



# ULTRA UF-II and UF-II Series

## OVAL Flowmeters



Characterized by quiet operation, low vibration and freedom from ripples owing to our proprietary spiral rotors, the high-precision PD flowmeter UF-II series find extensive use primarily in loading and unloading applications of petroleum products.

A latest addition to the field-proven UF-II series product line is the ULTRA UF-II series equipped with the popular electronic register which traditionally mounts on the ULTRA OVAL series. It goes intelligent and smart more than ever before with capabilities to furnish both pulse and analog output and offer efficient calibration with high-rate pulse train.

## Features

## Practically silent operation and vibration free.

- **Uniform rotation, uniform flowrate and uniform torque.**

Proprietary-contoured rotors offer (1) uniform rotor motion, (2) uniform flowrate free from pulsation, and (3) uniform rotational torque. No energy transfer takes place between the rotors.

- **Construction is simple with no pilot gears required.**

Exceptionally low noise level in operation and virtually vibration free.

- **Long life.**

Thanks to the absence of slippage between mating rotor teeth, extremely long life is achieved.

- **Small in size, yet can handle large quantities of flow.**

Large discharge per rotor revolution and rela-

tively fast rotor R.P.M. permits metering large quantities of the process fluid for its small size.

- **Built around the cpu, the Ultra register shows on the LCD the accumulated total, resettable total, instantaneous flowrate, and alarm (low battery) at the touch of mode selector.**

- **Two remote signals are provided - total flow signal (factored or unfactored current pulse, 4/20mA DC) and instantaneous flowrate signal (analog, 4/20mA DC) simultaneously.**

- **A complete line of explosionproof models we supply.**

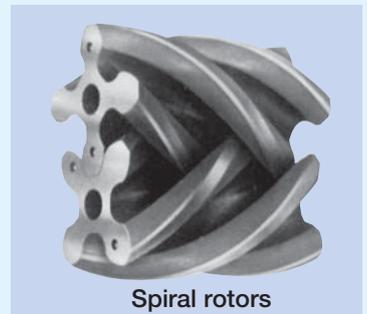
- **By combining a batch-controller equipped Ultra register, LW76E, you can simply and readily build a batch system.**

## Principle of Operation

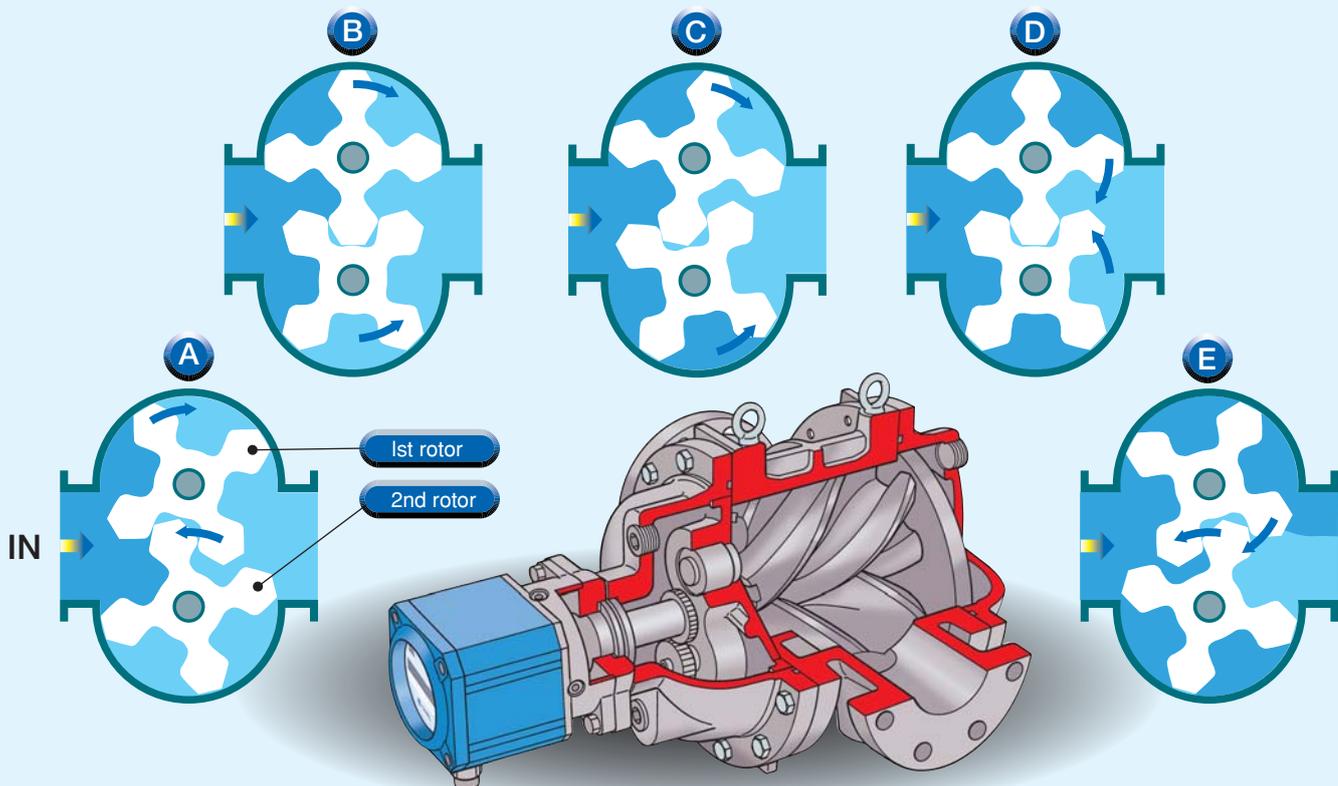
Having a pair of extraordinary rotors as revolving elements (see photo at right), the UF-II is a positive displacement flowmeter which directly meters the volume of flowing material passing through it. A pair of these spiral rotors are directly in mesh with each other with their tooth profile so contoured to achieve a zero slip factor. Operation can best be understood by referring to the figure below.

As the process fluid flows into the measuring chamber, the rotors are, under a differential pressure that exists between the inlet and outlet port, made to rotate in the direction opposite to each other as shown by arrows. At the instant "A" in the figure, viewed on a geometrical plane, a rotational force acts only on the first rotor; no rotational force on the second. But imagine in your mind these rotors in a solid geometry: they are twisted as shown in the photo. Each rotor receives the same rotational force, resulting in uniform rotor rotation and uniform rotational torque: no pulsation takes place in the flow being discharged.

Each space formed by the rotors and the inner wall of the measuring chamber serves as a pocket (colored in blue) and, in one complete rotor revolution, the process material of eight times the volume of this pocket is delivered to the discharge port. Thus, by picking up this turning effort of the rotors in terms of rotational frequency, we know the exact total volume of the process material delivered, while the instantaneous flowrate by measuring their rotational velocity.



Spiral rotors





A comprehensive family of flowmeters now available to suit the particular scale of your shipping/acceptance lines.

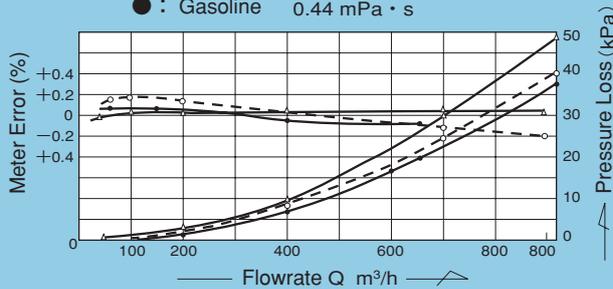
Basic Meter Specifications

Item		Description								
Meter Size		80	81	82	83	84	85	86	87	88
Typical Applications		Shipping to tank trucks			Marine shipping and acceptance at piers					
Metered Fluids		Gasoline, kerosene, light oil, heavy oil, etc.			LPG, gasoline, kerosene, light oil, heavy oil, crude oil					
Nominal Dia., mm (in.)		80 (3) 100 (4)	100 (4)	100 (4) 150 (6)	150 (6) 200 (8)	200 (8) 250 (10)	250 (10) 300 (12)	300 (12) 350 (14)	350 (14) 400 (16)	400 (16) 450 (18)
Max. Flowrate, m <sup>3</sup> /h		120	180	300	410	590	950	1400	2000	2800
Max. Operating Temp.		120°C								
Flange Ratings		SCPH2...JIS 10K RF ASME 150 RF			JIS 10K RF, JIS 20K RF ASME 150 RF					
Linearity		±0.15%			±0.35% or ±0.15%					
Repeatability		±0.02%			±0.05% or ±0.02%					
Flow Direction		Right→left (std.), left→right, top→bottom, bottom→top					Right→left (std.), left→right			
Materials	Meter body	SCPH2			SCPH2					
	Major parts	FC250								
Bearings		Carbon bearings								
Register		Standard ULTRA, Smart Type ULTRA, Batch Counter, Auto Temperature Compensator Equipped ULTRA, Mechanical Type UF-II								
Relevant General Specs.		GBL107, 108, 101		GBL107, 108, 102			GBL107, 108, 102			



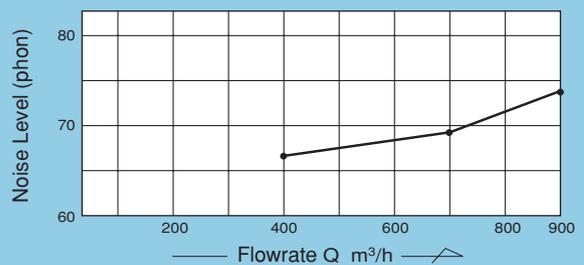
Meter Errors and Pressure Losses

UF-II flowmeter Meter size 85  
 △ : Heavy oil 22~23 mPa · s  
 ○ : Kerosene 1.5 mPa · s  
 ● : Gasoline 0.44 mPa · s



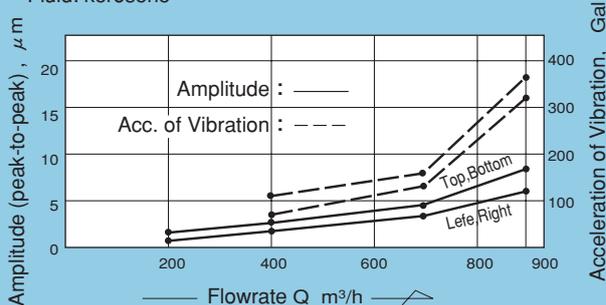
Noise Level

UF-II flowmeter  
 Meter size 85  
 Fluid: kerosene



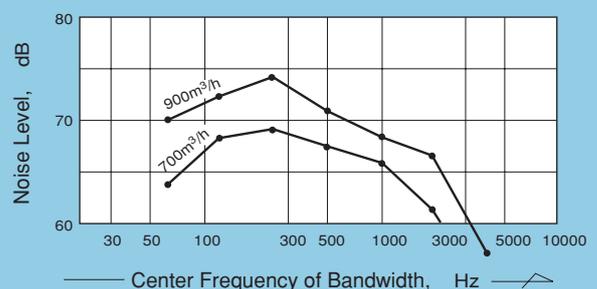
Vibration

UF-II flowmeter  
 Meter size 85  
 Fluid: kerosene



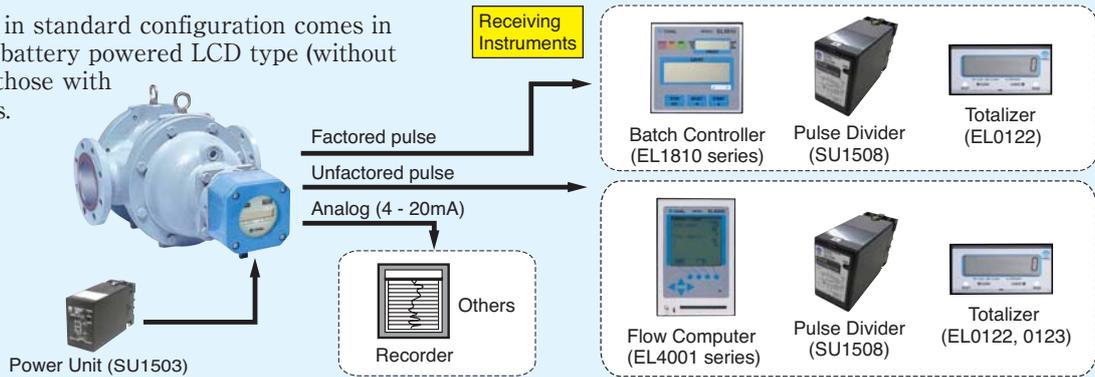
Frequency Response

UF-II flowmeter  
 Meter size 85  
 Fluid: kerosene



## Standard ULTRA

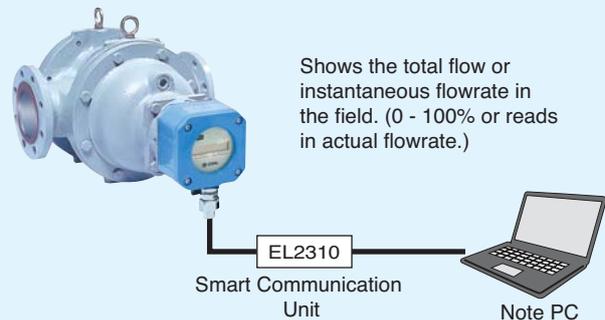
The ULTRA OVAL in standard configuration comes in 10 models, including battery powered LCD type (without remote output) and those with analog/pulse outputs.



## Smart Series

### For more sophisticated processes with communication interface

In addition to reading the measurement information, the Smart Ultra OVAL, when combined with our Smart Communication Unit (EL2310) and a PC, simplifies access to available variables and parameters, such as instantaneous flowrate, span, and meter factor, as well as setup, diagnostics, and other operations for maintenance, from the instrument room located far from the field. What's more, using an optionally available multidrop feature, a maximum of 15 transmitters may be connected to the host computer over two-wire cables to streamline field wiring.



Shows the total flow or instantaneous flowrate in the field. (0 - 100% or reads in actual flowrate.)

## Batch Counters (LW76E)

### Performs batch processes automatically! The latest batch counters for liquid service at the point of measurement

#### Features

- Top-of-the-line PD flowmeter, the ULTRA OVAL, is combined with batch control capability. When used in conjunction with an automatic ON/OFF valve, you can readily build a high price/performance local batch system.
- All pneumatic (the batch counter operates on a built-in battery.)



## Auto Temperature Compensator Equipped ULTRA Register

ULTRA Register finds extensive use in transactions of petroleum products, or elsewhere where flow measurement under given reference temperature is required.

It calculates the flow information of process material at the process temperature corrected for the reference temperature. Can mount on any ULTRA OVAL and ULTRA UF-II flowmeters.



- The specification as of June, 2016 is stated in this CATALOG.
- Specification and design are subject to change without notice.



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