

Compact structure – modular design

System components	Functions and variants
Programmed and configured evaluation electronics	The Controller S320, of modular build with evaluation electronics, is equipped to be application-specific, with different analog and frequency input and output cards, up to 10 channels in 24-bit resolution and with appropriately configured application-specific software.
Housing and measuring set-up	Standard 19" case, IP54 or customer-tailored case with power supply, plug sockets for sensors and analog outputs, serial and digital interface, manual control buttons as well as an optional installation of control valves and flow sensors with connectors.
Pressure sensors	Accurate and overload resistant pressure sensors for differential pressure, absolute pressure as single sensors or a combined transmitter PDP
Temperature and humidity sensors	Accurate and fast temperature and humidity sensors for temperature, relative humidity sensors as single sensors or a combined transmitter Humitter UX
Flow measuring elements	An application-specific selection of measuring elements: most importantly laminar flow elements but also gas meters, supercritical nozzles, pitot tubes, orifices, subcritical nozzles, thermal mass flow sensors optimally adjusted according to the measurement task
Accessories for measuring sections	Inlet and outlet sections, filters, flow rectifiers, sensor blocks, fittings etc. to the optimum set-up of the measurement technology
Calibration technology	Calibration devices based on various primary elements from calibration leaks up to critical nozzles for the checking of measuring systems for flow and leaks
Electronic control valves	Application-specific selection of mechanical or electronic control valve: mechanical pressure regulators, maintenance units, precision pressure regulator, needle valve, PWM-modulated valves, baffle plate or sliding gate valve depending on the flow and pressure control range
Switching valves and test valves	Application-specific selection of control or high-density test bench valves with low pressure surge and temperature development for switching the measurement technology on or over.

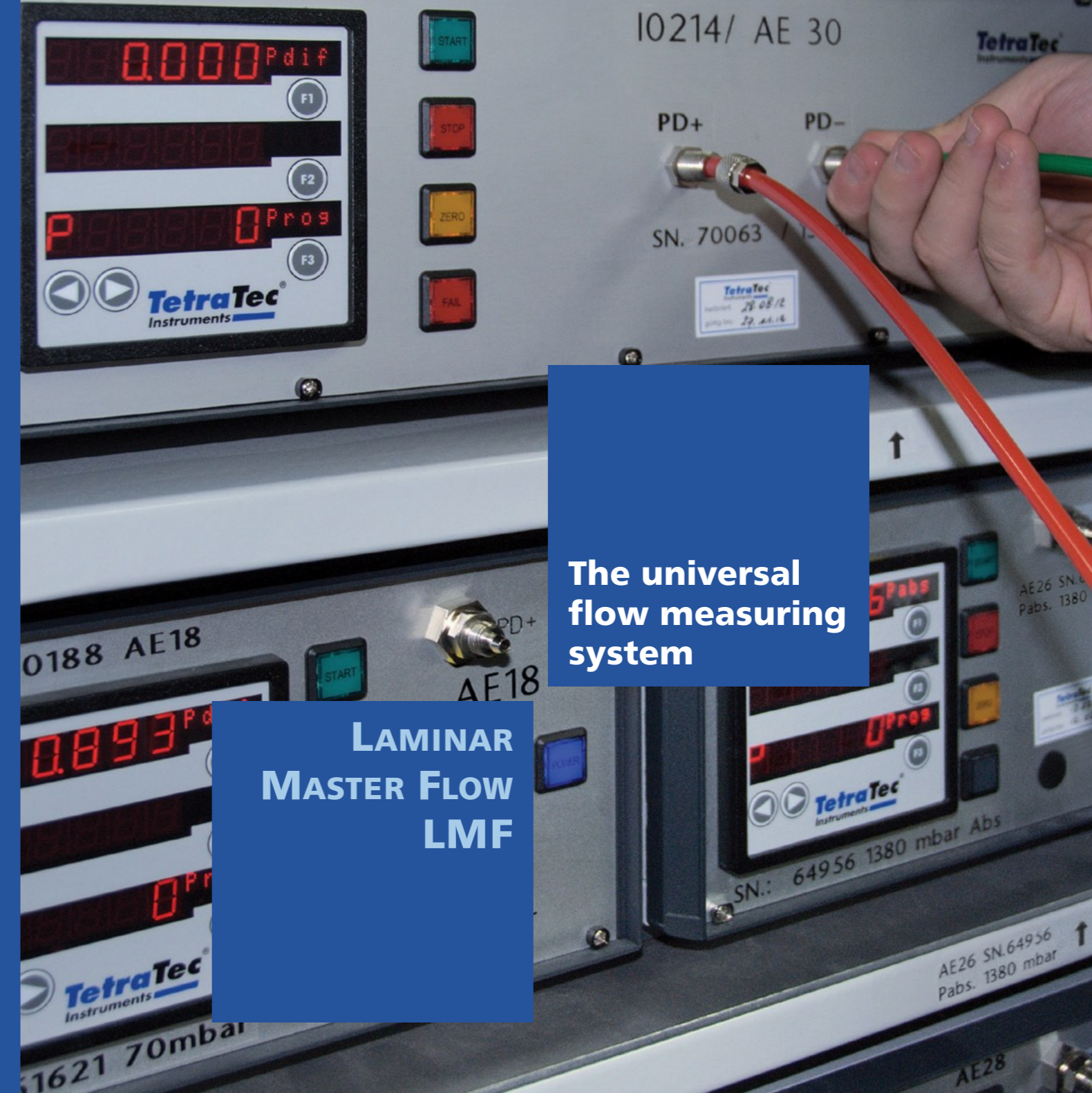
In order to meet ever changing needs from calibration up to the highly automated production testing, we offer a variable, modular measurement set-up. The case construction of the evaluation units and the set-up of the measuring technology are designed for quick installation and replacement for maintenance and recalibration purposes.

The software offers a variety of user-specific set-up options and diverse calculation and correction methods.

The flow measuring section is customizable with a large bandwidth of sizes and measuring ranges, as well as different types of flow elements and the sensors required for the evaluation of almost every conceivable measurement task.

Small dead volumes for fast response - defined measurement set-ups for safe evaluation, optionally with control valves for the automated regulation of pressure and flow control valves or the automated switching of measurement sections or sensors.

Errors excepted and subject to technical changes.



The universal flow measuring system

LAMINAR MASTER FLOW LMF

Laminar Master Flow LMF

Flow measurement – precise, quick, traceable!

The solution for calibration and quality assurance in batch production



Product features

- Flow measuring system with a high accuracy for air and gas flows
- Determination of the mass and volume flows of air as well as of more than a dozen types of gas
- Full scale measuring range with laminar flow elements (LFE): from 5 ml/min up to 64,000 l/min
- Characteristic curves with a measuring span from 1:10, extending up to 1:100
- 10 freely configurable test program memories
- Evaluation of up to 2 measuring sections at the same time
- Usable measuring element types: Laminar Flow Elements, gas meters, critical nozzles, pitot tubes, orifices, subcritical nozzles and calorimetric mass flow sensors
- Measuring accuracy from +/-0.5% of reading with flows < 0.5 l/min
- Measuring accuracy better than +/-0.85% o.R. with flows < 0.5 l/min, and better than +/-0.65% o.R. with flows > 0.5 l/min
- Test pressure up to 10 bar, with electronic control optional
- Test temperature -10 up to +70°C, humidity measurement optional
- Serial interfaces: 1 x RS232, 2 x RS485 and Ethernet TCP/IP
- Digital inputs/outputs for PLC communication, and for activation of actors, e.g. solenoid valves

The Laminar Master Flow System LMF is a universal and highly automatable measuring system for the precise measurement of flow rates and other parameters of air and gases.

Fields of application are such as the gauging of flow actuating elements (e.g. nozzles in motor production) and testing for leaks.

In manufacturing, development or in laboratories numerous different applications can be automated effectively with this system:

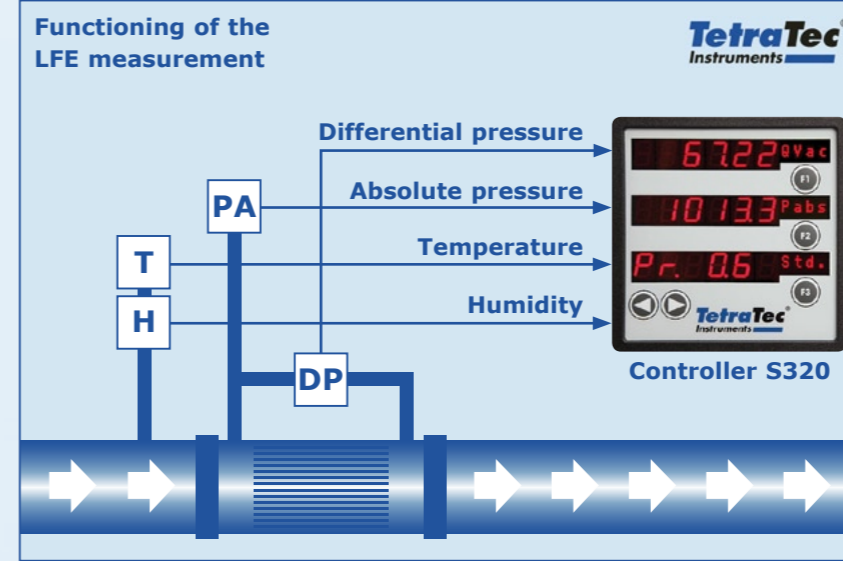
- Determination of transit characteristics of components and measurement by means of flow calibration, optionally with electronic control
- Geometry testing of components by flow measurement
- Functional testing of complete devices, component parts or aggregates
- Examination of passage flow and air and watertightness for quality control in manufacturing.



HUMTMP sensor: combined sensor for temperature and relative humidity

PDP sensor: combined sensor for static pressure and differential pressure

Laminar Flow Element: model 50MJ10



Thanks to the low pressure drop in the measuring section, measuring arrangements and various test pressures can be combined arbitrarily. Moreover it is irrelevant whether the measuring section is operated using the supply or exhaust air from the air-ducting components or using excess or negative pressure.

The system is configurable and provides the highest level of automation.

Despite extremely short test cycles an unsurpassed level of accuracy can be achieved. It consists of compact, modular units and can be easily adapted to the most different of operating conditions. The LMF Laminar Flow Master is supplied as a fully functional, autonomous working measurement system. An internal computer as well as interfaces to higher-level control computers (PLC) make a simple integration possible.

Functional range

For flow measurement of gas flows, the LMF measurement system offers a selection of sensors with different operating principles. Depending on the measuring task, the measuring section of the device can be fitted with laminar flow elements (LFE), gas meters, supercritical or subcritical nozzles, pitot tubes, orifices and calorimetric mass flow sensors.

In addition to air, the mass or volume flows of more than a dozen types of gas can be determined. At the same time a measuring range of 1:10 and a measurement accuracy of better than 0.65% from the measurement value can be achieved. Optionally the device can be fitted with an electronic test pressure control and the measuring range can be extended up to 1:100 with almost constant accuracy.

The measuring device is equipped with front buttons and a keypad for operation. The control and testing software can be freely programmed and configured by the provider for a specific application. In this way even customer-specific requirements can be implemented, for example for the creation and documentation of measurement value protocols. Special digital input/output cards and the RS232 interface are available for connection to the PLC. Via a serial RS-485 interface up to 32 measurement systems can be connected to a leading system and virtually any number can be networked with each other via the Ethernet interface with TCP/IP protocol.