OVAL

ULTRA UF-Ⅱ Type S



Characterized by low noise operation, less vibration and free from pulsation in flow 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 a versatile electronic register of our ULTRA OVAL series. The register generates pulse and analog output, realizes efficient calibration with high rate pulse trains, adds intelligence and smart inclusion technology and completes our product line up with features and functions that are suitable for the new generation of field sensors.

Silent operation and vibration free.

Features

- **Uniform rotation, uniform flowrate and uniform torque.**
  Proprietary-designed 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.
- **Simple construction with no pilot gears required.**
- **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 relatively fast rotor R.P.M. permits metering large quantities of process fluid for its small size.
- **The ULTRA register equipped with a CPU indicates total flow, resettable total flow, instantaneous flowrate and low battery alarm on the LCD by changing the 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.**
- **Available with a complete line-up of explosion-proof models.**
- **By combining a batch-controller equipped Ultra register, LW74E, LW76E, you can establish a simple batch system.**

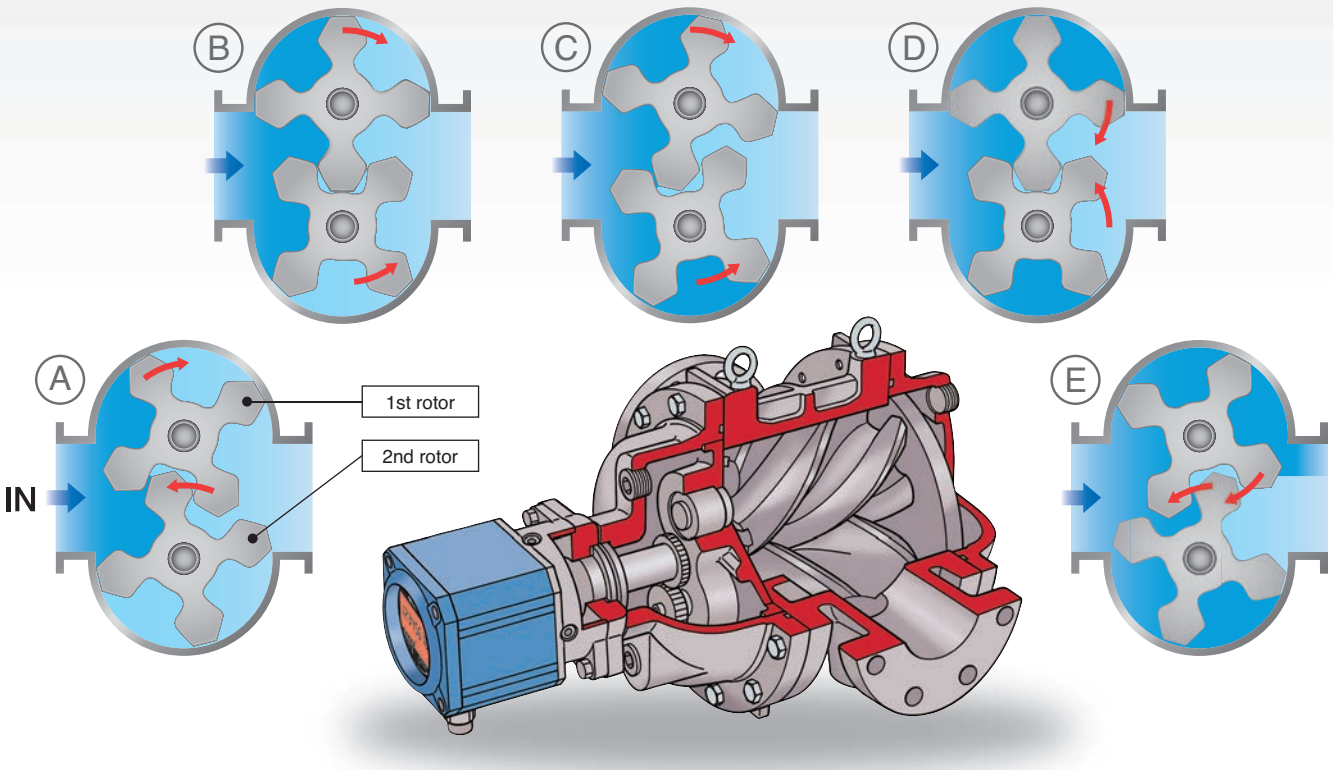
Principle of Operation

Having a pair of rotors as revolving elements (see photo at right), the UF-II is a positive displacement flowmeter which directly measures the volume of flowing fluid passing through. A pair of these spiral rotors are directly in gear with each other specially designed and precisely processed to achieve a zero slip factor. Operation principle is shown in 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, made to rotate in the direction opposite to each other as shown by arrows.
In figure "A", viewed on a plane illustration, a rotational force acts only on the first rotor; no rotational force acting on the second. But these rotors in actual are twisted as shown in the photo. Each rotor receives the same rotational force, resulting in uniform rotor rotation and uniform rotational torque with no pulsation in the flow being discharged.



Spiral rotors

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 fluid of eight times the volume of this pocket is delivered to the discharge outlet. Therefore, taking this rotor rotation by rotational frequency, we can measure the exact total volume of the process material delivered, while the instantaneous flowrate can be measured by the rotational velocity.



A comprehensive line-up of flowmeters available to satisfy your loading and unloading lines.

Specifications

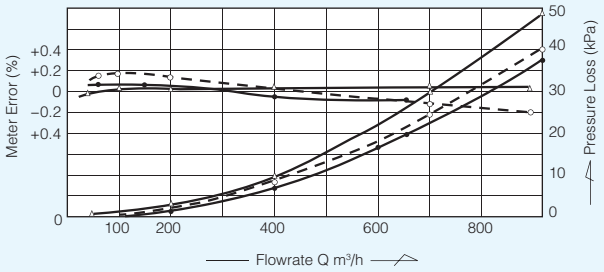
Item		Description								
Meter Size		80	81	82	83	84	85	86	87	88
Typical Applications		Mainly, loading to tank trucks		Mainly, marine loading and unloading						
Metered Fluids		Gasoline, kerosene, light oil, heavy oil, other petroleum products (excluding naphtha and LPG)		gasoline, kerosene, light oil, heavy oil, other petroleum products (excluding naphtha)						
Nominal Diameter mm (inch)		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 (m³/h)		120	180	300	410	590	950	1400	2000	2800
Max. Operating Temperature		120°C								
Flange Ratings		FC250: JIS 10K FF, ASME 125 FF SCPH2: JIS 10K RF, ASME 150 RF		JIS 10K RF, JIS 20K RF, ASME 150 RF						
Linearity		±0.15% of reading or better		±0.35% or ±0.15% of reading or better						
Flow Direction		Right→left (std.), left→right, top→bottom, bottom→top					Right→left (std.), left→right			
Materials	Meter body	FC250 with special surface treatment or SCPH2 with special surface treatment		SCPH2 or SCPH2 with special surface treatment						
	Rotor	FC250 with special surface treatment		FC250 or FC250 with special surface treatment						
Bushing		Carbon bushings								

Performance Characteristics

■ Meter Errors and Pressure Losses

UF-II flowmeter Meter size 85

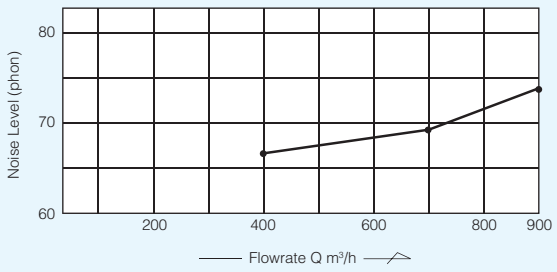
△: Heavy oil 22 to 23 mPa·s
○: Kerosene 1.5 mPa·s
●: Gasoline 0.44 mPa·s



■ Noise Level

UF-II flowmeter Meter size 85

Fluid: kerosene

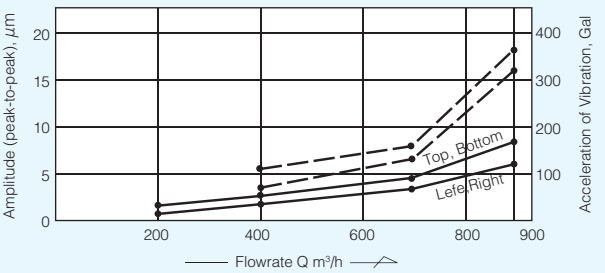


■ Vibration

UF-II flowmeter Meter size 85

Fluid: kerosene

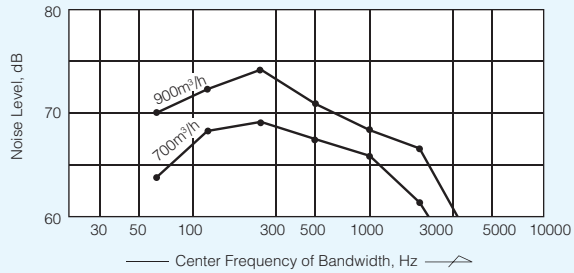
Amplitude: ——
Acc. of Vibration: — — —



■ Frequency Response

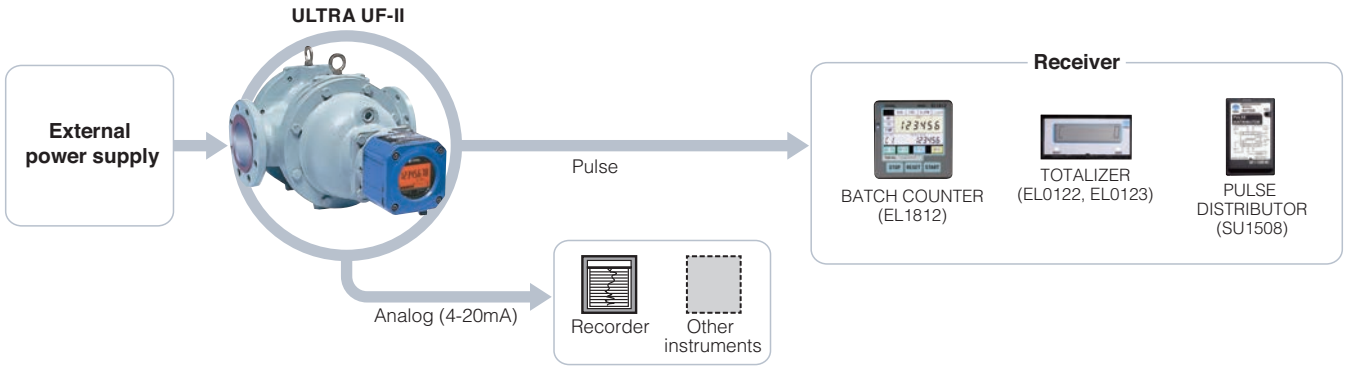
UF-II flowmeter Meter size 85

Fluid: kerosene



Connection with receiver

ULTRA UF-II is available in the following types: a battery driven type (without output) that requires no external power supply and an external power supply type (with pulse output and analog output).

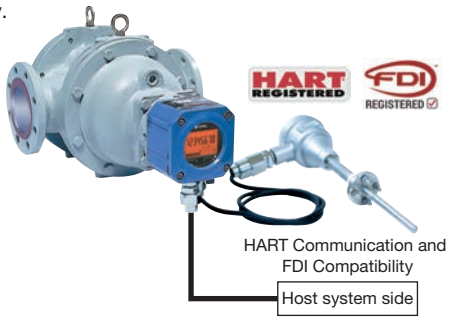


Related products developed according to applications

Ultra Register Type C with Automatic Temperature Compensation and HART Communication

- Accurate Flow Measurement with Temperature Compensation Function
  The system automatically and continuously converts the measured volumetric flow to a reference temperature, such as 15°C, using the fluid temperature detected by an externally connected temperature sensor.
  Ideal for applications requiring measurement under a specified reference temperature, such as petroleum products.
- Efficiency and Predictive Maintenance with Communication Functionality
  HART communication enables remote monitoring of various data and parameter settings.
  The system is capable of transmitting self-diagnostic information, such as wear diagnostics, to higher-level systems like Distributed Control Systems (DCS).
  Compatible with NAMUR NE107-compliant displays for enhanced operational transparency and reliability.

Temperature input		The platinum sheath temperature sensor (Pt 100 Ω)
Factored temperature range		–10 to +150°C
Temperature correction calculation		JIS K 2249-4:2011, JIS K 2240:2023
Communication interface		HART protocol (HART 7)
Power supply	Battery type	Dedicated lithium battery Battery life: approximately 7 years (depending on the usage conditions)
	External power supply type	12 to 45VDC Current consumption: Max.30mA Dedicated small built-in lithium battery (For battery type, only the local display is available. Output signal will not be generated.)



ULTRA register with batch control function

- Positive displacement flowmeter “ULTRA UF-II” comes with a fixed-quantity function. Combination with an automatic ON/OFF valve enables simplified construction of a high-performance field-type batch system.
- Fully pneumatic
  (Batch counter is powered by built-in battery.)
- Depending on your application, you can select one-stage opening/closing valve (LW74E) or two-stage opening/closing valve (LW76E) which enables accurate batch operation.

	LW74E	LW76E
Valve control system	Pneumatic one-stage opening and one-stage closing	Pneumatic two-stage opening and two-stage closing (Through setting, it can be changed to one-stage opening.)
Setting method	Push button type (LCD counter: 6 digits)	
Accumulated value (cumulative value)	LCD counter: 8 digits	
Alarm	Battery capacity drop, excessive batch, non-arrival of pulse (LCD)	
Backup	Total values, set values, etc. (Stored in EEPROM)	
Configuration	Intrinsically safe explosionproof (Exia IIB T3) and water-jet proof (IP65) configurations	
Ambient temperature	−10 to +60 °C	
Power supply	Dedicated lithium battery (Battery life: Approximately 4 years. However, it differs depending on use conditions.)	



• The specification as of October, 2025 is stated in this catalog. Specifications and design are subject to change without notice.
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