Variable Area Flowmeter
Rotameter® – The Original

- Precise measurement of liquids and gases
- Robust and universal
- Proven device with an installed base of more than 1,000,000 worldwide
- Wide product range
- Many options and different materials available
Proven technology: The Rotameter® (variable area) principle

The Rotameter® (variable area flowmeter) is one of the oldest and mature principles in flow measurement.
A float is guided inside a conically shaped tube.
The float rises within the tube as the flow increases.
This mechanical principle is as simple as it is reliable.

Due to its operating principle the Rotameters are installed in vertical pipes. Once the process medium flows through the tube, the gravimetric force balances with the flow resistive force in such a way that the position of the float indicates the flow rate value.

Rotameter® is synonymous with innovation, Quality and Foresight for over the past and future 100 years.

Float Blockage Detection System
(patented system)

The function of the Float Blockage Detection System allows the electrical transmitter to distinguish the fluctuations, which are caused by a moving float, with the fluctuations of the basic noise to state a fault status.

If the measuring signal does not exceed the auto-zero value during a defined supervision time, this is recognized as blockage. Error message “code 08” is produced and the bars under the display are flashing. Simultaneously the current output is set to a value which enables a clear fault detection of connected evaluation unit.
Robust and universal: Rotameter® **RAMC** – the original

At first glance the instrument looks impressive with its all stainless steel design. A closer look reveals a unique patented “float blockage” detection system. Operational safety is of the utmost importance in any flowmeter, and the RAMC is no exception – wetted parts are available in a variety of materials, and intrinsically safe outputs are available as an option.

The Rotameter® RAMC has been assessed in accordance with SIL 1 and SIL 2 level by EXIDA on the basis of EN 61508 and EN 61511 standards for operational safety. When having a local indicator with standard or fail safe limit switches the RAMC meets SIL 2. The RAMC with 4-20mA output or HART communication reaches SIL 1 and is the only Rotameter® in the world having SIL for electronic transmitter.

If you value flexibility in a flowmeter – from the measurement of air to highly aggressive liquids – in situ replacement of the indicator without degradation of performance – and the interchangeability of floats – then the RAMC is the right choice for you.

The RAMC combines all the advantages of the variable area principle with robust design, reliable measurement, with or without power, HART® or Profibus PA, culminating in a truly universal flowmeter for gases, liquids and steam applications.

**What makes this Rotameter® different from other brands is known by many users, who value the ease of installation and trouble-free operation.**

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**For Pipe Sizes:**
- DN 15 to DN 150 (1/2” to 6”)

**End Connections:***
- Flanges, threaded or Triclamp

**Measuring Range:**
- Water: 20°C (68°F), 2.5 l/h to 130 m³/h
- Air: 25°C (77°F), 1 bar (15 psi) abs: 75 l/h to 1400 m³/h

**Material:**
- 1.4404 (AISI 316L); PTFE lining; Hastelloy, Monel on request

**Process Temp. Range:**
- -180°C to +370°C (-292° F to 698° F)

**Pressure Range:**
- Up to 100 bar (1450 psi) higher pressures on request

**Ambient Temperature:**
- -40°C to 100°C (-40° F to 212° F)

**Accuracy:**
- 1.6% (qG 50%)
- VDE/VDI 3513-2 2.5% (qG 50%)

**Indicator:**
- Analog scale plate/LCD

**Ex-approvals:**
- ATEX, FM U.L.C, GOST, SAA, NEPSI

**Inputs/Outputs:**
- Analog 0-20 mA/4-20 mA

**Communication:**
- HART, PROFIBUS PA

**Power Supply:**
- 24 V DC 2-wire, 24 V DC 3-wire
- 230 V AC 4-wire, 115 V AC 4-wire

**Protection Class:**
- IP 66/67

**Fail Safe Limit switches available**
- Potentiometer blockage detection system
- Housing: aluminum or stainless steel
- Flame proof/dust proof/SIL 2 applicable
- Special options on request
The RAKD differentiates itself from other comparable variable area meters by means of its light and guided float design. This feature avoids oscillations caused by gas compressibility, resulting in a very stable measurement.

This design has a direct bearing on stability – pressure loss is lower by two-thirds compared to other comparable meters.

The RAKD variable area flowmeter is highly accurate, particularly for low flows and high-pressure applications. Once again, no auxiliary energy is required.

With the FMEDA for the RAKD done in November 2008, Yokogawa is the first supplier to become complete to provide safety excellence to all Metal Rotameter applications. The RAKD with either standard or fail safe limit switches is suitable for safety applications up to SIL level 2. The RAKD configuration with valve and flow controller reaches SIL level 1.

The RAKD is the smaller brother of the RAMC – is robust in design – for low flows and high pressure applications.
The flow metering tube is transparent giving you full insight into the process and position of the float – a scale on the outside of the tube indicates the true flow rate. All the measurement tubes in this series of variable area flowmeters are made of either glass or plastic.

A Rotameter® is a truly modular flowmeter. The variety in cones, floats, scales, process connections and options combine to make the Yokogawa Rotameter® suitable for a very wide range of applications. An example is our glass meter which resists highly corrosive mediums, is antistatic and especially suitable for low flow gas measurement.

Rotameter® gets its name from the rotating float. Special diagonal notches cause the float to rotate. This eliminates friction and guarantees very stable behaviour and highest accuracy; oscillations are eliminated by using low density floats.

This simple and affordable flowmeter has a very broad application range, smart design and decades of proven performance.

<table>
<thead>
<tr>
<th>RAJG/RAJL</th>
<th>RAJH</th>
<th>RAQN</th>
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<tbody>
<tr>
<td>For Pipe Sizes</td>
<td>1/4&quot; to 3/8&quot;, 6 to 12 mm</td>
<td>1/4&quot; to 2 1/2&quot; DN 15 to DN 40</td>
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<tr>
<td>End Connections</td>
<td>NPT, cutting ring</td>
<td>Female threads, Nozzle</td>
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<tr>
<td>Measuring Tube</td>
<td>Borosilicate Glass</td>
<td>Polyamide or Polysulfone</td>
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<td>Measuring Range</td>
<td>Water 20°C (68°F): 0.0025 l/h to 600 l/h</td>
<td>0.0025 ml/h to 10 m³/h</td>
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<td></td>
<td>Air 20°C (68°F): 0.2 l/h to 8300 l/h</td>
<td>0.1 l/h to 250 m³/h</td>
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<tr>
<td></td>
<td>Material</td>
<td>1.4571 (AISI 316Ti)</td>
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<tr>
<td></td>
<td>Process Temp. Range</td>
<td>Max. 130°C</td>
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<td></td>
<td>Pressure Range up to</td>
<td>1.5 bar (22 psi)</td>
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<td></td>
<td>Ambient Temperature</td>
<td>0°C up to 80°C</td>
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<td></td>
<td>Accuracy by G</td>
<td>1.6/2.5/4 (sphere 6)</td>
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<tr>
<td></td>
<td>Indicator</td>
<td>Direct reading scale</td>
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<tr>
<td></td>
<td>Comments</td>
<td>Limit switches available</td>
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<td></td>
<td>Pressure controller available</td>
<td>Valves available</td>
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Trust your own eyes:
Rotameter® RA-Series
No limitation: Rotameter® customized solutions

The Rotameter® is known all over the world as a reliable measurement instrument and nowadays is synonymous with the variable area flowmeter principle. We built this reputation on customer oriented solutions.

We have the ability to design and manufacture customer specific solutions. Especially Rotameters where we have almost a century of experience in manufacturing specific sizes, utilizing special materials and creating special scales. All you need to do is tell us what is necessary to fulfill your requirements and we will provide the solution (e.g. Rotameter® adapted to customer’s housing or armature).

Our customers have the opportunity to develop with us a specific solution for their application and take advantage of 100 years of experience. The result is a Rotameter® designed and built for your specific application.
Economical:
Modular and flexible

Rotameters are completely modular
and flexible. The measuring tube
can be made of glass, plastic or metal
– depending on the application.

If the tube is made of metal, the float
position is transferred to an external
indicator via a magnetic coupling. In the
case of glass and plastic tubes you can
simply view the float position to get a
reliable reading of the flow rate.

The mechanical nature of the measuring
principle provides a flow device that does not
require any electrical power supply. However,
there are many applications in process plants
that do require electronic indication and
transmission of the measured flow rate to other
associated devices. This capability
has considerably expanded the range of
applications for the variable area flowmeter.
Yokogawa’s Flow Center of Excellence in Europe:

In 1995 Yokogawa expanded its presence in Europe with the acquisition of the Rota company, well known and synonymous with the world famous Rotameter® variable area flowmeter. Rota Yokogawa, located in southern Germany looks back on almost a century of experience in flow measurement. The flow center provides a wide range of services, providing the support to customers and the Yokogawa sales organisation by advising and solving flow measurement problems, after sales services and application consultancy.

The mechanical nature of the measuring principle provides a flow device that does not require electronic indication and there are many applications in process plants that do not require any electrical power supply. However, the application of glass, plastic or metal – depending on flexible. The measuring tube can be made and the variable area flowmeter.

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