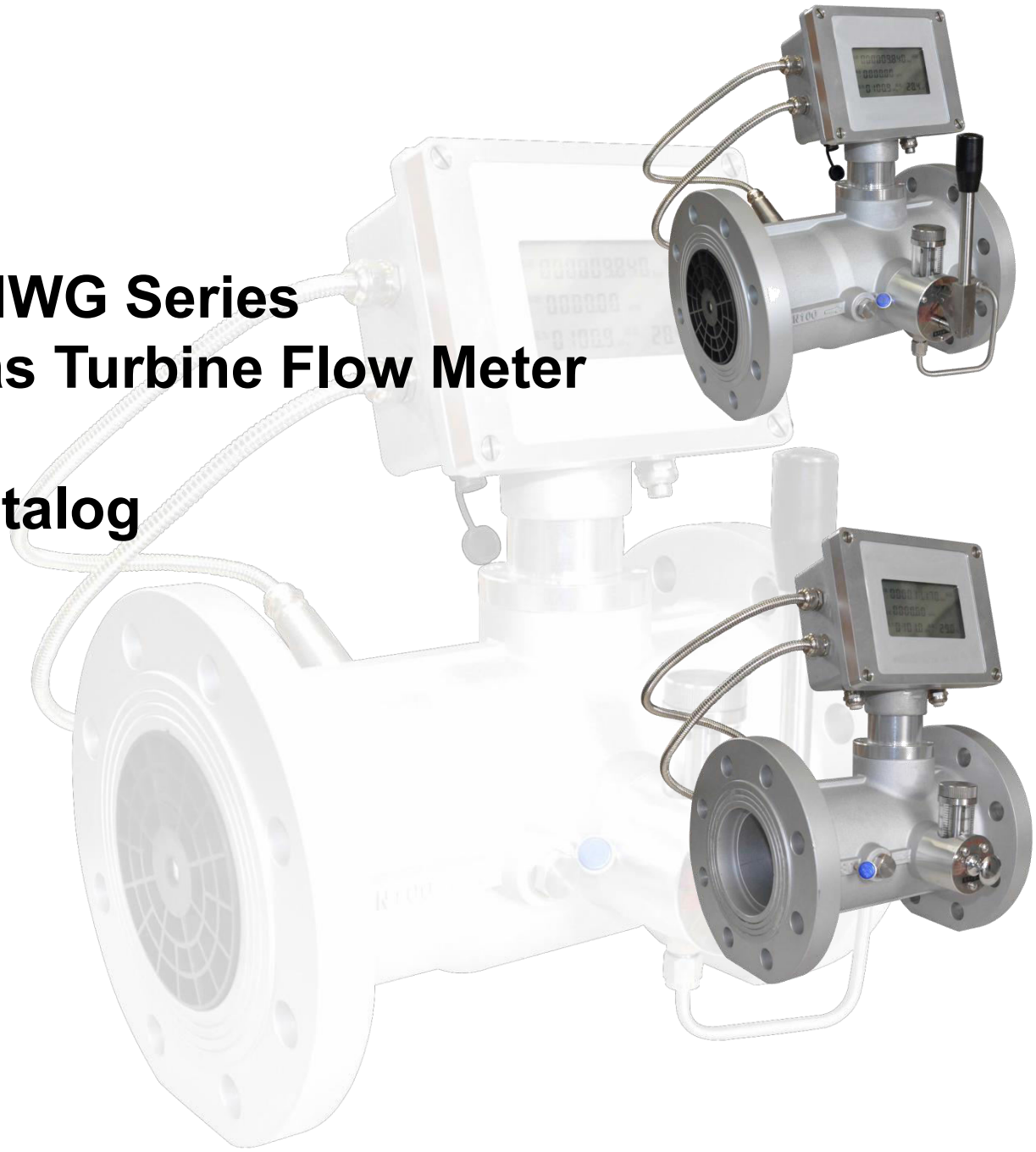
PHWG Series
Gas Turbine Flow Meter

Catalog



Overview

PHWG series gas turbine fow meter is one kind of precision measuring instruments which for gas measuring.This flow meter has the characteristics of low pressure loss,high accuracy,low initiating flow,anti vibration and pulsation flow resistance,widely range ratio etc.

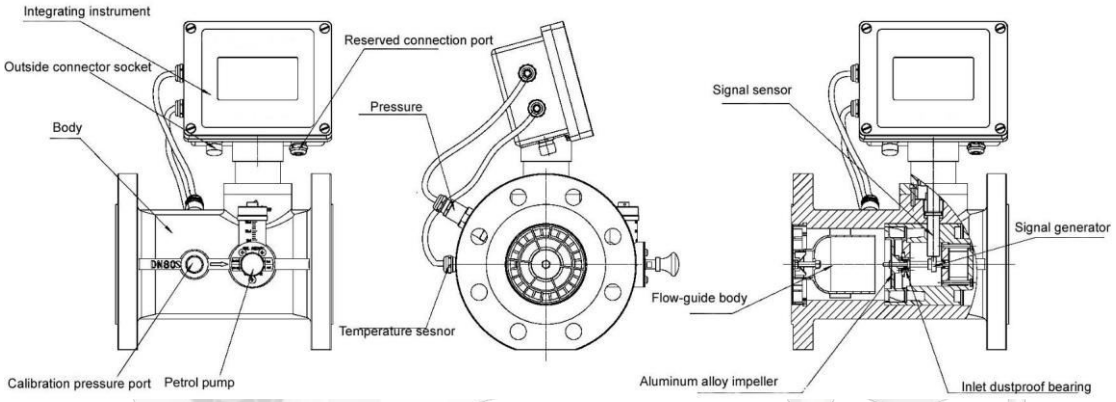
When design PHWG series gas turbine flow meter, we consider the gas compressibility, Volume quantity is closely related with medium temperature and pressure, thus we add the temperature and pressure sensors so that monitor the change of medium temperature and pressure,directly make working condition flow change into standard condition flow and ensure measuring accuracy.

PHWG series gas turbine flow meter could be separately used for gas that is clean,low viscosity,such as Air,Natural gas,LPG,Methane gas,N2,Ar,CO2,CO etc.

PHWG could be widely used in gas measuring from Petroleum, Chemical,Electric power,Industrial boiler etc.In addition,PHWG series gas turbine flow meter also be used in Gas-fired,Gas pipeline network,city gas field etc.

Working Principle

PHWG gas turbine flow meter is made up of base table and display,among them,the base table contains body,Rectifier,Turbo,Temperature sensor,Magnetic switch sensor,Pressure sensor and other important parts.



When medium enter the flow meter,through integration of the two level rectifier,medium be rectified and accelerated,then acts on the turbine blades which make a certain angle with flow direction,same time turbine will produces rotational torque,turbine blades begins to rotate after turbine overcomes the resistance moment and friction moment.When all moments reach balance,invariables turning speed,turbine rotation angular velocity is liner relationship with flow. Utilizing electromagnetic induction principle,through the top magnetizer of rotating turbine generator periodically change magnetic resistance and make magnetic field change accordingly,thus induction of the pulse signal that it is proportional to the volume flow rate.

This signal is amplified by preamplifier and shaped,the signal will be entered into integrating instrument together the temperature and pressure signal,then the integrating instrument will calculate and convert to flow value,the directly display standard instantaneous volume flow and total flow.

Features

- Rectifying device could be installed at the installation condition is not good and medium velocity change larger,also could keep the reliability of measurement.
- Dust-proof structure can effectively prevent the impurity of the medium enter into bearing and cause rapid wear and stuck.
- Low installation requirements,front straight pipe ≥2D,back straight pipe ≥1D,this could ensure the accuracy of flow meter
- Intelligent integration design could dynamically detect the temperature and pressure of medium ,and automatic compensation and compression factor correction,directly display gas standard instantaneous flow and standard total flow.
- Aluminum alloy turbine have some features:High strength,Corrosion resistance,Anti-aging,Long service life,High accuracy and good repeatability.
- Advanced microcomputer technology and high performance single chip make complete meter more powerful and superior performance.
- Advanced double power supply and micro power consumption technology,complete meter with low power consumption.Both could run on battery for a long time (Two lithium batteries could be used 3 years) and also could connect outside power.
- Large screen backlight LCD display,could clearly reading under dark environment.
- Flow meter with pulse output,also could add 4-20mA output,IC card quantitative pulse signal etc. according to user's requirement.
- Adopt RS485 communication,could be matched with MODEM,through telephone network could build automatic reading management system, higher automation.
- Adopt E2-PROM data storage technology,setup parameters could be keep long time after outage.
- The low voltage alarm(≤2.7V) of internal battery could remind user to replace battery.
- The intelligent integrating instrument could rotate 180 degrees,it is convenient reading,Unexpected power outage,Autosave data,Prevent data lost.
- Flow meter with signal output calibration function and could 4,8,16,20mA and 0~1000Hz
- Adopt over wide temperature LCD technology,and LCD could working for -30~80℃.
- Outside power is isolated with main circuit of flow meter, Isolation voltage reach 1000V
- Reliable electromagnetic compatibility design
- One aviation plug,all output terminal

Main Technical Parameters

Using environment	Environment temperature	-25℃~+60℃	
	Medium temperature	-30℃~+80℃	
	Relative humidity	5%RH~95%RH	
	Atmospheric pressure	70kPa~106kPa	
Nominal diameter	DN50~DN400		
Nominal pressure	1.6MPa 、2.5MPa 、4.0MPa		
Range Ratio	Under standard environmental conditions（P=101.325、T=293.15K),range ratio could reach 40 （Note:Small size flow meter,the range ratio will narrow)		
Accuracy Level	Flow Range	1.0	1.5
Max.permissible error	Qmin~0.2Qmax	±2%	±3%
	0.2Qmax~ Qmax	±1%	±1.5%
Note:Qmin is the Min. flow what could measure,Qmax is the Max.flow what could measure,if any special require,0.5% is ok			
Repetitive	During flow range,flow meter's repetitive can't exceed the 1/3 of the Max.permissible error absolute value		
Ex-proof	Exia Ⅱ BT4 Ga;Protect grade:IP65		
Shell material	Aluminum alloy,Carbon steel		
Electrical performance indicators	Power supply	1.Battery power:3.6V lithium battery 2.DC24V(External power): DC18V~DC30V	

Input output	Flow signal: (0~1500)Hz; (Pulse amplitude:3V) Temperature signal: -35℃~+125℃(PT1000,accuracy better than 0.5) Pressure signal: 0MPa~4MPa(Accuracy better than 0.5)
Output signal	Mechanical signal: It is the flow pulse signal which after being amplified and shaped by amplifier (Without correction or correction,only for flow meter calibration); 4mA~20mA: From standard flow transform current analog quantity; IC card pulse signal: 1m3 or 0.1m3 correspond one pulse(Supply IC card controller) Battery under-voltage alarm signal: It is high level at ordinary time, when under-voltage alarm for low level Flow alarm signal:When instantaneous lower than set value, it is low level, it is high level at ordinary time.
Communication	RS485/RS232C(2400bps、4800bps、9600bps)；Communication methods:Half duplex,8 data bits,1 stop bit,Parity NONE;MODBUS;HART
Electrical protection	DC24V supply terminal is isolated with shell and internal processing circuit,could bear one minute shock of DC500V;DC24V supply terminal could resist strong interference of ±500V、10ms RS485/RS232C is isolated with DC24 V and shell,could bear one minute shock of DC500V;DC3.6V supply terminal could prevent mis connection with ±24V,could bear strong interference of ±500V 10ms;RS485 communication port with transient voltage inhibition function, lighting protection, Antistatic discharge,could meet and exceed EIARS-485 and ISD/IEC8482:1993 (E):Electrostatic discharge voltage: All bus pins 8000V(3A),all pins 1200V(3B);Two wire current loop could resit strong shock of 500V、10ms

Flow Range

DN (mm/inch)	Model	Flow specification	Flow range (m3/h)	Qmin (m3/h)	Max.pressure loss (Kpa)	Shell material	Weight(kg)
50(2”)	PHWG-50 (A)	G40	6.5-65	≤ 1.3	0.9	≤16MPa Aluminum alloy >1.6MPa carbon steel Carbon steel	6.5
	PHWG-50 (B)	G65	8-100	≤ 1.6	0.8		
	PHWG-50 (C)	G100	10-160	≤ 2.4	2.0		
80(3”)	PHWG-80 (A)	G100	8-160	≤ 2.4	1.0		9.5
	PHWG-80 (B)	G160	13-250	≤ 3.0	1.6		
	PHWG-80 (C)	G250	20-400	≤ 5.0	2.0		
100(4”)	PHWG-100 (A)	G160	13-250	≤ 3.3	1.0		15
	PHWG-100 (B)	G250	20-400	≤ 4.2	1.6		
	PHWG-100 (C)	G400	32-650	≤ 6.7	1.8		
150(6”)	PHWG-150 (A)	G400	32-650	≤ 7.8	1.6		27
	PHWG-150 (B)	G650	50-100	≤ 10	2.0		
	PHWG-150 (C)	G1000	80-1600	≤ 12	2.3		
200(8”)	PHWG-200 (A)	G650	50-1000	≤ 13	1.6		45
	PHWG-200 (B)	G1000	80-1600	≤ 16	2.0		
	PHWG-200 (C)	G1600	130-2500	≤ 20	2.2		
250(10”)	PHWG-250 (A)	G1000	80-1600	≤ 20	1.2		128
	PHWG-250 (B)	G1600	130-2500	≤ 22	2.0		
	PHWG-250 (C)	G2500	20-4000	≤ 25	2.3		
300(12”)	PHWG-300 (A)	G1600	130-2500	≤ 22	1.6		265
	PHWG-300 (B)	G2500	200-4000	≤ 25	2.0		
	PHWG-300 (C)	G4000	320-6500	≤ 35	2.3		
400(16”)	PHWG-400 (A)	G1600	300-2500	≤ 25	1.8		380
	PHWG-400 (B)	G2500	500-4000	≤ 35	2.0		
	PHWG-400 (C)	G4000	600-8000	≤ 40	2.3		

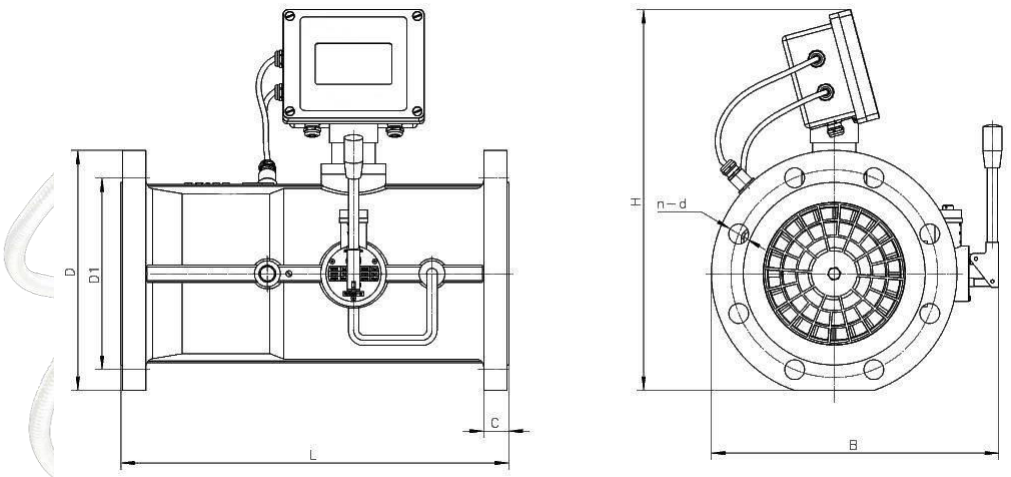
- Accuracy level:
  The accuracy level within the range:1.0%, 1.5%

  1.0%:0.2Qmax~Qmax:±1.0%; Qmin~0.2Qmax:±2.0%

  1.5%:0.2Qmax~Qmax:±1.5%; Qmin~0.2Qmax:±3.0%

Note: 1) “Max.pressure loss” is measured value under standard state,medium is air and flow is Qmax.
2) Shell pressure grade :1.6Mpa,2.5Mpa,4.0Mpa
3) “Weight” is the reference data for each size flow meter,the normal pressure is 1.6Mpa
4) If need other pressure and shell material,please notice

Dimension



DN	L	D	D1	n-d	C	H	B
50(2″)	150	165	125	4-φ18	20	340	275
80(3″)	240	200	160	8-φ18	20	362	280
100(4″)	300	220	180	8-φ18	22	382	285
150(6″)	450	285	240	8-φ22	24	347	370
200(8″)	600	340	295	12-φ22	24	493	390
250(10″)	750	405	355	12-φ26	26	580	480
300(12″)	900	460	410	12-φ26	28	618	535
400(16″)	1200	580	525	16-φ30	32	743	665
Note	1.Flange: GB9113.1-2000 2.The date is under 1.6Mpa 3.Unit:mm						

5. Selection

Model	PHWG	
DN	XX	XX--Nominal dia. Such as 100 standard DN100
Structure	M	Compact type
Output	I0	I0--Two wire current output
	IC	Ic-- IC card quantitative output
	QA	QA-- Flow alarm
	R4	R4--RS485
	R2	R2--RS232
	RM	RM --Standard MODBUS communication protocol
	RH	RH --Standard HART communication protocol
Converter	1	1--Without temperature and pressure compensation
	2	2--With temperature and pressure compensation
Power supply	0	0--External power 24—30VDC(two wire)
	1	1--External power 24—30VDC (Three wire)
	2	2--Lithium battery（3.6VDC）
Working pressure	P1	0.5MPa
	P2	1.0MPa
	P3	1.6MPa
	P4	2.5MPa
	P5	4.0MPa
Ex-proof	NE	Without Ex-proof
	EX	With Ex-proof