
	4.5-500	0.11	540	1.0	-20~80	Flanged
150	8.1-650	0.65	580	1.0	-20~80	Flanged
	10-800	0.76	590	1.0	-20~80	Flanged
	12.5-1000	0.76	600	1.0	-20~80	Flanged
	13.3-1200	0.76	700	1.0	-20~80	Flanged
200	31-1600	1.15	650	1.0	-20~80	Flanged
250	75-3000	8.00	450	1.0	-20~80	Flanged

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HN-W V-Cone Flowmeter

HN-W series V-cone flowmeter



Overview

Like other differential-pressure flowmeters, the V-cone meter follows conservation of mass (continuity) and energy (Bernoulli's equation) in a closed pipe. Instead of contracting flow toward the pipe center, a coaxial V-shaped cone gradually constricts flow toward the inner wall. Flow is obtained from the differential pressure across the cone; for steady flow, velocity is proportional to the square root of this pressure difference. The design combines advantages of Venturi tubes, annular orifices and wear-resistant orifices, and is suitable for almost all gases, liquids and steam.

Features

1. High accuracy and repeatability for precise flow measurement.
2. Turndown of 10:1 without secondary-instrument software correction.
3. Self-conditioning permits short straight runs: 1-3D upstream and 0-1D downstream, with low pressure loss.
4. Self-cleaning for dirty fluids, suspended solids, low-pressure fluids, wet gases and fouling media.
5. Self-protection limits wear of critical restriction components for long-term stability.
6. Resists high temperature, pressure, corrosion and vibration.
7. Broad media coverage (liquids, gases and steam), flow range and pipe sizes DN15-DN3000.

Technical Data

Accuracy: Classes 0.5, 1.0 and 1.5.
Size: DN15-DN3000.
Repeatability: ±0.1% FS.
Nominal pressure: ≤16 MPa; maximum ≤40 MPa.
Turndown: 10:1.
Media: gases, steam, liquids and special fluids.
Straight pipe: 1-3D upstream, 0-1D downstream.
Reynolds number: 5 × 10^3 to 1 × 10^7.



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Ordering Codes

Brand	Sep.	Model	DN	Connect	Flange	MPa	Tube	Cone	Tx	Display	Ex	Option	Description	Notes
HN													Company code	
	-												Undefined separator	
		W											V-cone flowmeter	
			XXX										050 = DN50	
			ST										Special size	
				F									Flanged	
				W									Welded	
				N									Threaded	DN15-DN100
					A								ANSI	
					D								DIN2501	
					G								GB9115	
					S								Special requirements	User-defined
						10							1.0 MPa	
						16							1.6 MPa	
						25							2.5 MPa	
						40							4.0 MPa	For >4 MPa, consult manufacturer
							B						304 stainless	
							L						316L stainless	
							P						PTFE/PP	Pressure ≤0.6 MPa
							C						Carbon steel 20#	
							U						Other material	User-defined
								B					304 stainless	
								L					316L stainless	
								P					PTFE/PP	Pressure ≤0.6 MPa
								C					Carbon steel 20#	
								U					Other material	User-defined
									0				None	
									1				Domestic standard	
									2				Imported	
									3				T/P/flow parameters	T/P compensation
									4				User-specified	
										0			None	
										1			Instantaneous and total flow	
										2			Instant./total + T/P comp.	Select transmitter option 3
										3			User-specified	
											N		Non-hazardous	
											E		Flameproof	
											I		Intrinsically safe	
												0	None	
												1	3-valve manifold	
												2	Matching flanges	
												3	3-valve manifold + flanges	
HN	-	W	XXX	F	A	10	B	B	0	2	E	0	Complete model example	

Notes: State other or special requirements in parentheses after the model. Supply the fluid name; pipe inside/outside diameters; scale-flow units; normal, maximum and minimum flow; operating pressure; maximum/minimum/normal temperature; flange standard; gas composition; piping arrangement; density and viscosity.

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HN Open-Channel Flowmeter

HN series open channel flowmeter



Overview

Open-channel systems include ultrasonic, Doppler and multichannel flowmeters, depending on the measuring principle. They monitor flow in open channels and watercourses, including reservoirs, rivers, water projects, municipal water supply, sewage treatment, irrigation and water-resource management, in rectangular/trapezoidal channels and culverts.

Features

1. High accuracy and repeatability for precise flow measurement.
2. Turndown of 10:1 without secondary-instrument software correction.
3. Self-conditioning permits short straight runs: 1-3D upstream and 0-1D downstream, with low pressure loss.
4. Self-cleaning for dirty fluids, suspended solids, low-pressure fluids, wet gases and fouling media.
5. Self-protection limits wear of critical restriction components for long-term stability.
6. Resists high temperature, pressure, corrosion and vibration.
7. Broad media coverage (liquids, gases and steam), flow range and pipe sizes DN15-DN3000.

Technical Data

Ultrasonic open-channel type
Construction: compact or remote.
Flow: 0.1-99,999.99 m³/h, depending on flume.
Maximum total: 429,000,000.00 m³.
Level accuracy: 0.5%.
Resolution: 3 mm or 0.1%, whichever is greater.
Flow accuracy with standard weir/flume: 1-5%.
Supply: 220/24/12 V, battery or solar.
Protection: display IP66, probe IP68.
Doppler open-channel type
Level: 0.02-3 m or 0.02-10 m.
Velocity: 0.03-5.0 m/s.
Velocity resolution: 1 mm/s.
System error: ±3‰.
Flow: 1 L/s to 99,999,999 m³/h.

Doppler type (continued)
Operating temperature: -20°C to +60°C.
Minimum level resolution: ±1 mm.
Output: RS485, Modbus.
Supply: 12 VDC, battery or solar.
Wireless: GPRS RTU.
Multichannel open-channel type
Velocity accuracy: 1.0%.
Velocity: ±10 m/s.
Channel width, transit-time method: 0.5-10 m.
Time-difference resolution: 40 ps.
Ambient: -20°C to +70°C.
Operating: -20°C to +70°C.
Medium: -20°C to +80°C.
Protection: IP68.

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Operating Principle

Ultrasonic open-channel meter
The level-flow calculation combines measured liquid level with standard weir/flume geometry, side-slope coefficients, channel parameters, hydraulic slope and vertical-velocity correction factors. A microprocessor calculates flow. Non-contact ultrasonic measurement suits harsh environments. Pulse travel time determines the distance to the liquid surface and thus level; the level-flow relationship then gives flow Q.
Doppler open-channel meter
A contact sensor is placed on the channel bottom. Transmitting and receiving probes use the Doppler effect to measure velocity. Multiplying velocity by the local cross-sectional flow area gives instantaneous flow.
Multichannel open-channel meter
Also called a transit-time open-channel meter, this online system uses ultrasonic sensors on opposite channel walls to measure mean water velocity. An ultrasonic level meter measures water level, and the totalizer applies a calibrated hydraulic model to calculate instantaneous flow.
Application guide
Typical locations include municipal water-supply intake channels, thermal-power cooling-water intake/discharge channels, sewage-treatment inlet/outlet channels, industrial wastewater discharge, water projects and irrigation channels.

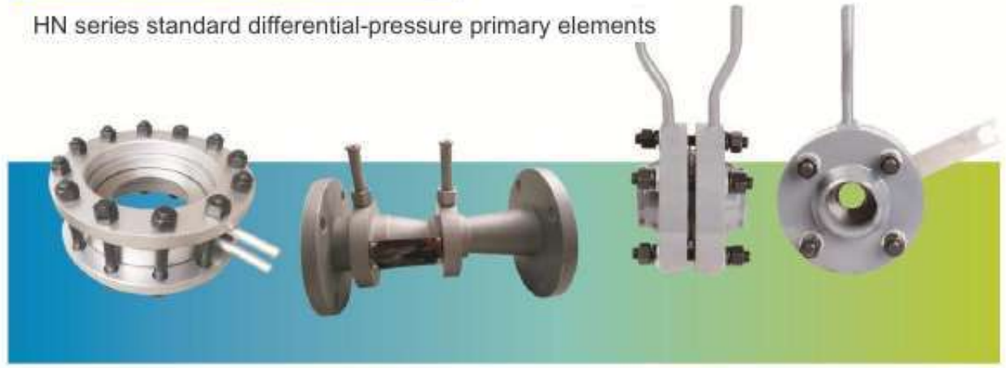
Comparison Table

Method	Thin-plate weir	P flume	PB flume	Submersible electromagnetic
Channel type	Open	Open	Circular closed channel	Open or closed
Structure	Obstructing weir; simple primary structure	Flume fitted in part of channel; more complex	Flume fitted in part of channel; more complex	Obstructing sensor body; bypass model extends range
Instrument	Level meter	Level meter	Level meter	Direct measurement
Width / throat / size (mm)	Channel width 450-8000	Throat 25-240 (15,200)	Size 150-1800 (3000)	Size 500-400 (600)
Flow range	15-40,000 m³/h; triangular weir: low; rectangular: medium; broad/equal-width weir: high	30-15,000 (33,000) m³/h	20-12,000 (4200) m³/h	10-5000 m³/h
Accuracy (% FS)	1-3	3-5	3-5	Sensor 1.5; bypass 2.5
Turndown	(10-20):1	(20-30):1	(20-30):1	10:1
Head rise (mm)	200 (120)-80	75-200	(1/20-1/30) × diameter	100-500
Solids / sediment	Deposits; cannot flush away; periodic cleaning	No deposits; passes with flow	No deposits; passes with flow	Deposits; can partly flush away
Upstream straight run (mm)	1500-24,000, including conditioning section 690-12,000	300-20,000	Upstream ≥5-10 diameters; downstream ≥2 diameters	
Liquid requirements	No special requirements	No special requirements	No special requirements	Conductivity >10 S/cm; wastewater/downstream water measurement acceptable

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HN Standard DP Primary Elements

HN series standard differential-pressure primary elements



Overview

HN primary elements are combined with differential-pressure instruments to measure liquid, gas and steam flow in petroleum, chemicals, metallurgy, power and light industry. Manufactured to applicable standards, they provide simple construction, high accuracy, safety, reliability and broad applicability.
Standard elements can be produced without individual calibration in accordance with GB/T2624-2006 and ISO5167:2003(E), Measurement of Fluid Flow by Means of Pressure Differential Devices Inserted in Circular Cross-Section Conduits Running Full.

Features

For gas, steam and liquid flow measurement.
Suitable for high- and low-pressure service.
Simple construction and convenient installation.
Accurate measurement and stable performance.
Broad applicability and economical construction.

Selection Notes

1. The table lists common types only; describe other primary elements in the written specification when ordering.
2. Explain special requirements in writing or drawings; both parties must confirm the design and manufacturing plan.
3. Design and manufacture follow the Flow Measurement Primary-Element Design Manual; state special requirements in the specification.
4. Unless otherwise specified, measuring-pipe assemblies are supplied with 10D upstream and 5D downstream straight runs.
5. Unless otherwise specified, the company selects flanges, preferring national-standard flanges.

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Ordering Codes

HN								Standard differential-pressure primary element			
						Code		Primary-element type			
						Table 1		Letter code			
Code					Pressure-tapping arrangement						
Table 2					Letter code						
Code				Nominal size							
Table 3				Numeric code							
Code			Nominal pressure (MPa)								
Table 4			Numeric code								
Code			Straight pipe								
Table 5			Letter code								

Primary-Element Type Codes (Table 1)

Code	Description	Code	Description
K	Standard orifice with annular chamber	S	Double nozzle
Y	Standard orifice without annular chamber	D	Quarter-circle nozzle
H	Annular orifice	C	Long-radius nozzle
P	Standard nozzle	I	Eccentric orifice
W	Standard Venturi, as-cast convergent	Q	Segmental orifice
J	Standard Venturi, machined convergent	B	Eight-slot orifice
T	Standard Venturi, rough welded-sheet convergent	X	Small-bore orifice
L	Venturi nozzle	V	Restriction orifice
JYF	Airfoil airflow sensor		

Pressure-Tapping Codes (Table 2)

Code	Description	Code	Description
H	Annular-chamber taps	A	22.5° toward inlet
Z	Drilled taps	B	45° toward inlet
F	Flange taps	T	Special taps
J	D and D/2 taps		

Nominal-Size Codes (Table 3)

Code	02	03	04	05	06	08	10	12	15
Size (mm)	25	32	40	50	65	80	100	125	150
Code	17	20	22	25	27	30	32	35	37
Size (mm)	175	200	225	250	275	300	325	250	375
Code	40	45	50	60	70	80	90	99	
Size (mm)	400	450	500	600	700	800	900	1000	

Nominal-Pressure Codes (Table 4)

Code	00	01	02	03	04	06	10	16	25	32	40
Pressure (MPa)	0.6	1.0	1.6	2.5	4.0	6.4	10	16	25	32	40

Straight-Pipe Codes (Table 5)

Code	Description
A	Without upstream/downstream straight pipe
B	With upstream/downstream straight pipe
C	With upstream/downstream straight pipe and connecting flanges

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HN Elbow Flowmeter

HN series elbow flowmeter



Overview

Like an orifice meter, the elbow meter is a differential-pressure instrument. The difference lies in how pressure is generated: an orifice uses flow contraction, while an elbow sensor uses fluid inertia.
The design retains the simplicity, stability and accuracy of differential-pressure measurement while reducing pressure loss, blockage and maintenance difficulties. Applications include steam, coal gas, natural gas, hot/cold water, oil, air, acetylene, hydrogen sulfide and carbon-dioxide two-phase flow in heating, combined heat and power, metallurgy and petrochemicals.

Applications

The meter uses a natural bend in the pipe without adding restriction elements, obstructions or intermediate media, combining transport and measurement.
Designed from fluid mechanics and dynamics, the system measures liquids, gases and steam in metallurgy, chemicals, power/heating, textiles, pharmaceuticals, petroleum, natural gas, paper, tobacco and food processing. It can connect directly to DCSs for long-term industrial monitoring. The system consists of an elbow sensor, dedicated instrument or DCS, differential-pressure transmitter, pipework and valves. Temperature/pressure-compensated measurement also requires pressure and temperature transmitters and a temperature sensor.

Operating Range

1. Nominal size: 25 mm ≤DN ≤2000 mm.
2. Nominal pressure: PN ≤10 MPa.
3. Medium temperature: t ≤450°C; specify when ordering if above 450°C.
4. Reynolds number: ReD >10^4.
5. Accuracy: Classes 1.0 and 1.5.

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Operating Principle

Wide medium coverage includes liquids, steam and gases: hot/cold water, oil, liquid ammonia and other liquids; saturated/superheated steam; blast-furnace gas, coke-oven gas, oxygen, air, natural gas, acetylene and hydrogen sulfide.
Pipe size: DN10-DN2000.
Temperature: -50°C to +600°C.
Pressure: 0-32 MPa.
Installation: at a pipe bend or in a straight run. A 90° standard sensor is used at bends; a V-shaped sensor is used in straight pipe.
Turndown: 10:1; bidirectional flow can be measured.
Velocity: 0.2-12 m/s for liquids, and 5-160 m/s for gases/steam, within the specified measurement accuracy.
The sensor can operate under high temperature/pressure, dust, vibration, humidity and poor installation conditions. Corrosion-resistant versions made from stainless steel, engineering plastics, glass or ceramic can measure corrosive media.
Straight runs of 5D upstream and 2D downstream are sufficient.
No inserts or restriction elements are present, so no additional pressure loss is introduced; this reduces transport power and operating costs.
Replace the existing elbow with the sensor to measure flow. Sensor life matches pipe life, with virtually no maintenance after installation.
System accuracy: Classes 0.5-1.5.
Repeatability: 0.2%; stable over long service. Once installed, the sensor does not require repeated removal, preserving installation accuracy.

Ordering Codes

	Model specification	Description
Construction	HN-WGL	90° elbow flowmeter
	HN-WGS	180° elbow flowmeter
Medium	Y - liquid	Liquid
	Q - gas	Gas
	Z - steam	Steam
Connection	1 - flanged	Flanged
	2 - butt-weld	Butt-weld
Flange material	C - carbon steel	Carbon steel
	S - stainless steel	Stainless steel
	O - other	Other
Nominal pressure	025	0.25 MPa
	06	0.6 MPa
	10	1 MPa
	...	...
	100	10 MPa
Nominal size	-25	DN25
	-32	DN32
	-40	DN40
	...	...
	2000	DN2000

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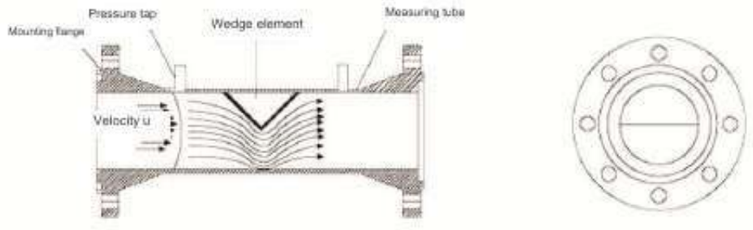

HN-LGX Integrated Smart Wedge Flowmeter

HN-LGX series integrated intelligent wedge flowmeter



Overview

The HN-LGX integrated smart wedge flowmeter was developed for applications with large flow variations, including district heating, municipal water, coal gas and natural gas. It also addresses flow measurement of coke tar, fuel oil, asphalt, residual oil, easily crystallized molten sulfur and other high-viscosity liquids, as well as highly corrosive saturated/supersaturated acid, alkali and salt solutions that crystallize as temperature changes.
1. High long-term field accuracy: up to Class 0.2 for liquids and Class 0.5 for gases, uncommon among differential-pressure flowmeters.
2. Wide range: normally 25:1, and over 100:1 after changing the differential-pressure transmitter range.
3. Broad applicability: single-phase and gas-liquid, gas-solid or liquid-solid two-phase media. Reynolds numbers from 300 to 1 × 10^7 allow laminar and turbulent operation. Minimum velocity is 0.01 m/s. The sensor resists deposits and blockage, and suits high-temperature, high-pressure, viscous or highly corrosive liquids and dusty gases.
4. Anti-adhesion wedge sensor: the measuring tube and restriction are designed to prevent mud, sand, dust, suspended matter and fibers from adhering or accumulating, and to reduce tube corrosion.
The sensing element is a V-shaped restriction with its rounded apex pointing downward. This allows suspended solids and viscous liquid to pass without upstream stagnation or accumulation on either side of the element, supporting long-term stability of ±0.1% FS/year.



Wedge flowmeter measuring principle

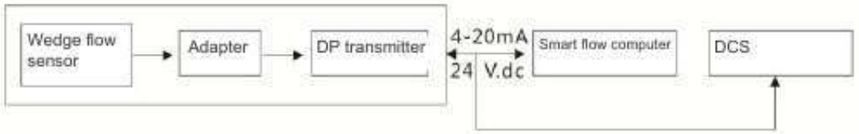
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HN-LGX Integrated Smart Wedge Flowmeter




System Configuration

The integrated smart wedge flowmeter (Figure 2) comprises an integrated wedge flow transmitter and an intelligent flow computer. The transmitter contains the wedge sensor, adapter and differential-pressure transmitter. When a full pipe of fluid passes the wedge, dynamic pressure increases and static pressure falls downstream. The differential-pressure transmitter measures the pressure difference and outputs 4-20 mA DC. The flow computer processes this signal to display flow.



Features

Long-term stability: simple, reliable construction with no moving or easily damaged parts, excellent abrasion resistance, stable meter factor, and service life exceeding ten years.
Fouling/blockage resistance: a V-shaped restriction without blind zones is self-cleaning. No deposits form around the element; pressure ports up to 3 inches resist blockage.
Low pressure loss: only 50% of the measured differential pressure.
Straight pipe: including the body's own pipe length, 5D upstream and 3D downstream generally ensure accuracy.
Bidirectional flow: one meter with two DP transmitters measures forward and reverse flow.
Suitable for single-phase and gas-liquid, gas-solid or liquid-solid two-phase media. Re ranges from 300 to above 10^6, permitting laminar or turbulent flow. Particularly suitable for high temperature/pressure, viscous or slow flow, crystallizing liquids, suspended solids, particles, long fibers and dusty gas. PTFE-lined versions suit strongly corrosive acids, alkalis and salts.

Principal Technical Data

Accuracy: Classes 0.5, 1.0 and 1.5.
Wedge ratio H/D: 0.2, 0.3, 0.4 or 0.5.
Turndown: 10:1.
Long-term field stability: 0.1% FS/year.
Service life: over ten years.
Reynolds number: minimum 300; maximum above 10^6.
Maximum viscosity: 3000 cP.
Size: DN15-DN1200.
Operating pressure: -0.1 to 25 MPa.
Operating temperature: -20°C to +450°C.
Process connection: wafer, threaded or flanged.
Pressure taps: threaded, flanged or chemical T-type.
Flanges: HG20592-20635-97; specify other standards (GB, HGJ, JB/T, ANSI, DIN, etc.) when ordering.
Wedge materials: 1Cr18Ni9Ti, 304SS, 316SS, 316L, Hastelloy C or PTFE-lined.
Body materials: CS, 1Cr18Ni9Ti, 304SS, 316SS, 316L, Hastelloy or PTFE-lined.

Ordering Codes

Brand	Sep.	Model	Tx	Pipe dir.	Process	Taps	Pipe size	Body	Wedge	Temp.	MPa	H/D	Ex	Option	Description
HN															Company code
	-														Undefined separator
		LGX													Integrated smart wedge flowmeter
			1												DP transmitter
			2												Dual flat-flange capillary type
			3												Dual raised-flange capillary type
			4												Smart flow transmitter
			5												Multivariable mass-flow transmitter
				H											Horizontal pipe
				V											Vertical pipe
					N										Threaded
					F										Flanged
					W										Wafer
						N									Threaded
						F									Flanged
							□X□								Pipe OD × wall thickness (mm)
								C							CS
								S							1Cr18Ni9Ti or 304SS
								L							316SS or 316L
								H							Hastelloy C
									C						CS
									S						1Cr18Ni9Ti or 304SS
									L						316SS or 316L
									H						Hastelloy C
										1					-20°C to +100°C
										2					-20°C to +200°C
										3					-20°C to +300°C
										4					-20°C to +450°C
											A				PN1.0
											B				PN1.6
											C				PN2.5
											D				PN4.0
											E				PN6.3
											F				PN10.0
											G				PN16.0
											H				PN25.0
												1			0.2
												2			0.3
												3			0.4
												4			0.5
													O		Standard
													D		Flameproof
													E		Intrinsically safe
														F	Corrosion-resistant, PTFE-lined
														T	Temperature measuring port
														P	Pressure measuring port
														V	Primary instrument valve
														J1	Steam heating jacket
														J2	Heat-transfer-oil jacket
HN	-	LGX	I	H	N	N	□X□	C	C	1	A	1	O	F	Complete model example

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HN Roots Flowmeter



HN Roots Flowmeter

HN series Roots flowmeter



Overview

The HN Roots flowmeter integrates flow, temperature and pressure sensing using microcontroller technology and a capacitive pressure sensor. It has no moving parts, resistance to vibration, impurities and interference, simple operation, easy installation, maintenance-free operation, self-diagnostics and low running costs. Applications listed include semi-water gas, coke-oven gas, heavy oil, residual oil, asphalt, liquid paraffin, toluene, sulfuric acid, natural gas, chlorinated methane compounds, flue gas, chlorine, wastewater, clean water and other special media.

Operating Principle

The Roots flowmeter is a rotary positive-displacement instrument with a mechanical counter. Measuring elements continuously divide the fluid into known volumes, and total flow is obtained by counting successive filling and discharge cycles. Low starting flow and a wide range suit gas loads that vary widely. Accuracy is independent of pressure and flow variations, with stable performance and long life.

Features

High accuracy and repeatability. Precision-machined, balanced internal rotors rotate without contact; oil lubrication maintains accuracy and service life.
No straight pipe required upstream or downstream, allowing installation in confined spaces.
Low starting flow and wide range suit varying gas loads.
Stable measurement despite pressure and flow changes.
Standard accessories are interchangeable across the Roots sensor range.
RS485 and a dedicated signal concentrator support remote data collection and monitoring over GPRS/CDMA, Internet or telephone networks.
Surface-mounted circuitry gives a compact, interference-resistant and reliable design.
High-performance microprocessor and digital filtering provide powerful software functions and reliability.
Floating-point calculation and automatic five-section meter-factor correction, with self-diagnostics and alarms.
Low-power operation from internal or external supply.
Local flow display with multiple signal outputs.
High-contrast LCD shows standard total volume, standard volumetric flow, percentage of actual volumetric flow, medium temperature/pressure and battery percentage, with Chinese prompts.
Real-time storage prevents data loss during battery replacement or sudden power failure; parameters are retained permanently.
Explosion protection: ExiaIICT4.
Housing protection: IP65.

Technical Data

Nominal size	DN32-DN250
Accuracy	±1.5% R or ±1.0% R
Pressure rating	1.0 MPa
Supply	3.6 V lithium battery; 24 VDC
Consumption	Average ≤3.6 mW; sleep mode ≤1.8 mW
Data storage	Start/stop events, daily records and timed-interval records
Operating conditions	Medium -20°C to +80°C; ambient -30°C to +60°C; 5-90% RH; atmospheric pressure 86-106 kPa
Materials	Body: aluminum alloy or cast iron; converter: cast aluminum; rotors: aluminum alloy; bearings: cemented carbide
Protection	IP65
Explosion protection	ExiaIICT4, intrinsically safe. Complies with GB3836.1-2000 (general requirements) and GB3836.4-2000 (intrinsic safety "i") for electrical apparatus in explosive gas atmospheres.
Connection	Flanged; vertical installation with downward flow

DN (mm)	Flow (m³/h)	Starting flow (m³/h)	Max. loss (Pa)	DN (mm)	Flow (m³/h)	Starting flow (m³/h)	Max. loss (Pa)
32	0.8-16	0.05	120	100	2.7-300	0.11	280
	1-20	0.05	120		4.1-450	0.11	300
40	1.5-30	0.07	130		4.5-500	0.11	540
	1.5-40	0.07	180	150	8.1-650	0.65	580
50	1-60	0.07	180		10-800	0.76	590
	1.2-85	0.07	210		13.3-1200	0.76	600
80	1.4-100	0.07	220		12.5-1000	0.76	700
	1.2-140	0.08	220	200	31-1600	1.15	650
	2.9-200	0.15	220	250	75-3000	8.00	450
100	3.1-250	0.11	240				

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HN Smart Target Flowmeter



HN Smart Target Flowmeter

HN series intelligent target flowmeter



Overview

The HN target flowmeter combines the traditional target principle with new sensing and digital technologies to form a force-sensing flowmeter. It retains the absence of moving parts found in conventional target, orifice and vortex meters, while offering accuracy comparable to positive-displacement meters. Its resistance to interference and impurities, light weight and reliability suit gases, liquids, steam and viscous media. Applications include petroleum, chemicals, energy, food, environmental protection, water projects, pharmaceuticals, steel, metallurgy, coking and road construction.

Operating Principle

As the medium flows through the measuring tube, its kinetic energy produces a pressure difference and force on the target, causing a small displacement. Force is proportional to the square of velocity. The target stem transfers force to the sensor's elastic element, unbalancing a capacitor bridge and generating a voltage related to target force. Flow is proportional to the square of the bridge voltage.

Features

1. No moving components; insertion construction permits easy removal.
2. Fully sealed welded construction without dead zones or leakage points, rated up to 42 MPa.
3. Corrosion- and temperature-resistant materials, including Hastelloy and titanium.
4. Built-in self-diagnostics clearly identify faults.
5. The sensor does not contact the medium; no component wear.
6. On-site dry calibration by hanging weights, completed with a single key.
7. Integrated temperature/pressure compensation directly outputs mass flow or standard volume.
8. Multiple installation options; online insertion reduces installation costs.
9. Optional low-flow cutoff, nonlinearity correction and adjustable filtering time.
10. Measures gas/liquid flow at ambient temperature, up to 500°C or down to -200°C.
11. Fast measurement with typical repeatability of 0.05-0.08%.
12. Accuracy up to 0.2%.
13. Low pressure loss, approximately half that of a standard orifice.
14. Strong resistance to interference and impurities.
15. Low-power battery display shows instantaneous/total flow and a percentage bar graph.
16. Change the target plate to change the measuring range.
17. Easy installation and maintenance.
18. Multiple outputs for remote parameter transmission.
19. Vibration resistance; pulsating flow can be measured within a specified range.

Selection Data

Medium	Liquid; gas; steam			
Nominal size	Flanged 15-520 mm		Wafer 15-500 mm	Insertion 65-3200 mm
Nominal pressure	0.5~48MPa		0.6~42MPa	0.6~42MPa
Medium temp.	-200°C to +500°C or higher			
Accuracy	±0.2%	±0.5%	±1.0%	±1.5%
Turndown	1:3 (liquids) 1:10 (steam)	1:5 (liquid/gas)	1:10 (liquid/gas)	1:10 (steam)
Compensation	Temperature; pressure			
Repeatability	0.05%~0.08%			
Supply	Internal 3.6 V lithium battery; external 24 VDC			
Output	Local display; two-wire 4-20 mA; 0-5 V pulses; RS465/RS132; GPRS wireless			
Measuring tube	Carbon steel; stainless steel; other materials by agreement			
Explosion protection	Intrinsically safe ExiaIICT4; flameproof ExdIICT4			
Protection	IP65; IP67			
Flanges	GB/T series standards; special machining to user requirements			

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HN-V Averaging Pitot Flowmeter



HN-V Averaging Pitot Flowmeter

HN-V series averaging pitot flowmeter



Overview

The HN-V uses differential pressure generated by converting dynamic pressure to static pressure. Its aerodynamic probe design provides high accuracy, efficiency and reliability. Typical media include gases, liquids, steam, natural gas, cooling water, saturated/superheated steam, compressed air, boiler water, fuel gas, demineralized water, gaseous/liquid hydrocarbons, hot air, cryogenic liquids, producer gas and heat-transfer fluids.

Features

1. This differential-pressure averaging-velocity sensor measures flow from the pressure difference generated in the fluid. It reflects actual velocity and provides a very stable, non-pulsating differential-pressure signal.
2. Probe design: the bullet-shaped cross-section gives a precise pressure distribution and fixed separation points. Low-pressure ports on the rear sides, ahead of separation, provide a stable signal and resist blockage. Integral internal construction prevents signal leakage, increases strength and maintains long-term accuracy.
3. Low installation costs:
(1) Only a few inches of weld seam are needed for simple, rapid installation.
(2) Special tools permit live installation under pressure in less than one hour.
(3) Valves and instrument interfaces require straightforward assembly.
4. Long-term accuracy:
(1) Resistant to wear, dirt and oil.
(2) No moving parts.
(3) A high-static-pressure zone around the probe protects the high-pressure ports. Fluid sweeps past the side/rear low-pressure ports to reduce blockage; other probe designs may put these ports in a fluctuating low-pressure region where impurities accumulate.
5. Continuous operation reduces blockage risk, but precautions are still required:
(1) Leaking impulse lines disturb the high-pressure equilibrium zone, allowing fine particles into the ports.
(2) During shutdown, Brownian motion can carry fine impurities into the ports.
(3) Frequent starts/stops can allow fine particles to enter during transient pressure formation and accumulate over time.
(4) Large amounts of tar, algae or fibrous material may also block the probe.

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Principal Technical Data

HN-V Flow Measurement System Performance

Accuracy: ±1% FS.
Repeatability: ±0.1% FS.
Pressure: 0-40 MPa.
Temperature: -20°C to +560°C.
Upper measuring limit: probe-strength limit.
Lower limit: minimum required differential pressure.
Turndown: >10:1.
Pipe: 15-9000 mm, round or square.
Media: single-phase gas/steam or liquids ≤10 mPa·s, full pipe, unidirectional flow.

Ordering Codes

Specify medium, materials, accuracy, maximum/minimum/normal temperature, flow and operating pressure, density and viscosity. For gases, state composition and whether flow is at operating conditions or standard conditions (0°C, 101.325 kPa). State any special requirements.

Brand	Sep.	Model	Pipe	Config.	Mount	Direction	Purge	Taps	Comp.	DP Tx	Tx mount	Ex	MPa	Temp.	Description
HN															Company code
	-														Undefined separator
		V													Averaging pitot flowmeter
			( )												State OD × wall thickness (mm)
				1											In-line, DN15-100
				2											Insertion, DN100-1000
				3											Wafer, DN300-9000
					L1										Flanged
					L2										Clamped
					L3										Spring-lock
						1									Horizontal
						2									Vertical
							0								None
							1								Provided
								1							Shutdown installation
								2							Hot-tap installation
									0						None
									1						Temperature
									2						Pressure
									3						Temperature and pressure
										1					Standard
										2					Smart
										3					Multivariable
											1				Compact
											2				Remote
												0			None
												1			Intrinsically safe
												2			Flameproof
													1		-0.1 to 1.6 MPa
													2		1.6-6.0 MPa
													3		6.0-25 MPa
													4		25-40 MPa
														1	0-100°C
														2	100-300°C
														3	300-450°C
														4	450-560°C
HN	-	V	400x9	2	L2	1	0	1	3	2	1	0	4	4	Complete model example

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HN Ultrasonic Water Meter




HN Ultrasonic Water Meter

HN series ultrasonic water meter



Overview

The ultra-low-power dual-path ultrasonic water meter measures liquid flow in round pipes by transit time. Industrial-grade electronics and battery power provide fully electronic measurement without mechanical rotation, wear or pressure loss. High accuracy, reliability, low cost and long service life allow replacement of other water-meter types.

The meter detects the transit-time difference between ultrasonic beams traveling with and against the water flow, determines velocity, and calculates flow. With no moving or obstructing parts, it resists the effects of waterborne impurities. Comprehensive outputs and communications support wired and wireless networking. Excellent low-flow detection supports stepped water tariffs and more effective conservation and use of water resources.

Applications

The water meter offers high accuracy, ultra-low consumption and stable operation. Each part is designed to IP68 for harsh environments. Applications include municipal water supply, water-resource management, irrigation, landscaping, industrial production and industrial automation.

Features

Very low starting flow; minimum measurable velocity 0.01 m/s.
Ultra-low power consumption: <0.00055 W.
Battery operation for 6-10 years or more.
No mechanically rotating parts; ten-year maintenance-free design.
Bidirectional flow measurement.
Cast measuring section for leak-tight construction.
Selectable accuracy: ±1%, ±2% or ±3%.

Technical Data

Standards: ISO4064-2005, GB/T778-2007 and JJG162-2009.
Fluid: water, wastewater or seawater in a full pipe; other liquids by special design.
Fluid temperature: 0.1-30°C.
Ambient: -10°C to +45°C; relative humidity up to 100%.
Pressure: 1.6 MPa; 2.5 MPa optional.
Upstream flow-profile sensitivity: U3; downstream: D0.
Climatic/mechanical environment class: C.
Electromagnetic compatibility: E2.
Communications: RS485 / USART / infrared.
Outputs: two isolated OCT or TTL pulse channels; one two-wire 4-20 mA analog output.
Supply: internal 3.6 V, 19 Ah lithium battery; external 8-36 VDC; or two-wire 4-20 mA loop power.
Protection: IP68; operation 2 m underwater.
Local display: two lines, including 9-digit total volume, 4-digit instantaneous flow, status indicators and units.
Storage: EEPROM/FLASH for parameters; automatically records total flow for the previous 128 months and 512 days.
Measurement cycle: once per second in normal mode; four times per second in verification mode.
Battery life: DN15-DN150 over ten years; DN200-DN300 over six years.

Flow Range Table

DN (mm)	Range ratio R	Minimum Q1	Transitional Q2	Permanent Q3	Overload Q4	Starting flow
DN15	200	0.003	0.0125	0.020	2.500	3.125
DN20	200	0.0035	0.016	0.026	3.200	4.000
DN25	200	0.007	0.020	0.032	4.000	5.000
DN32	200	0.010	0.032	0.050	6.300	7.875
DN40	200	0.015	0.100	0.160	20.000	25.000
DN50	100	0.030	0.400	0.640	40.000	50.000
DN65	0.059	100	0.630	1.008	63.000	78.750
DN80	100	0.064	1.000	1.600	100.000	125.000
DN100	100	0.094	1.600	2.560	160.000	200.000
DN125	100	0.120	2.000	3.200	200.000	250.000
DN150	100	0.270	2.500	4.000	250.000	312.500
DN200	100	0.315	4.000	6.400	400.000	500.000
DN250	100	0.508	4.000	6.400	400.000	500.000
DN300	100	0.770	6.300	10.080	630.000	787.500

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