



High Precision Turbine Wheel Flow Meter

for Liquids

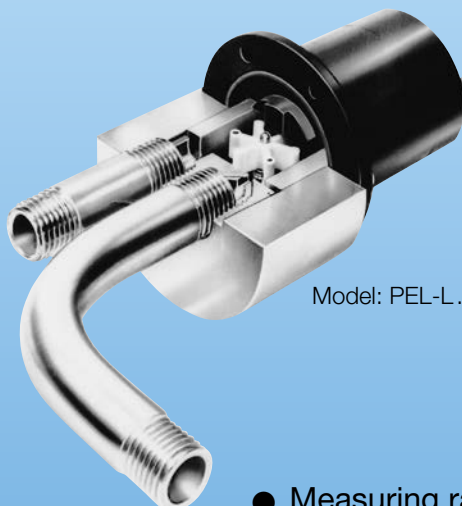


measuring
•
monitoring
•
analysing

PEL



Model: PEL-LMX



Model: PEL-L...

- Measuring ranges:
0.006-0.1 ... 10-500 l/min water
- Measuring accuracy: $\pm 1.25\%$ f. s.
- p_{\max} : 345 bar; t_{\max} : 135 °C
- Viscosity range: low viscosity,
max. 10 mm²/s
- Connection: R $\frac{1}{4}$, R $\frac{1}{2}$,
hose connector 8 mm /11 mm
intermediate flange DN 40 ... DN 50
- Material: Nylon[®], stainless steel,
PVC, titanium
- Output: pulses



KOBOLD companies worldwide:

ARGENTINA, AUSTRIA, BELGIUM, BULGARIA, CANADA, CHILE, CHINA, COLOMBIA, CZECHIA, DOMINICAN REPUBLIC, EGYPT, FRANCE, GERMANY, GREAT BRITAIN, HUNGARY, INDIA, INDONESIA, ITALY, MALAYSIA, MEXICO, NETHERLANDS, PERU, POLAND, ROMANIA, SINGAPORE, SOUTH KOREA, SPAIN, SWITZERLAND, TAIWAN, THAILAND, TUNISIA, TURKEY, USA, VIETNAM

KOBOLD Messring GmbH
Nordring 22-24
D-65719 Hofheim/Ts.
Head Office:
+49(0)6192 299-0
+49(0)6192 23398
info.de@kobold.com
www.kobold.com

Description

The sensor principle based on a Pelton water wheel is remarkable for its high reliability – proven over more than ten years of service. This flow meter is to be found in applications in a variety of plants, where not only negligible volumetric flow rates of media such as fuels, distilled water, or hot greases are measured, but also high flow rates normally found in power stations. The sensors satisfy almost all industrial requirements with temperature limits of 135 °C and nominal pressures up to 345 bar (higher pressures upon request). Only V4A Supra stainless steel (material no. 1.4571) or titanium is used for metallic parts. Swiss precision bearings ensure long service life and reliability. Sensors with solid sapphire bearings and no metal parts have been developed to measure aggressive liquids such as sulphuric acid and hydrochloric acid.

Other critical media such as toluene and vinyl chloride can be measured in hazardous environments. Sensors made of less expensive materials are used for less sophisticated conditions.

Function principle

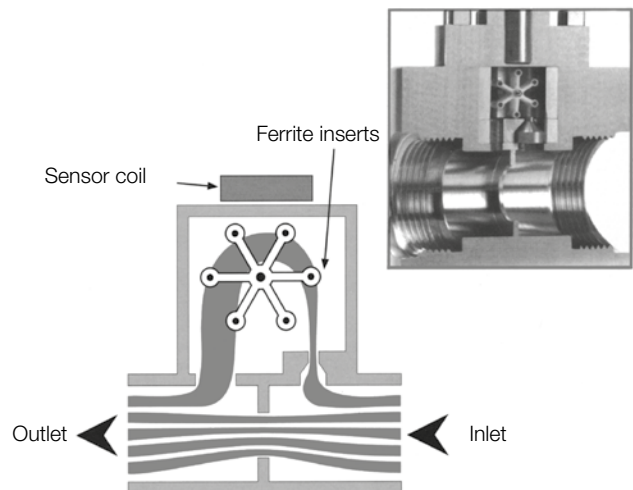
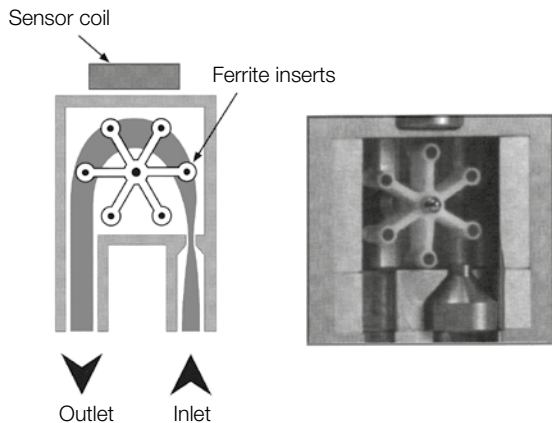
The model PEL flow meter works on the turbine wheel principle. The heart of this device is a Pelton turbine supported by tungsten/sapphire bearings. The Pelton turbine is an impeller with ferrite inserts embedded in the blade tips. When this turbine is brought into rotary motion, the motion is recorded by a coil mounted nearby; the resulting electrical impulses are passed to a control unit for further processing.

Model PEL-L... for low flow rates

- Linearity: 1% full scale
- Repeatability: < ±0.2% at 90% of range
- Accuracy: ±2% of actual reading for 10-100% of range
±0.5% FSD for 0-10% of range
- Measuring range: 100:1 up to 280:1

Model PEL-M... for higher flow rates

- Linearity: 1% full scale
- Repeatability: < ±0.25% at 90% of range
- Accuracy: ±1.25% full scale at 10-100% of measuring range
- Measuring range: at least 50:1


















Model KOBOLD PEL-L flow meters measure the entire volumetric flow that passes through the instrument. A nozzle guides the flow to the impeller. The resulting turbine rotation is proportional to the flow rate.

A small sensing coil signals the approach of the ferrite inserts contained in the impeller. An output signal with constant current is then produced by the electronics.

The KOBOLD PEL-M devices comprise a Pelton turbine and screen.

A small part of the total volumetric flow is forced through the Pelton turbine by the differential pressure at the screen. The total flow can be determined from the partial flow, as the relationship between partial flow and total flow is always constant. This method is especially suited for high flow rates and is used in lines up to DN300.

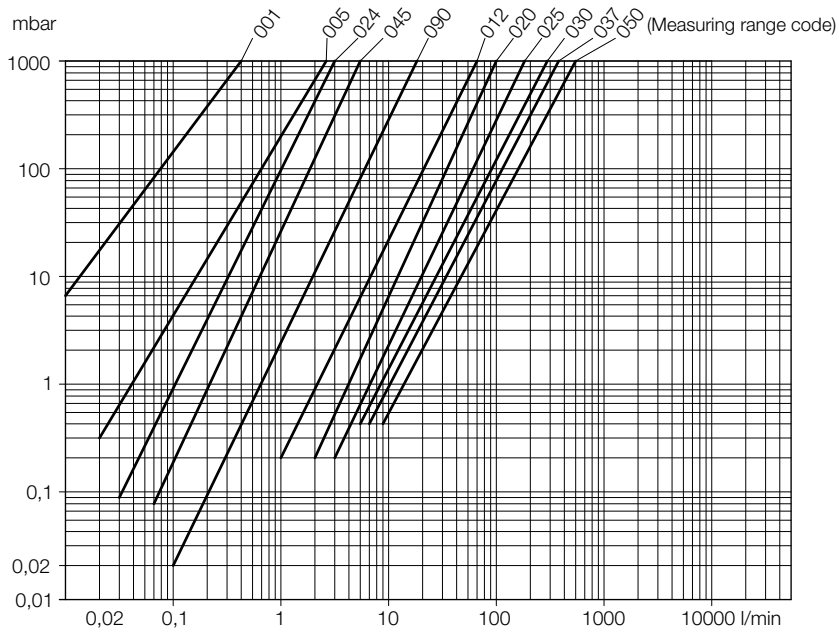
Model	Meas. range [l/min]	Version								
		...GN1...	...LMX...	...SPF...	...S03...	...S10...	...S20...	...S34...	...Ti1...	
PEL-L000...	0.006-0.1									
PEL-L001...	0.01-0.25									
PEL-L005...	0.02-1.3									
PEL-L024...	0.03-4.3									
PEL-L045...	0.04-6.3									
PEL-L090...	0.08-15									
PEL-L220...	0.1-28									
Process connection	hose conn. ø 8 mm /11 mm incl. mounting	male thread R 1/2	male thread R 1/4	male thread R 1/4	male thread R 1/4	male thread R 1/4	male thread R 1/4	male thread R 1/4	male thread R 1/4	
Housing	glass/Nylon®*	VA	VA	VA	VA	VA	VA	VA	Ti	
Electronic housing	VA	Alu	Alu (shaft in VA)							
Turbine ring	VA	VA	VA	VA	VA	VA	VA	VA	Ti	
Rotating vane	glass/Nylon®	PFA	PFA	PFA	PFA	PFA	PFA	PFA	PFA	
Rotating vane bearings		sapphire (mounting VA)								Ti
Rotating vane axle	VA/sapphire	VA/sapphire	VA/sapphire	VA/sapphire	VA/sapphire	VA/sapphire	VA/sapphire	VA/sapphire	Ti	
O-ring		FPM (optional: EPDM, Kalrez, PTFE covered FPM)								
p _{max}	5 bar	100 bar	40 bar	30 bar	100 bar	200 bar	345 bar	50 bar		
t _{max}	75 °C	100 °C	70 °C	135 °C	135 °C	135 °C	135 °C	135 °C		
Version electronic housing	rubber cap	rubber cap	rubber cap	housing IP 65	housing IP 65	housing IP 65	housing IP 65	housing IP 65		

Model	Meas. range [l/min]	Connection size	Version						
			...LMX...**	...SPF...	...S10...	...Ti1...***	...PVC...		
PEL-M012...	1-65	R 1/2							
PEL-M020...	2-130	R 3/4							
PEL-M025...	3-160	R 1							
PEL-M030...	5-220 (p _{max} 66 bar)	R 1 1/4							
PEL-M037...	7-350 (p _{max} 54 bar)	DN 40							
PEL-M050...	10-500 (p _{max} 40 bar)	DN 50							
Process connection			male thread R 1/2	female thread R 1/2 ... R 1 1/4 IG or intermediate flange DN 40/DN 50	female thread R 1/2 ... R 1 1/4 IG or intermediate flange DN 40/DN 50	female thread R 1/2 ... R 1 1/4		glue-in pipe DN 15 ... DN 50	
Housing			VA	VA	VA	Ti	PVC		
Electronic housing			Alu	Alu (shaft in VA)				PVC	
Turbine ring			VA	VA	VA	Ti	PVC		
Rotating vane			PFA	PFA	PFA	PFA	glass/Nylon®*		
Rotating vane bearings			sapphire (mounting VA)						
Rotating vane axle			VA/sapphire	VA/sapphire	VA/sapphire	VA/sapphire	Ti		
O-ring			FPM	FPM	FPM	FPM	FPM		
p _{max}			100 bar	40 bar	100 bar	50 bar	5 bar		
t _{max}			100 °C	70 °C	135 °C	135 °C	60 °C		
Version electronic housing			rubber cap	housing IP 65	housing IP 65	housing IP 65	rubber cap		

* Glass-fibre reinforced Nylon® **Version for PEL-M012 only *** not for PEL-M037 and PEL-M050



Flow rate pressure loss diagram



Technical Details

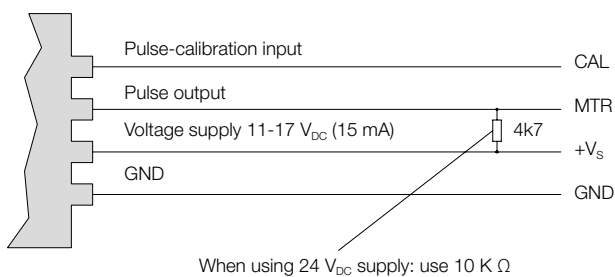
Standard pulse output (Code F)

Power supply: 11-17 V_{DC}, max. 8-15 mA

Signal: +2 V up to max. V_S

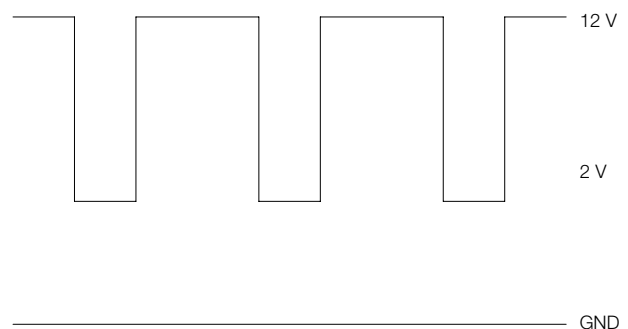
Electrical connection

Standard pulse output



Voltage level - pulse output

With 12 V_{DC} power supply



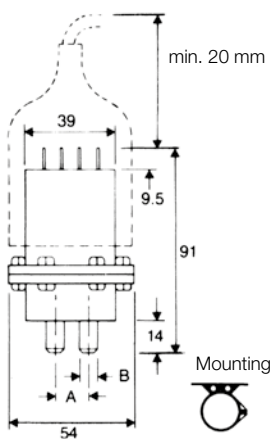
Order Details (example: **PEL-L000 GN1 F**)

Measuring range* [l/min]	Model	Version/material	Evaluating electronics
0.006-0.1	PEL-L000	...GN1... ...LMX... ...SPF... ...S03... ...S10... ...S20... ...S34... ...Ti1...	...F = standard pulse output 11-17 V _{DC} , 8-15 mA
0.01-0.25	PEL-L001		
0.02-1.3	PEL-L005		
0.03-4.3	PEL-L024		
0.04-6.3	PEL-L045		
0.08-15	PEL-L090		
0.1-28	PEL-L220		
1-65	PEL-M012		
2-130	PEL-M020	...SPF... ...S10... ...Ti1... ...PVC...	
3-160	PEL-M025		
5-220	PEL-M030	...SPF... ...S10... ...PVC...	
7-350	PEL-M037		
10-500	PEL-M050		

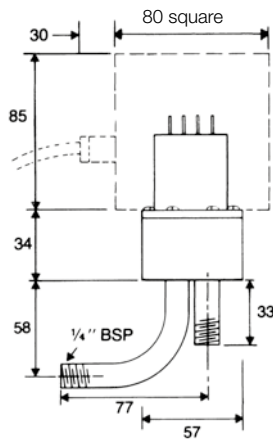
*Higher measuring ranges upon request

Dimensions

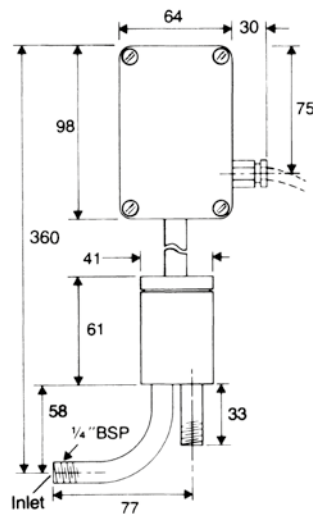
PEL-L...GN1



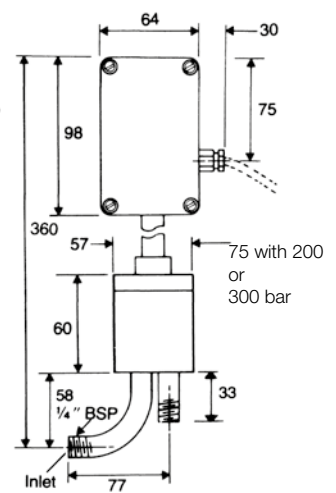
PEL-L... SPF



PEL-L... S03 / ...Ti1



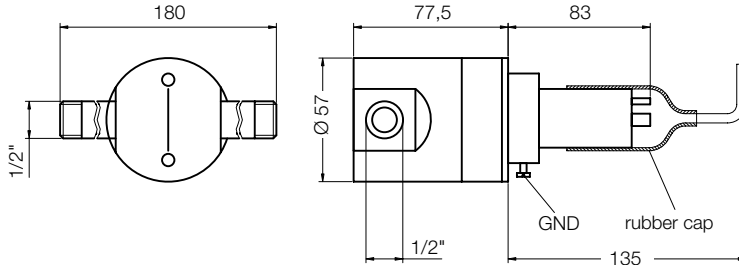
PEL-L... S10 / ...S20 / ...S34



PEL-L	... 000 up to ... 090	... 220
A	14 mm	17 mm
B	8 mm	11 mm

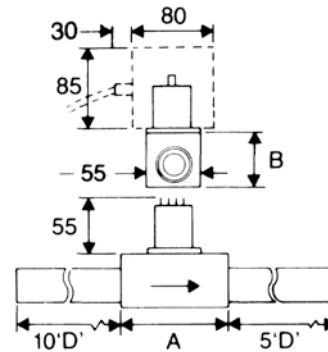


PEL-L...LMX



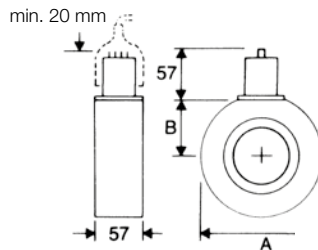
PEL-M...PVC

PEL-M	...012PVC	...020PVC	...025PVC	...030PVC
A	65 mm	65 mm	85 mm	95 mm
B	45 mm	50 mm	60 mm	65 mm
DN	12.5 mm	20 mm	25 mm	30 mm



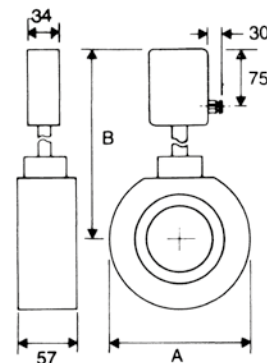
PEL-M037PVC, PEL-M050PVC

PEL-M	...037PVC	...050PVC
A	89 mm	106 mm
B	36 mm	44 mm
DN	40	50



PEL-M037SPF, PEL-M050SPF, PEL-M037S10, PEL-M050S10

PEL-M	...037	...050
A	89 mm	106 mm
B	300 mm	308 mm
DN	40	50



PEL-M... SPF, ... S10, ...Ti1

PEL-M	...012	...020	...025	...030
A	75 mm	75 mm	95 mm	95 mm
B	60 mm	60 mm	75 mm	75 mm
DN	R½	R¾	R1	R1¼

