For precise and economic control of fluids with or without solids or gases.

- Optimised energy control characteristic according to DIN EN 60534
- Robust construction designed for high switching frequencies, specialized for regulation applications
- Fully retractable control diaphragm
  - Large free aperture.
  - High flow capacity $K_v$
- Large adjustment field and control range. High position repeatability
- Optimum speed profile obtained through central axial flow as well as rounded flow optimised edges.

Energy cost savings and low noise emission due to flow-optimised design. Because the flow is almost completely unobstructed and eddy formation is low in our valves, losses are reduced to a minimum.

Our valve characteristics allow for proper regulation at wide aperture which means energy efficient operation. Fixed throttling apertures and imprecise regulation methods cause unnecessary pressure losses and energy costs.
Sensyflow® integrated mass flow rate measurement

- Accurately measured air flow rates
- Precisely controlled air flow rates

The high precision thermal Sensyflow® gas mass flow rate measurement system from ABB Automation Products Ltd. is integrated directly in the, central flow axis of the IRIS® diaphragm control valve.

Long flow stabilising pipes on the inlet and outlet are not needed with our optional Sensyflow calibration on a DKD certified test bench.

**Sensyflow® IG compact measurement unit**

- **Options:**
  - Proibus DP / V1
  - remote version with separate wall housing

**Advantages in a glance:**

- Independent of the control valve
- Independent of the control valve stroke
- Independent of the pressure and temperature
- High precision measurement (±2-5% measurement value)

- High reproducibility (± 0.5%)
- Rapid response time (0.5 Seconds)
- Robust and compact unit
- Can be mounted in any position
Information on designing plants with control valves

The controllability of a plant is a physical function of the fluid properties, environmental conditions, plant characteristics, delivery pressure characteristics and the control characteristics of the valve.

The data mentioned above is therefore needed to select a proper control valve. To illustrate the plant characteristics the following has been put into a chart: the dependencies of the plant characteristic (dynamic pressure losses of the installation without control valves relative to the flow rate), necessary control pressure allowance, and static pressure component in the plant and system pressure in the plant.

To simplify, there are generally two different pressure systems. The required system pressure is held constant (constant pressure regulation) or the delivery pressure is variable and must be taken into account.

Regulation of constant pressure systems is usually used for the delivery and control of multiple gas flow paths in parallel, such as air entrainment systems in biological applications and wastewater purifications plants. Variable pressure systems are generally used for the delivery and control of liquids.

Required data for the design:
- Static pressure loss of the plant
- Dynamic pressure loss of the plant
- Permitted pressure loss of the valve at \( Q_{\text{max}} \)
- Physical data of the delivery medium
- Temperature of the delivery medium
- Delivery characteristic of the pump/compressor
- Flow rates \( Q_{\text{max}} / Q_{\text{norm}} / Q_{\text{min}} \)
- Nominal diameter of the pipeline upstream/downstream of the valve
Control characteristic of control valves

To demonstrate the control characteristics of a control valve, it is necessary to know the flow and valve characteristic (AKL). These are determined on a certified test bench according to DIN EN 60534. On the test bench, flow factors (kv) are measured at constant pressure (1 bar) with many different degrees of opening of the valve as defined in DIN EN 60534. Other testing methods used to determine kv cannot be used for comparison between different valve types. Only valves tested under the same standard can be compared, all other comparisons are irrelevant.

When installed, the control valve becomes a part of the pipeline system. In other words, the control characteristics are not only determined by the valve characteristic but also by the dynamic losses, static pressure of the pipeline system, total static head, ratio between dynamic pressure loss of the control valve and dynamic pressure loss of the entire system, permitted pressure loss at the control valve at QMAX. The combination of all these factors produces the operating characteristic (BKL) of the complete system, including the valve.

The deviation from an ideal linear operating characteristic (linear change in flow rate to change in degree of opening) is expressed as the Gain. A forgiving and stable control characteristic for the system is obtained with a gain factor between 0.5 and 2.0. Within these limits, the system is said to be within a stable control range. The basic requirement for an uninterrupted, wide (over almost the entire adjustment range of the control valve) and stable control range is a steadily increasing kv value.

Control circuits which are cost effective and stable can only be built using control valves that function within the stable control range limits such as the IRIS® diaphragm control valve.

Design according to the flow operating characteristics [BKL]
... Diaphragm control valve(s)

Control valve with measured control characteristic according to DIN EN 60534.

Diaphragm control valve with central hexagonal aperture as the control diaphragm for the precise, processable control of liquid and gaseous media.

Diaphragm can be retracted completely from the valve body to allow passage of the entire nominal cross section.

Minimum pressure losses due to flow-optimised valve segments
Hysteresis-free valve behaviour even with high frequency regulation to identical positions
Valve opening values are indicated directly on the valve
Compact, robust design
Automatic spindle lubrication

- **Manufacturer’s specifications**
  - Make, Type: EGGER BS DN .......
  - Nominal connection diameter: DN......................
  - Installed length: ................................ mm, inch
  - Nominal pressure: ......................................... bar, psi
  - Max. operating temperature: ................................ °C, °F
  - Valve pressure loss at QMAX: ................................ bar, psi
  - Stable control range from: ........... to ........... m3/h, gpm
  (flow data for gases in Nm3/h, gpm)

- **Electric actuation**
  - Actuator with integrated motor controller (thyristor rotating unit) and local control point, suitable for intermittent operation S4 - 25 % ED, electronic position encoder (4 - 20 mA), torque and end-position switching for opening and closing, handwheel for manual operation, switchgear chamber heater, IP 67 enclosure, corrosion protection for outdoor installation. Other options available on request.

  - Make, Type: AUMASAR .............

- **Integrated gas mass flow rate measurement system**
  - Integrated in the central flow axis is a robust direct gas mass flow rate measuring device.

  - Make, Type: EGGER / ABB, Sensyflow®

    - Accuracy of measurement independent of the valve, pressure, temperature and inlet-outlet lines.
    - Measurement accuracy ±2-5%, reproducibility ±0.5%, measurement range 1:100, rapid response time (0.5 seconds) to achieve stable positioning.
    - Calibration of the Sensyflow with piping and valve on certified test bench monitored by the German Calibration Service.
    - Measurement sensor: ceramic sensor unit with protective cage.
    - Welded-on adaptor made of stainless steel with centring pin for reproducible installation position, set up as a four-conductor compact measurement unit, without display, type of enclosure IP 65, voltage supply 24 V external, output signal 4 - 20 mA.
    - Optional: Integrated Profibus connection DP/V1, graphics display to show flow rate and temperature, voltage supply 220 V / 24 V.

- **Dimensioning specifications**
  - Medium: ...................................................
  - Flow rate: 
    - \( Q_{\text{MIN}} \) .............. m3/h, gpm
    - \( Q_{\text{NORM}} \) .............. m3/h, gpm
    - \( Q_{\text{MAX}} \) .............. m3/h, gpm
  - Temperature of medium: ................................ °C, °F
  - Nominal pipe diameter up-/downstream of valve: 
    - ......./..... mm, inch
  - Permitted pressure loss due to valve at \( Q_{\text{MAX}} \): 
    - ..... bar, psi
  - Static pressure loss of plant: 
    - ..... bar, psi
  - Dynamic pressure loss of plant: 
    - ..... bar, psi
  - System pressure compressor/pump: 
    - ..... bar, psi

- **Option K\(_v\) value measurement**
  - Valve performance test with protocol. Test includes measurement of \( K_v \) values according to DIN EN 60534-2-3 on a certified valve control test bench.
Materials and versions

OVERALL DIMENSIONS: DN 25 - DN 600, 1" - 24"
FLANGE CONNECTIONS: PN 10 ACCORDING TO DIN 2501
OPERATING PRESSURE: MAX. 6 BAR, 87 psi
TEMPERATURE: MAX. 140 °C, 280 °F

DIAPHRAGM CONTROL VALVE
Materials, dimensions, actuator types

Dimensions for design E and EM

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1) L1 - Version E with AUMA STANDARD actuator
2) L1 - Version EM with AUMA MATIC actuator

Design P
Pneumatic control actuator

Design E and EM
Electric control actuator

Design H
Hand-lever actuator for DN25-DN150, 1" - 6"

Design S
Precision handwheel actuator

Adapter positioning pin in flow direction

Weld-on adapter for measurement system Sensyflow
Any fitting position possible vertically to the tubular axle. Measures according to welding specification

Flow direction

Measured section