New foundation for flow control:

MFCs for industrial gases with efficient Industrial Ethernet connectivity

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New foundation for flow control

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The new mass flow controllers and mass flow meters of the 874x series from Bürkert offer an efficient method of connecting several sensor-actuator modules to Industrial Ethernet via a single system control unit (SCU). A MEMS sensor that measures directly in the gas provides maximum precision and very short response times of the flow controllers/meters. The Bürkert Communicator software, part of the new device platform EDIP (Efficient Device Integration Platform) allows user-friendly parameterization.

The mass flow meters (MFM) and mass flow controllers (MFC) for gases have become a Bürkert success story since the introduction of the first models in 1996. Available in different sizes, sensor variants and designs, they are ideal for all types of applications requiring high precision and reproducibility – e.g. the supply of exact mixing ratios of fuel gas and oxygen for flame control, the production and control of gas mixtures for plasma applications in coating technology or the provision of defined atmospheres for welding applications and heat treatment furnaces. All MFC and MFM devices have one thing in common: built-in electronics for signal processing, closed loop and valve control. Together with the flow sensor and a solenoid control valve as actuator this produces a closed control loop. The mass flow is generally kept stable based on a constant set point or is modified according to a predefined profile. The control is not affected by pressure fluctuations or increased flow resistance. The digital feedback signals of the MFCs ensure traceability of the exact gas composition at all times. This is especially important with respect to quality and safety aspects, for example in hardening and coating furnaces or in medical applications.

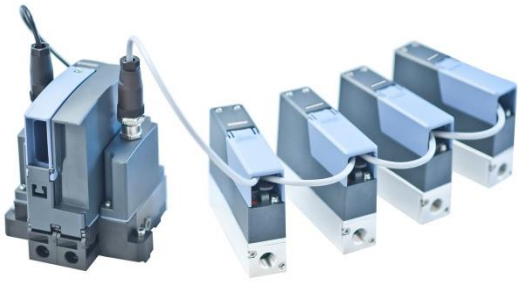
One control unit operates multiple field devices

In the new Type 8741 mass flow controller (MFC) / mass flow meter (MFM) Bürkert removed control-relevant elements. These control tasks are transferred to a higher-level controller, which communicates with the sensor actuator modules (SAMs), like e.g. mass flow controllers, via a system bus. The SAMs are equipped with only one interface for this proprietary Bürkert system bus (büS). While previous MFCs/MFMs contained their own control hardware, now the system control unit (SCU) of Type ME2X is used. It can control up to 16 control loops (e.g. SAMs) simultaneously and serves as a gateway between Industrial Ethernet and the büS. This allows direct connection of field devices to Industrial Ethernet. The Bürkert system bus is the standardised digital interface for all devices in the system. It is based on CANopen, but uses auto-addressing and requires no master in the system. If a CAN bus already exists in the customer's application, a toggle switch on the device can be used to switch between büS and CANopen. The shift of the control hardware from the MFCs/MFMs to the SCU results in significant advantages in applications with many control loops. Not only the simplification of the flow controllers/meters, but also the reduction to only one Industrial Ethernet interface in the central control unit results in easy implementation and high efficiency of the plant.

The new MFC/MFM 8741 is equipped with the CANopen based Bürkert System Bus (büS) and therefore offers intelligent network communication.

Inner qualities with robust shell

Device-specific parameters of a SAM are stored on a Micro-SIM card, which can easily be transferred to a replacement device. Type 8741 is equipped with MEMS technology (micro electric mechanical systems) for direct flow rate measurement in gases and is designed for nominal flow rates from 0.01 Nl/min to 80 Nl/min (with reference to nitrogen). It features impressively high accuracy, fast response times and excellent repeatability. It also achieves very short settling times in the process. The MEMS sensor integrated in the MFM/MFC calculates the mass flow rate based on the principle of thermal measurement. The measurement requires essentially a heating resistor and two temperature gauges. The operating medium flowing through the device changes the measured temperature difference between the two gauges. Based on the thermal measurement the MFC can control the required mass flow rate. This is virtually independent of pressure and temperatures changes in the respective application.



büS system consisting of four Mass Flow Controllers Type 8741 with system control unit Type ME2X for Industrial Ethernet connection.

The actuators used in the MFCs are the excellent solenoid control valves of the 287x series. These are direct-acting and normally closed valves, available in widths from 0.05 to 4 mm. All Type 8741 devices come in a stable polycarbonate housing, which is mounted on the fluidic body made of aluminium or stainless steel. Type

8741 are the first MFCs/MFMs which use a terminal block for the electrical connection. It can be easily configured with a 4-wire cable and then plugged into the socket on the MFC/MFM.

Advantages with bus communication

The System Control Unit (SCU) ME2X from Bürkert makes Ethernet available at the fieldbus level. As control unit it integrates up to 16 MFCs or MFMs via the Bürkert system bus (büS).

The central control unit (SCU) Type ME2X features a modular design. The gateway module ME23 is mounted together with the büS input and büS output modules ME29 on a joint backplane, which permits top hat rail mounting. Type ME24 I/O modules can optionally be integrated in the SCU. The I/O modules transmit / receive analogue or digital signals, which can then be used for the control of processes. An analogue input, for example, records a 4-20 mA signal from a pressure transmitter of a control loop, and puts it on the proprietary bus to communicate the pressure value to the SCU. The SCU software can then further process this pressure signal for specific uses. The SCU comes in a polycarbonate housing and is equipped with an SD card slot on the bottom for storage of the device-specific data on a removable memory. Two RJ45 interfaces establish the connection to Industrial Ethernet and a mini-USB port is used for factory service. Configuration and parameterization of the components can be done with the standardized Bürkert Communicator software and the büS stick, which is available as an accessory. As part of the new device platform EDIP this ensures a user-friendly process monitoring. A highlight is the User-f(x) function which can be started from the Bürkert Communicator. The User-f(x) allows fast and easy programming of a customized system control, e.g. a gas mixing process. Signals read by the SCU (e.g. via an ME24 I/O module) can also be processed.

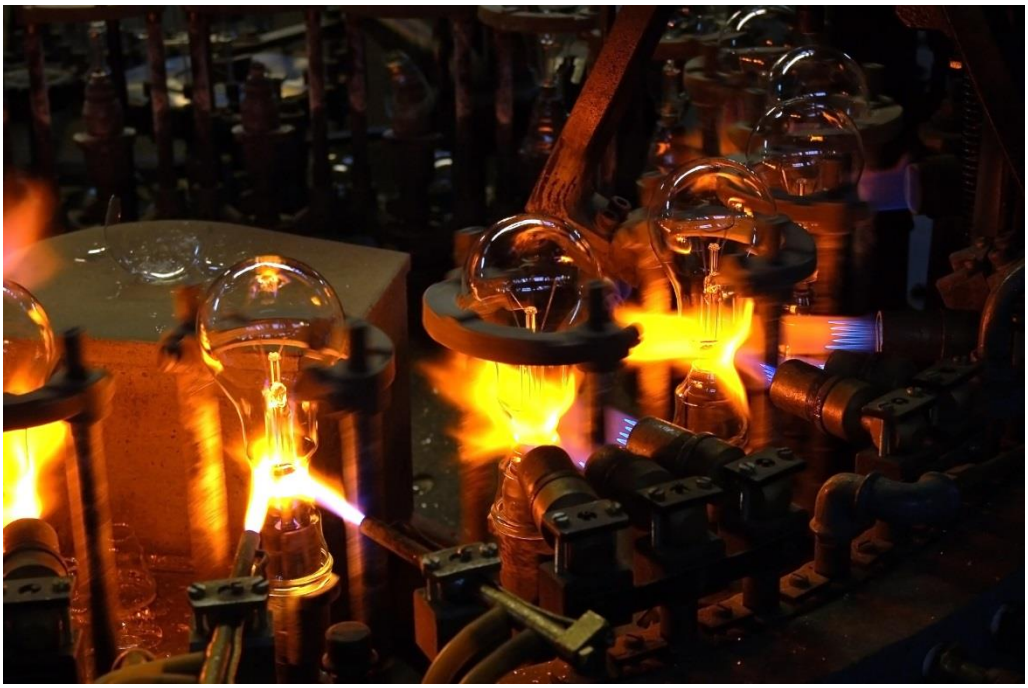
The Bürkert Communicator software is used for parameterization and diagnosis.

Standardised device platform EDIP

In the future, EDIP will standardise the control, communication and interfaces of many process devices. EDIP enables integration of all Bürkert devices in the proprietary büS system and operation with the Bürkert Communicator. The Bürkert Communicator is an MS Windows-based software tool that allows the user to program additional parameters of the MFC/MFM or to monitor control points in the process.

With EDIP users also benefit from standardised interfaces, faster development of system configurations (software and hardware), easier replacement of system components and the interplay of single system components. All büS devices have equal access and receive functional addresses from the user. The information intended for these addresses is filtered based on the address.

The MFC / MFM Type 874x and the system control unit Type ME2X are intended especially for gas applications in the glass industry and surface technology, as well as the pharmaceutical and biotechnology sectors. A well-known example for the use of such a controller is the control of high-precision gas mixtures such as those needed in plasma control and medical technology or for protective and reactive gas atmospheres. An overall system consisting of the SCU controller and the new compact MFCs is convincing in terms of efficient Ethernet connection and an easy but powerful, integrated software.



Mass flow controllers in Glass Manufacturing and processing deliver precise gas mixtures for the burners.

Contact

Do you have questions or can we show you our newest controlling technology? Just contact

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