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.

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meter Size</td>
<td>80 81 82 83 84 85 86 87 88</td>
</tr>
<tr>
<td>Typical Applications</td>
<td>Mainly, loading to tank trucks</td>
</tr>
<tr>
<td>Metered Fluids</td>
<td>Gasoline, kerosene, light oil, heavy oil, other petroleum products (excluding naphtha)</td>
</tr>
<tr>
<td>Nominal Diameter mm (inch)</td>
<td>80 (3) 100 (4) 100 (4) 100 (4) 150 (6) 200 (8) 200 (8) 250 (10) 300 (12)</td>
</tr>
<tr>
<td></td>
<td>300 (12) 350 (14) 400 (16) 450 (18)</td>
</tr>
<tr>
<td>Max. Flowrate (m³/h)</td>
<td>120 180 300 410 590 950 1400 2000 2800</td>
</tr>
<tr>
<td>Max. Operating Temperature</td>
<td>120°C</td>
</tr>
<tr>
<td>Flange Ratings</td>
<td>FC250: JIS 10K FF, ASME 125 FF, SCPH2: JIS 10K RF, ASME 150 RF</td>
</tr>
<tr>
<td>Linearity</td>
<td>±0.15% of reading or better or ±0.15% of reading or better</td>
</tr>
<tr>
<td>Flow Direction</td>
<td>Right→left (std.), left→right, top→bottom, bottom→top</td>
</tr>
<tr>
<td>Materials</td>
<td>Meter body: FC250 with special surface treatment</td>
</tr>
<tr>
<td></td>
<td>Rotor: SCPH2 or SCPH2 with special surface treatment</td>
</tr>
<tr>
<td>Bushing</td>
<td>Carbon bushings</td>
</tr>
</tbody>
</table>

### Performance Characteristics

#### Meter Errors and Pressure Losses

**UF-II flowmeter Meter size 85**

- Fluid: kerosene
- Rotor: 1.5 mPa·s
- Gasoline: 0.44 mPa·s
- Heavy oil: 22 to 23 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
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).

Smart type register

- More advanced process operation has been achieved with “communication”!
- With the smart type register, not only reading of measurement information but also reading out, setting and self-diagnosis of various parameters including instantaneous flowrates, spans and meter coefficients can be performed in a control room away from the field using the smart communication unit (EL2310), while at the same time facilitating maintenance. Furthermore, by utilizing the optional multi-drop function, a maximum of 15 transmitters can be connected to a host computer using two-wire cable, which minimizes wiring.

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.

ULTRA register with automatic temperature correction function

- Automatically converts into volumetric rate of flow with a reference temperature!
- This ULTRA register can be used for applications that require flowrate measurement at a prescribed reference temperature, for example, in the case of petroleum trading, having a function to convert into a flowrate at a reference temperature. Available to all types of ULTRA UF-II.

- The specification as of July, 2020 is stated in this catalog. Specifications and design are subject to change without notice.
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