# Variable Area Flowmeter
# Rotameter – The Original


- precise measurement of liquids and gases
- robust and universal
- proven device with an installed base of more than 500,000 worldwide
- a wide product range
- many options and different materials available

# Proven technology: The Rotameter (variable area) principle

**The Rotameter 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 Rotameter is usually 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.

# Economical: Modular and flexible

**Rotameter 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 outside 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 variable of flow to other associated devices. This capability has considerably expanded the range of applications for the variable area flowmeter.

# Robust and universal: Rotameter **RAMC**


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

At first glance the instrument looks impressive with its all stainless steel design. A closer look reveals a unique patented "float blockage" detection systems. 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.

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 inter-changeability of floats, – then the RAMC is for you.

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

| | |
|---|---|
| Sizes | DN 15 to DN 150 (1/2" to 6") |
| Design Options | DIN EN Flanges, ASME Flanges |
| | Male thread DIN 11851, Triclamp |
| | Female thread G & NPT |
| Measuring range | Water 20°C (68°F): |
| | 2.5 l/h to 130 m³/h |
| | Air 20°C (68°F); 1 bar (15 psi) abs: |
| | 75 l/h to 1400 m³/h |
| Material | 1.4404 (AISI 316L); PTFE |
| Process Temp. Range | -180°C to +370°C (-292°F to 698°F) |
| Pressure Range up to | 400 bar (5800 psi) |
| Ambient temp. | -20°C to 100°C (-4°F to 212°F) |
| Accuracy | Class 1.6/2.5 VDI/VDE |
| Indicator | Analog scale plate / LCD |
| Ex-approval | ATEX / SAA |
| Inputs/Outputs | Analog 0-20 mA / 4-20 mA |
| Communication | HART, PC tool Pactware |
| Power Supply | 230 V AC 4-wire, 115 V AC 4-wire |
| | 24 V DC 3-wire, 24 V DC 2-wire |
| Protection Class | IP 65 (IP 67 on request) |
| Comments | Limit switches available |
| | Float blocking detection |
| | Housing: plastic, aluminium, stainless steal |
| | Special design on request |

# Small and robust: Rotameter **RAKD**


**The RAKD is the smaller brother of the RAMC – is robust in design – for low flows and high pressure applications.**

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 leading to very stable measurement.

This design has a direct bearing on stability – pressure loss is lower by 2/3 compared to other comparable meters.

Measurement of low flows is best handled by the RAKD with its established technology. The RAKD represents the latest generation in low flow metal flowmeters.

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

| | |
|---|---|
| Sizes | DN 15 to DN 25 |
| | 1/2" to 1", 6 to 12 mm |
| Design Options | DIN EN Flanges, ASME Flanges |
| | Female thread G & NPT |
| | Cutting ring, Flexible tube connection |
| Measuring range | Water 20°C (68°F): |
| | 0.1 l/h to 250 l/h |
| | Air 20°C (68°F); 1bar (15 psi) abs: |
| | 4 l/h to 8000 l/h |
| Material | 1.4571 (AISI 316 TI) |
| Process Temp. Range | -80°C to +200°C (-112°F to +292°F) |
| Process Pressure up to | 160 bar (2320 psi) |
| Ambient temp. | -20°C up to 100°C (-4°F up to 212°F) |
| Accuracy | Class 4 VDI/VDE |
| Indicator | Analog scale plate |
| Ex-approval | ATEX |
| Signal Outputs/ Inputs | Analog 4-20 mA |
| Communication | Service Box |
| Power Supply | 24 V DC 2-wire |
| Protection Class | IP 65 |
| Comments | Limit switches available |
| | Valves available |
| | Differential pressure regulator available |
| | Special design on request |

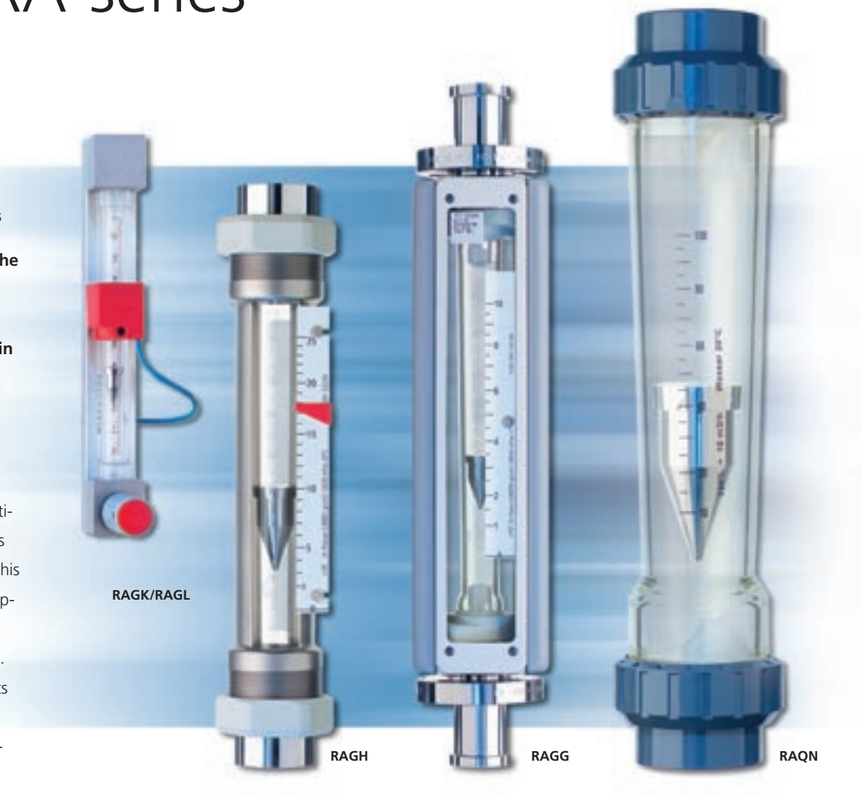
# Trust your own eyes: Rotameter RA-series

**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 like a puzzle. The combination of a cone, a float, a scale and a process connection build up a Rotameter. Due to this flexible and modular system it can be equipped with additional features and various materials suited for all kind of applications. An example is our glass meter which resists highly corrosive mediums, is antistatic and especially suitable for low flow gas measurement.

Rotameter stands for rotating floats. Special sloping notches cause the float to rotate. This eliminates the friction and guarantees very stable behaviour and highest accuracy; oscillations are eliminated by using low density floats.

This simple and affordable instrument has an enormous application range and a smart design with a proven performance over decades.



RAGK/RAGL RAGH RAGG RAQN

| | RAGK/RAGL | RAGH/RAGG | RAQN |
|---|---|---|---|
| Sizes | 1/4" to 3/8", 6 to 12 mm | 1/4" to 2 1/2" DN 15 to DN 40 | 3/8" to 2" |
| Design Options | NPT; cutting ring; | Female threads; flexible tube | Female threads |
| | flexible tube; Swagelok | connection; adhesive fittings; | adhesive fittings |
| | | DIN EN flanges | |
| Measuring range | | | |
| Water 20°C (68°F): | 0.0025 l/h to 600 l/h | 0.0025 ml/h to 10 m³/h | 10 l/h to 10 m³/h |
| Air 20°C (68°F); 1 bar (15 psi) abs: | 0.2 l/h to 6200 l/h | 0.1 l/h to 250 m³/h | 160 l/h to 250 m³/h |
| Material | 1.4571 (AISI 316 TI); | 1.4571 (AISI 316 TI); | Steel, PVC; |
| | Polypropylene; PTFE; | Steel; PVC; PTFE; | various float material available |
| | various float materials available | various float materials available | |
| Measuring tube | Borosilicate Glass | Borosilicate Glass | Polyamid or Polysulfone |
| | | | *Polyamid* *Polysulfone* |
| Process Temp. Range | 0°C to +130°C | max. 130°C (266°F) | 0°C to +60°C 0°C to +100°C |
| | (32°F up to +266°F) | | (32°F to +140°F) (32°F to +212°F) |
| Pressure Range up to | 16 bar (232 psi) | Depending on measuring tube size: | 10 bar (145 psi) |
| | | 6 to 16 bar (87 to 232 psi) | |
| Ambient temp. | 0°C up to 80°C | 0°C up to 80°C (32°F up to 176°F) | *Polyamid* *Polysulfone* |
| | (32°F up to 176°F) | | 0°C to 60°C 0°C to 80°C |
| | | | (32°F to 140°F) (32°F to 176°F) |
| Accuracy | Class 4/2.5 (sphere 6) VDI/VDE | Class 1.6 VDI/VDE | Class 4/2,5 VDI/VDE |
| Indicator | Direct reading scale | Direct reading scale | Direct reading scale |
| Comments | Limit switches available | Limit switches available | Limit switches available |
| | Special design on request | Special design on request | Special design on request |
| | Valves available; Differential | Valves available | |
| | pressure regulator available | | |

# No limitation: Rotameter Customized Solutions

**The Rotameter is known all over the world as a reliable measurement instrument and nowadays as a synonym for variable area meters. We built this reputation on customer oriented solutions.**

We have the ability to design and manufacture customer specific solutions. Especially on Rotameter where we have almost a century of experience in manufacturing specific sizes, utilizing special materials or creating special scales. All you need to do is tell us what is necessary to fulfil your requirements and we will provide the solution.

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

# Yokogawa's Flow Center of Excellence: Rota Yokogawa

**In 1995 Yokogawa acquired the former Rota Company well known and synonymous with the world famous Rotameter variable area flow meter. Rota Yokogawa, still located in southern Germany, looks back on almost a century of experience in flow measurement and has successfully managed the transition from a traditional enterprise into a company operating in the global Yokogawa network. The Rotameter and Rotamass are developed and manufactured for the global market at Rota Yokogawa.**

Calibration Facility of Rota Yokogawa, 79664 Wehr, Rheinstr. 8, Germany

***commitment*** means building the future ***to last***

**A Yokogawa Commitment to Industry**

**vigilance™**

What does **vigilance™** mean to Yokogawa? For starters, always, always making sure the products and solutions that leave our research & developement labs a re the best the world has seen – from day one throughout your business live cycle. Our innovative technologies and committed experts help design, install and manage your production systems efficiently and dynamically. In an ever-changing business environment, we help plan for the future to ensure continuity and flexibility in your automation strategies. Yokogawa goes the extra mile to do things right. Let us be vigilant about your business.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