

SCREW GEAR FLOWMETER

For High Viscosity Liquids



FHG-1000 Series



- ✓ Pulsation-Free Measurement
- ✓ Lowest Pressure Loss for High Viscosity
- ✓ Short Response Time
- ✓ Up to 1,000,000 Centistoke Viscosity
- ✓ High Accuracy and Wide Ranges



FHG-1000 shown smaller than actual size.

FHG-1000 flowmeters measure the flow rate based on the screw pump principle. A pair of rotors fitted precisely into the housing constitutes the measuring element. An integrated gear and non-contact signal pick-up system detects the rotations of the measuring element and converts them to digital pulses. Together with the housing walls, the rotor edges form closed measuring chambers in which the fluid is transported from the inlet to the outlet side. The fluid volume put through within one main rotor rotation is the rotation volume, which is divided by the sensing gear and digitized, processed and output in the sensor module.

Sensor System Explanation

The non-contact pick-up system consists of two GMR-bridges (sin/cos), which are located in a sensor unit in cartridge design. It detects the movement of the sensing gear and routes the sin/cos-signals to the preamplifier electronics. The preamplifier electronics digitize and amplify the sensor signals and multiply them by a high-resolution interpolator using adjustable settings. The square wave signals are bidirectional and can be utilized by any evaluating instrument as well as computers and PLC-controls. The resolution is selectable in steps from factor 1 to 128. In case of an 1-channel evaluation, a separate directional signal is available. An adjustable pulse filter can offset and suppress negative flows (e.g. generated by vibrations) while still in the device. The frequency of the output signals is proportional to the flow (volume flow) and depends on the respective flowmeter size. The frequency range is from 0 to 100 kHz. The preamplifier is protected against reverse polarity and incorrect connection. It is suitable for fluid temperatures of -30 to 120°C (-22 to 248°F) and is mounted directly on the flowmeter.

Flowmeter Selection

For the trouble-free, safe and reliable operation of the flowmeters, selecting the correct type and size is critical. Because of the wide variety of applications and flowmeter designs, the technical data in the specifications are of a general nature. Certain properties of the devices depend on type, size, and measurement range as well as the liquid to be measured. Please contact the OMEGA Flow Department for detailed information about the appropriate flowmeter for your particular application.

Electronics

A special sensor system detects any movement of the pair of rotors or of the liquid column. For this purpose, a precision gear connected to a shaft of the rotor pair is scanned by a special magneto-resistive sensor. The scanning sensor includes two GMR-bridges (sin/cos) and is housed in a removable stainless steel cartridge case together with a signal conditioning and amplifier unit. The downstream electronics unit features a high-resolution sin/cos-interpolator, which is adjustable with 10 different resolution factors. Furthermore, a programmable signal filter is available as well, which can offset unwanted negative pulse sequences up to an adjustable degree. In addition, a signal for a separate direction detection, e.g. in case of a 1-channel evaluation, is provided by the electronics. Optionally, this output can be used for the detection of excess flows and temperatures.



SPECIFICATIONS

Frequency Range: 0 to 100 kHz, adjustable

Measurement Accuracy: $\pm 0.5\%$ of measured value with viscosity of > 21 cSt

Repeatability Accuracy: $\pm 0.05\%$ with same operating conditions

Materials

Gray Cast Iron Model: EN-GJS-400-15 (EN 1563)/16 Mn Cr 5

Stainless Steel Model: Stainless steel 1.4305/1.4112, others available upon request

Bearing Fluid: Dependent as anti-friction bearing or SSIC/wolfram carbide friction bearing

Seal:

Standard: FPM

Optional: PTFE, NBR or EPDM

Fluid Temperature: -30 to 120°C (-22 to 248°F)

Viscosity Range: 1 to 1.000.000 cSt

Installation Position: Any

Supply Voltage: 10 to 28 Vdc

Current Consumption: 65 mA at 24 Vdc unloaded

Delay: $< 8 \mu\text{s}$

Protection Class: IP65

Power Supply

Supply Voltage: $u = 10$ to 28 Vdc; reverse pole protection

Current Consumption: $I_0 = 65$ mA (at 24 Vdc); unloaded

Delay: $t_V = 8 \mu\text{s}$ maximum (between scanning and measured value)

Signal Outputs

Output Signal Shape: Quadrature signals (A, B with 90° phase shift)

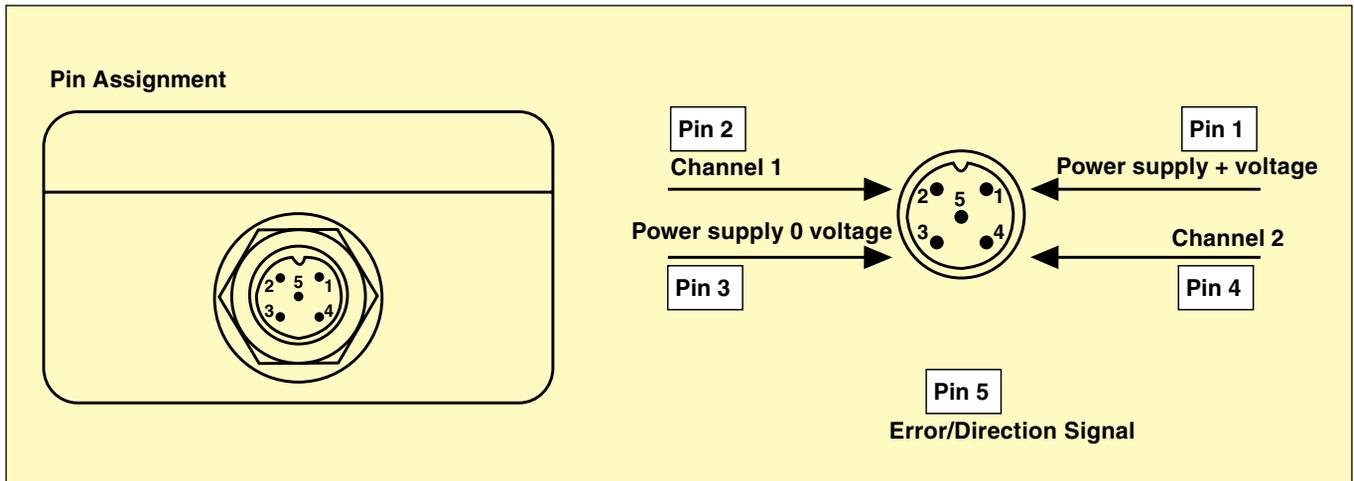
Directional Output: Positive high (24V), negative low (0.8 to 1V)

Error Output: Active high (24V), inactive low (0.8 to 1V)

Maximum Output Frequency: 100 kHz

Signal Voltage Output: $V_{SS} = 9$ to 27 Vdc (channel 1, channel 2, error/direction)

Signal Output: Current $I_{out} = 300$ mA maximum at 24 Vdc (channel 1, channel 2)



To Order

Model No.	Flow Range LPM (GPM)	Housing Material	Bearing Type	Flange Connection
FHG-1112	0.5 to 120 (0.13 to 32)	Cast iron	Ball	SAE Metric $\frac{3}{4}$ " 6000 psi
FHG-1122	0.5 to 120 (0.13 to 32)	Cast iron	Hard metal	SAE Metric $\frac{3}{4}$ " 6000 psi
FHG-1212	0.5 to 120 (0.13 to 32)	Stainless steel	Ball	SAE Metric $\frac{3}{4}$ " 6000 psi
FHG-1222	0.5 to 120 (0.13 to 32)	Stainless steel	Hard metal	SAE Metric $\frac{3}{4}$ " 6000 psi
FHG-1114	1 to 500 (0.26 to 132)	Cast iron	Ball	SAE Metric $1\frac{1}{4}$ " 6000 psi
FHG-1124	1 to 500 (0.26 to 132)	Cast iron	Hard metal	SAE Metric $1\frac{1}{4}$ " 6000 psi
FHG-1214	1 to 500 (0.26 to 132)	Stainless steel	Ball	SAE Metric $1\frac{1}{4}$ " 6000 psi
FHG-1224	1 to 500 (0.26 to 132)	Stainless steel	Hard metal	SAE Metric $1\frac{1}{4}$ " 6000 psi
FHG-1115	4 to 1000 (1 to 264)	Cast iron	Ball	SAE Metric 2" 6000 psi
FHG-1117	10 to 3000 (2.6 to 793)	Cast iron	Ball	SAE Metric 4" 490 psi
FHG-CABLE	Recommended connection cable 5 m (16.4') long, M12 5-pin shielded, meter plug to stripped leads			

Comes complete with operator's manual.

Ordering Example: FHG-1112, cast iron, ball bearing, SAE $\frac{3}{4}$ " 6000 psi flanged screw gear meter with FHG-CABLE, 5 m (16.4') connection cable with M12 5-pin plug and stripped leads.