

THERMAL GAS FLOW SENSOR IP65



- THERMAL MASS · 5 ... 6000 L/MIN · R1/2 ... G1-1/2
- COLOUR DISPLAY, REVERSIBLE 180° · IP65
- TWO SWITCHES · PULSE · 1 ... 5 V · 4 ... 20 MA · RS485

KEY DATA

Property	Value	Property	Value
Flow range	5 ... 6000 L/min, by size	Media	Dry air · nitrogen
Display accuracy	± 3 % F.S. ± 1 digit	Repeatability	± 1 % F.S. ± 1 digit
Working pressure	0 ... 1.0 MPa	Protection grade	IP65
Output	2 switches · pulse · 1 ... 5 V · 4 ... 20 mA · RS485 · IO-Link	Consumption	≤ 50 mA
Medium temperature	0 ... +50 °C	Ambient temperature	0 ... +50 °C

A thermal mass meter: the sensor is heated and the gas stream carries heat away; how much it carries is the mass flow. Five sizes: 5 ... 500, 10 ... 1000, 20 ... 2000, 30 ... 3000 and 60 ... 6000 L/min.



MEASUREMENT

Measuring principle	Thermal mass · heat carried away by the gas stream
Media	Dry air, nitrogen (N ₂) · non-corrosive and non-flammable
Direction	One-way
Rated flow	5 ... 500 · 10 ... 1000 · 20 ... 2000 · 30 ... 3000 · 60 ... 6000 L/min
Display range	3 ... 525 · 8 ... 1050 · 15 ... 2100 · 25 ... 3100 · 50 ... 6100 L/min
Accuracy range	2 ... 100 % F.S.
Display accuracy	± 3 % F.S. ± 1 digit (1)
Analogue accuracy	± 5 % F.S. (1)
Repeatability	± 1 % F.S. ± 1 digit · ± 2 % F.S. at 50 ms (2)
Linearity	± 3 % F.S. (2)
Temperature effect	± 5 % F.S. (2)
Pressure effect	± 5 % F.S. ± 1 digit (3)
Response time	≤ 100 ms on the analogue output · 800 ms on the switches, selectable down to 50 ms

MATERIALS AND PROCESS

Process connection	Rc1/2 · G1/2 · G3/4 · G1 · G1-1/2, by size
Working pressure	0 ... 1.0 MPa
Pressure resistance	1.5 MPa
Protection grade	IP65
Medium temperature	0 ... +50 °C · no dew and no freezing
Ambient temperature	0 ... +50 °C · storage -10 ... +60 °C
Humidity	35 ... 85 % RH, no dew · in operation and in storage
Insulation	≥ 2 MΩ at 50 Vdc between leads and plastic housing
Withstand voltage	250 Vac for one minute
Vibration	1.5 mm or 10 g, 10 ... 55 ... 10 Hz per minute, two hours in each of the three axes
Shock	100 m/s ² (10 g), three times in each of the three axes
EMC	IEC 61000-6-2 and IEC 61000-6-4

ELECTRICAL PROPERTIES

Consumption	≤ 50 mA
Switch outputs	Two · PNP by default, or NPN · short-circuit protected
Switch modes	Response difference, window, cumulative flow, cumulative flow pulse
Pulse	5 · 10 · 20 · 30 · 60 litres per pulse by size · full scale 100 Hz
Voltage output	1 ... 5 V · output impedance 1 kΩ
Current output	4 ... 20 mA · load ≤ 300 Ω
Communication	RS485 · IO-Link
Electrical connection	M8 x 1 four-pin plug

DISPLAY

Display	Colour LCD · can be turned by 180°
Instantaneous unit	1 L/min or 0.1 ft ³ /min
Totalized range	99 999 999 L
Totalized unit	1 L or 1 ft ³

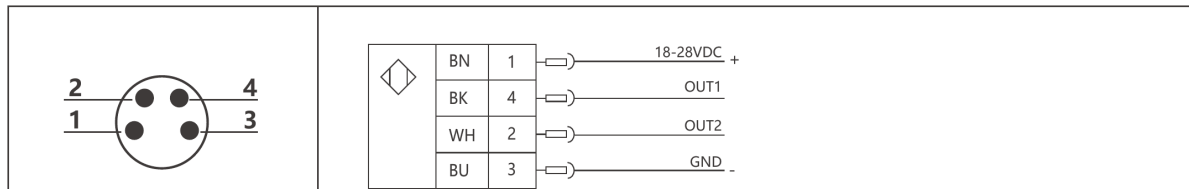
(1) Measured with 600 kPa at the inlet, one atmosphere at the outlet and 25 °C.

(2) Measured with one atmosphere at the outlet and 25 °C.

(3) Measured over 0 ... 1.0 MPa with one atmosphere at the outlet and 25 °C.



WIRING



Left the four pins of the M8 plug seen from outside, right the four cores with their pin numbers. What each core carries depends on the output version — see the table below.

Wire colours to IEC 60757: BN brown, BU blue, BK black, WH white. Four cores in every version — what the black and the white core carry is set by the third field of the order code, so a cable made for one version fits another mechanically but not functionally. The connector is an M8 × 1 four-pin plug; the factory configuration is a two-metre moulded cable.

WIRING

Core	Pin	S2 · two switches	SA · one switch + 4 ... 20 mA	SV · one switch + 1 ... 5 V	RS · RS485
BN	1	Supply +	Supply +	Supply +	Supply +
BU	3	Supply -	Supply -	Supply -	Supply -
BK	4	Switch 1 · PNP by default, or NPN · original or linear frequency (100 Hz F.S.) · IO-Link	Switch 1 · PNP by default, or NPN · frequency · IO-Link	Switch 1 · PNP by default, or NPN · frequency · IO-Link	RS485 (A)
WH	2	Switch 2 · PNP by default, or NPN	Flow · 4 ... 20 mA	Flow · 1 ... 5 V	RS485 (B)

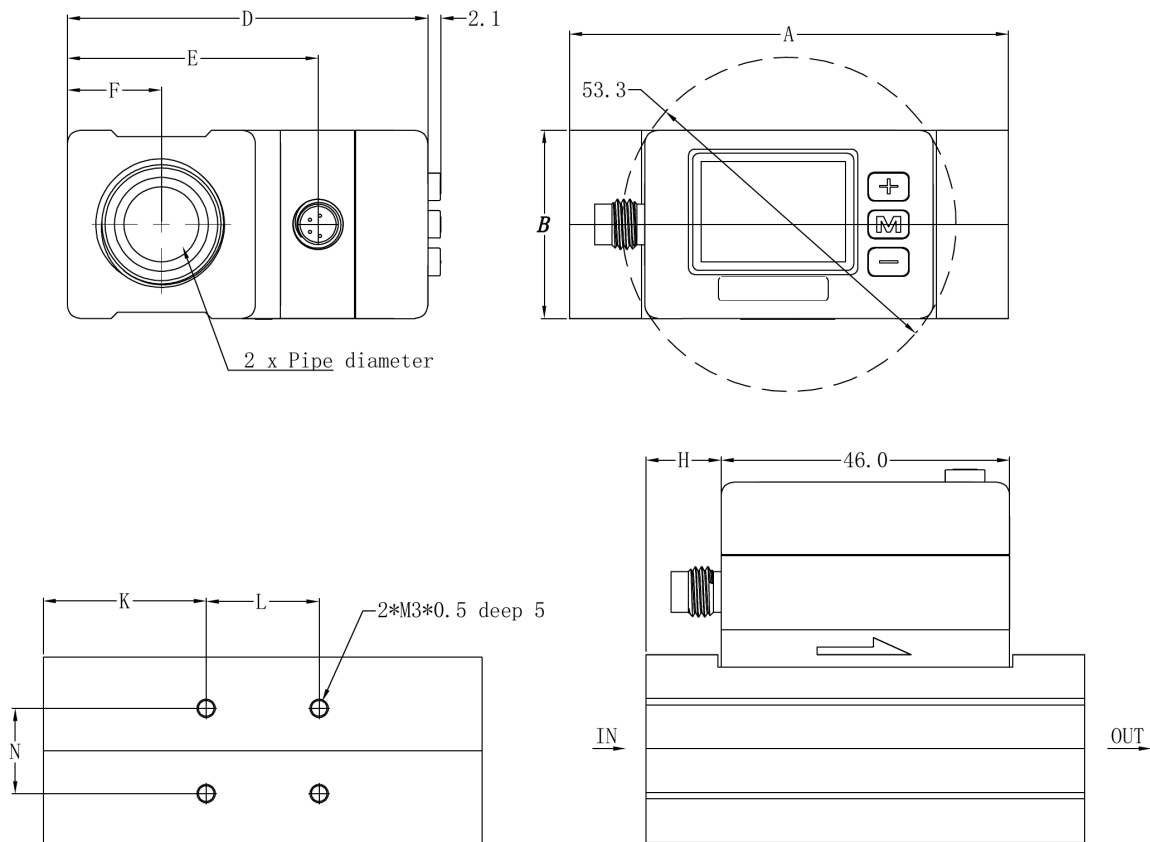
The thread column is not part of the order code; its fourth field distinguishes only a G from an Rc thread. The pulse column is the cumulative pulse output in litres per pulse; in cubic feet the values are 20, 40, 80, 120 and 240 ft³ per pulse.

VERSIONS

Code	Rated flow (L/min)	Display range	Pulse	Thread
01	5 ... 500	3 ... 525	5 L	Rc1/2 or G1/2
02	10 ... 1000	8 ... 1050	10 L	Rc1/2 or G1/2
03	20 ... 2000	15 ... 2100	20 L	G3/4
04	30 ... 3000	25 ... 3100	30 L	G1
05	60 ... 6000	50 ... 6100	60 L	G1-1/2



DIMENSIONS (mm)



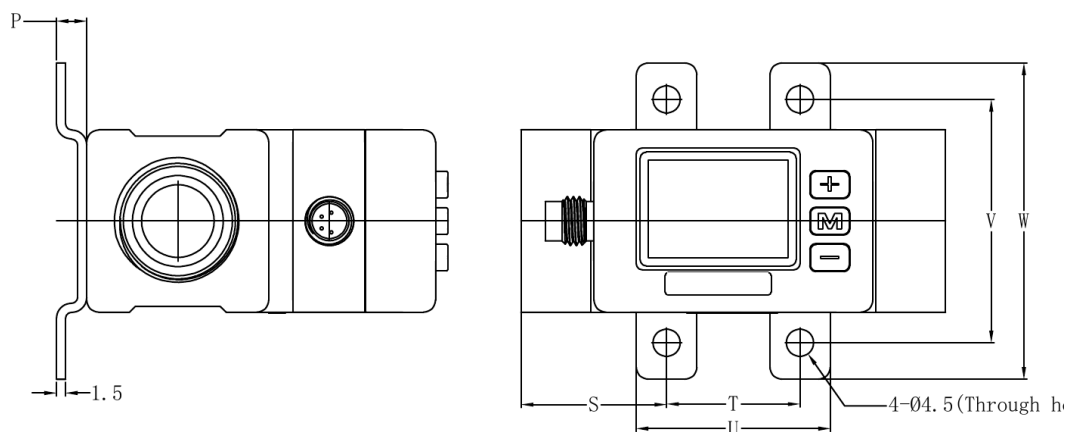
The letters of the drawing are the columns of the table below.

A is the overall length, B the height of the body, D the width over the head, E and F the two distances to the connection axis, H the thread length, K and L the mounting hole spacings and N the distance between the two rows. The head is 46.0 mm deep and 2.1 mm proud of the body, the display diagonal 53.3 mm, and the mounting holes are 2 × M3 × 0.5, 5 mm deep. The table gives one row per thread size.

OVERALL DIMENSIONS (mm)

Thread	A	B	D	E	F	H	K · L	N
Rc1/2	70	30	57.5	40	15	12	26 · 18	13.6
G1/2	76	30	57.5	40	15	12	26 · 18	13.6
G3/4	90	35	62.5	45	17.5	22	31 · 28	16.8
G1	110	45	73.5	56	22.5	32	25 · 60	30
G1-1/2	170	60	88.5	71	30	62	45 · 80	40





The fixed frame with the device fitted. Its five sizes are listed in the accessories section.



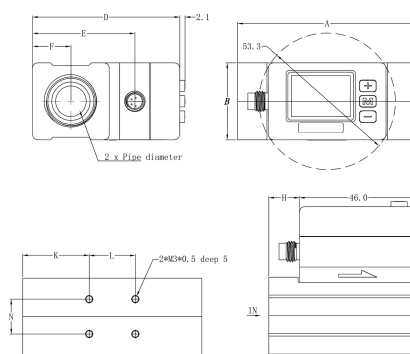
COMPLIANCE AND CERTIFICATION

Protection grade	IP65
EMC	IEC 61000-6-2 and IEC 61000-6-4
Measuring principle	Thermal mass
Accuracy	$\pm 3\%$ F.S. ± 1 digit on the display, $\pm 5\%$ F.S. on the analogue output
Repeatability	$\pm 1\%$ F.S. ± 1 digit
Pressure rating	1.0 MPa working, 1.5 MPa resistance

ORDER CODE

Accessories

- Two accessories. The fixed frame is the fifth field of the order code, one size per device: 24 / 22 / 32 / 40 / 50 mm for the two smallest, 30 / 30 / 42 / 48 / 58 for the G3/4, 27.5 / 55 / 70 / 60 / 71 for the G1 and 45 / 80 / 90 / 80 / 96 for the G1-1/2, each 1.5 mm thick with four $\varnothing 4.5$ through holes. The cable is an M8 four-pin moulded lead in 2, 5 or 10 metres; two metres is the factory configuration. Order numbers M84PC02G, M84PC05G and M84PC010G.



Connector
M8 x 1 · 4-pin

Cable
2 · 5 · 10 m

Example: QGKN-01-S2-GK. The fourth field says only whether the thread is a G or an Rc; the thread size is not part of the order code and has to be stated with the order.

ORDER CODE

Field	Code	Meaning
1 Series	QGKN	QGKN thermal gas flow sensor
2 Range	01 · 02 · 03	500 · 1000 · 2000 L/min
	04 · 05	3000 · 6000 L/min
3 Output	S2	Two switches / pulse frequency / IO-Link
	SA	One switch / pulse frequency / IO-Link + 4 ... 20 mA
	SV	One switch / pulse frequency / IO-Link + 1 ... 5 V
	RS	RS485
4 Thread	GK	G internal thread
	RK	Rc internal thread
5 Bracket	—	None
	T	Fixed frame

