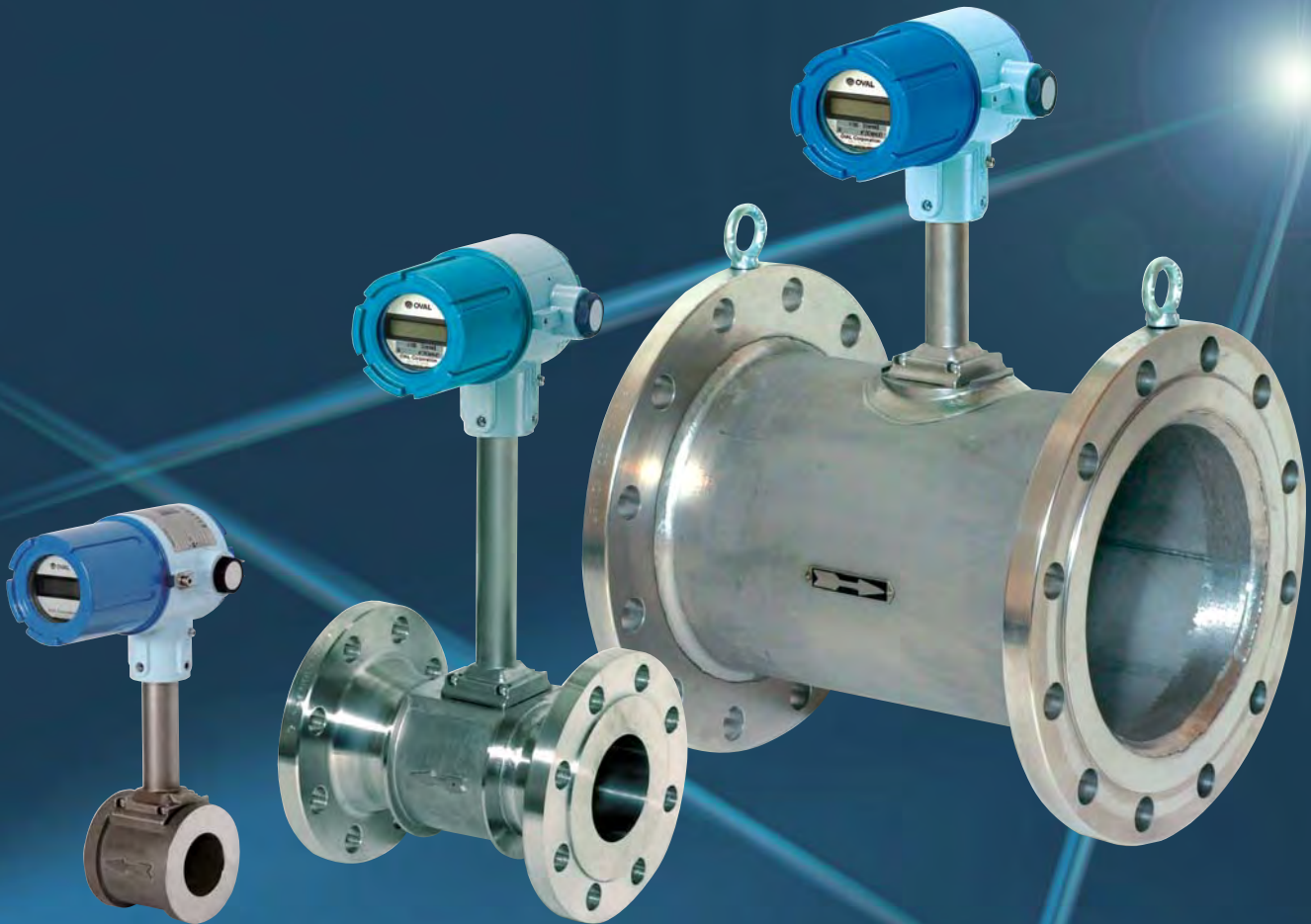


EX DELTA II

Excellent Vortex Flowmeter



Features

Wide application and outstanding performance

A triangular-section vortex shedder combined with a piezoelectric sensor can measure liquid, gas, and steam flows to a high degree of accuracy.

Easy to use and economic benefits

Durable and simple design. Easy to use, easy to service. The net result is substantial savings in initial cost, running expense, and total cost.

Increased safety















Unobstructed flow path with minimum seals. Replaceable type in particular permits the operator to service the sensor intact without the need of interrupting the fluid flow.

Saves energy and space

Small pressure loss is synonymous with energy saving. A dedicated flow straightener reduces installation space requirements, too.

We can meet the need of wide range flow measurement

A variety of combinations gives you a wider range of configuring flow measurement systems

Product Name	Acceptable Fluid	Bluff Body	Basic Meter	
Standard EX DELTA II	  		 Replaceable Sensor	 Fixed Sensor
			 Hottap Type	 Fixed Type
EX DELTA II -DIA designed for "dirty" fluids	  		 Replaceable Sensor	 Fixed Sensor



EX DELTA II -fixed sensor type

Basic model of the EX DELTA II. One flowmeter can measure liquid, gas or steam flow. Having a wide flow and temperature range, it can be extensively used in numerous applications.

GS. No. GBD642E



EX DELTA II -battery powered

Operates on batteries. Requiring no external power source and related work means cost savings. The battery pack is good for 7 years on a 24-hours-a-day basis (model with integrally mounted transmitter). Can monitor the total flow and instantaneous flowrate on a digital display in this user-friendly meter.

GS. No. GBD661E, 606E



EX DELTA II replaceable sensor type

Servicing the vortex sensor does not interrupt the process fluid or require removal of the meter from the pipeline. Particularly suited for long-running processes or on-site instrumentation where utmost reliability and rugged structure are required.

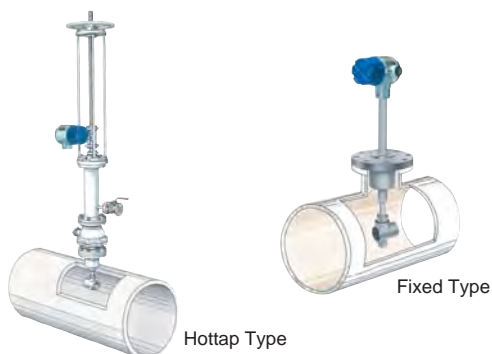
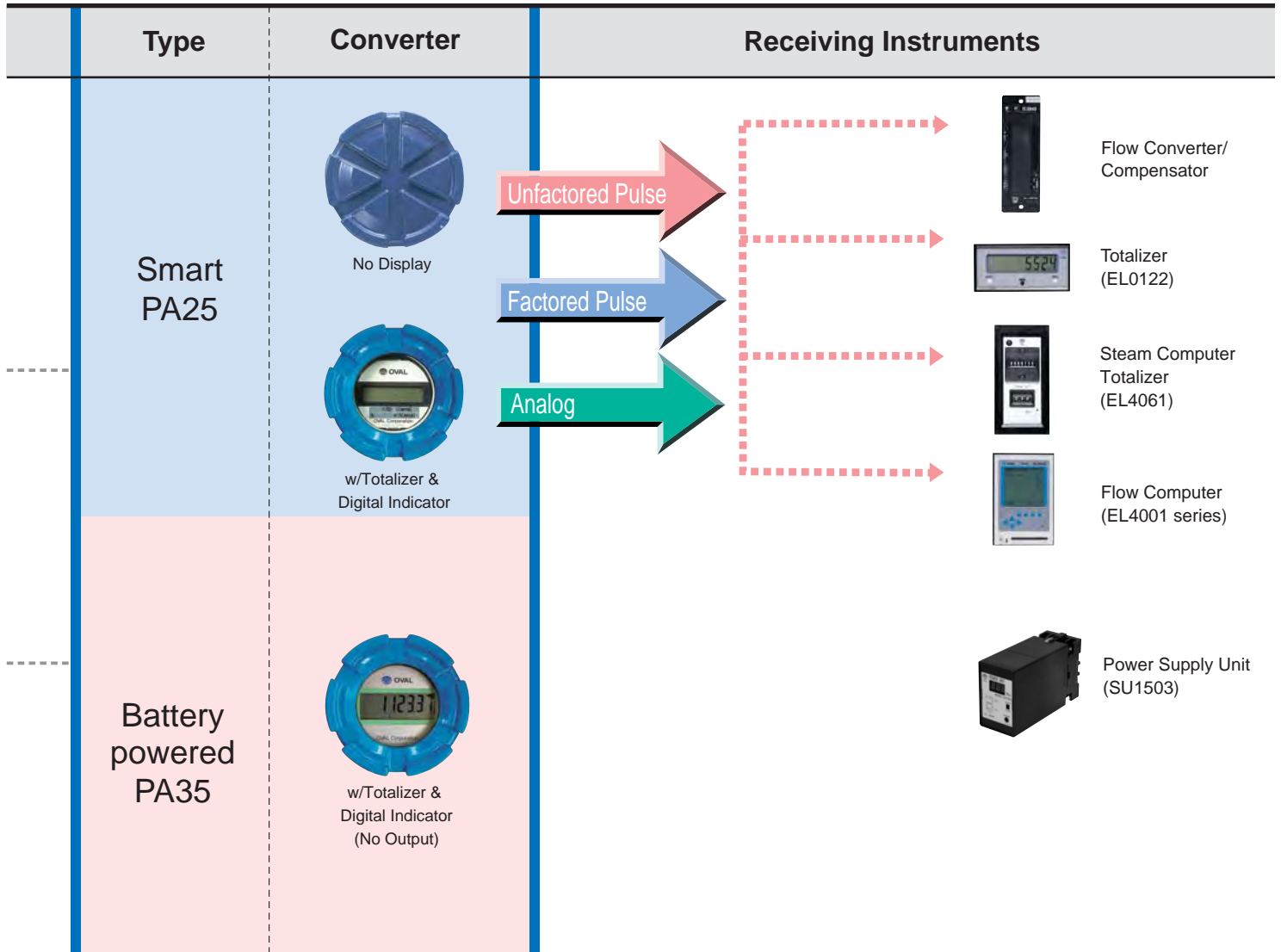
GS. No. GBD642E



EX DELTA II · DIA

Developed from OVAL's filed experiences, this meter utilizes a unique diamond-shaped vortex shedder, the performance comparable to our standard triangular shedder. In an arrangement where the sensor is located apart from the bluff body, consistent performance can be maintained in processing "dirty" liquids containing such materials as scale, dust and other contaminants that have a tendency to build up.

GS. No. GBD642E, 661E



EX DELTA II -insertion type

An economically beneficial solution for flow measurement in pipelines of 200mm and larger in nominal diameter. Not only in new installations, but also in the existing installations, all you need is to insert the probe into the pipe-line. The hottap type is particularly advantageous for in-line measurement of a continuous process or a vital process where you cannot stop the flow.

GS. No. GBD605E, 606E



EX DELTA II -with separate type converter

In areas where pipelines are densely installed, or installed in elevated or hazardous locations, a transmitter separately-mounted type is ideal. Can be mounted up to 200m from the meter body. This allows the operator to monitor a multitude of flowmeters dispersed in the fields from the monitoring station where the transmitters are located for centralized control. It makes the maintenance easier, too.

GS. No. GBD642E, 661E

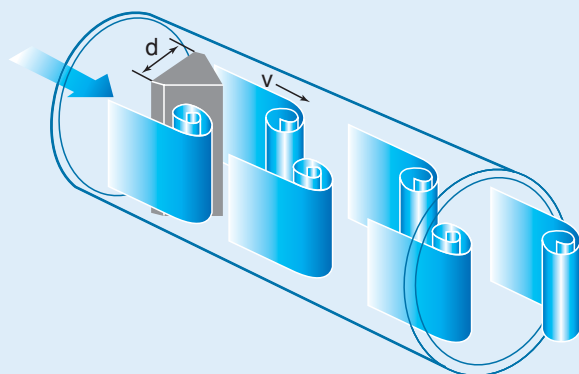
■ General Specifications

Item		Standard Type	Insertion Type	DIA
Nominal size	Wafer type (fixed sensor)	10 to 150mm	—	15 to 80mm
	Flanged type (fixed sensor or replaceable sensor)	15 to 300mm	—	15 to 80mm
	Applicable pipeline dia.	—	200 to 2000mm (mounted on a 100mm flange)	—
Flow range	Liquid	○	○	○
	Gas	○ (10mm not available for battery powered type)	○	×
	Steam	○ (10mm not available)	○	×
Accuracy		(1) Standard · Nominal size : 10mm ±2% of full scale or better · Nominal size : 15 to 300mm ① ±1% of reading or better ② ±1% of full scale or better (2) Max. flow velocity : 80m/s available. · Nominal size: only 80mm and bigger for gas and steam measurement. ① ±1.5% of reading or better ② ±1.5% of full scale or better (3) Only for a liquid. High accuracy (option) · Nominal size: 15mm to 300mm ① ±0.75% of reading or better ② ±0.75% of full scale or better	±2% of full scale or better	±1% of reading or better or ±1% of full scale or better
Flowrate	Liquid (Water)	0.2 to 2510 m ³ /h	72 to 67800 m ³ /h	0.82 to 172 m ³ /h
	Gas (0.2MPa Air)	2 to 15000 m ³ /h	923 to 565000 m ³ /h	—
	Steam (0.5MPa Saturated steam)	0.02 to 47.6 t/h	3.06 to 1790 t/h	—
Operating temp. range		Ambient temperature type : -30 to +120 (Fixed sensor only) Standard type : -30 to +300 High temp. type : -30 to +460°C (Replaceable sensor only)	-10 to +300	Ambient temperature type : -30 to +120 (Fixed sensor only) Standard type : -30 to +300 High temp. type : -30 to +460°C (Replaceable sensor only)
Max. operating pressure (Depends on the type of process connection.)		5.00MPa	1.37MPa	5.00MPa
Converter (integral or separate type)	Smart	Display	No display or w/display model	
		Output	Current pulse (Factored, Unfactored), Open collector pulse (Factored, Unfactored), Analog output	
		Function	Calculation (Mass flow fixed calculation, normal flow fixed calculation)	
			HART protocol communications (Parameter change by dedicated communication kit is available.)	
	Battery powered	Display	Total/digital instantaneous flowrate	
		Output	None	
		Function	Calculation (Mass flow fixed calculation, normal flow fixed calculation)	
Construction		Non-explosionproof or explosionproof		
Power Supply	Smart converter	12 to 45VDC		
	Battery powered	Five 3.6V lithium batteries Life : 7 years (integral) or 4 years (separate)		

: Flow range shown here is the sum of all sizes.

: See GS (General Specification) Sheets of each model for their general specifications.

Principle of Operation



Downstream of an object placed in a flowing fluid, vortices under certain conditions regularly form and shed on alternating sides of the stream. This phenomenon is called Karman vortex street. Assuming the vortex frequency is "f", fluid velocity across the throttled part is "v" and the width of the bluff body is "d", the relationship is represented by $f = st \cdot v/d$, where "st" is a constant Strouhal number. The Strouhal number is a function of the physical geometry of the bluff body having a triangular cross section used in the EX DELTA II. It is constant at 0.16 approx. over a wide region in Reynolds number. In a range where the Strouhal number remains constant, the vortex frequency is proportional to the fluid velocity. Hence the flowrate can be calculated by counting the number of vortices being produced. Since strongest vortices form and shed behind a triangular-column bluff body with no drift of locations at where the vortices shed, a constant measurement is achieved. The piezoelectric sensor, on the other hand, is located at an ideal position to pick up vortices accurately and efficiently and enable easy maintenance at the same time.

The specification as of July, 2013 is stated in this catalog. Specifications and design are subject to change without notice.