Leakage Measurement System LMS

TetraTec® Instruments

The *Leakage Measurement System,* LMS in brief, allows leakage measurement with air or gases according to the pressure drop method. An improvement of resolution is achieved by measurement of differential pressure.

- Leakage Measurement acc. to Pressure Drop Method
- Diff. Pressure Measurement for Higher Resolution
- Electronic Pressure Control (optionally)
- Very Small Tare Weight
- Modular Set-Up
- Controller S320 as Measuring and Control System
- Pneumatic Valves with Electric Pilot Valves or Impulse Valves as (External) Components
- Various Interfaces (Digital, Serial and Ethernet)
- Networking with up to 32 Devices via RS485

Technical Description

The measuring system runs testing schedules autonomously and can transfer the measurement results digitally. The controller S320 manages the complete testing schedule as well as the data acquisition and evaluation.

Modularity is preserved by both mechanical set-up and sensors of the measuring system and also by the multi-purpose parameterisable software of the device. Modular set-up and parameterisability allow an optimal customisation for various testing tasks.

The 10 available testing programs make it possible to switch quickly and easily between the saved configurations, to satisfy different measuring tasks.

During standard operation the display of the LMS shows:
- the testing pressure value
- the pressure drop value (total and per time unit)
- the leakage volume flow value

Additionally it's possible to display all sensor signals the measuring system is fed with (e.g. differential pressure, gauge pressure, temperature etc.). If needed, internally calculated values for density, viscosity or Reynolds number etc. of the gas can be calculated. Furthermore the conversion to different standard conditions is supported by setting the corresponding parameters.

LMS testing modul with PDP sensor

The configuration data, like limits, measuring method and testing parameters can be set by interfaces via PC or manually via front keypad. Being saved in Flash-ROM, the entered data are preserved in powerless state.

The measuring system has a modular set-up. As separate components likewise measuring sensors or switching valves can be connected.

For this purpose both, pneumatic valves with electric pilot valves and impulse valves, can be used.
An optional electronic pressure controller allows it to run the program fully automated with different test pressures.

Operation principle of the leak testing
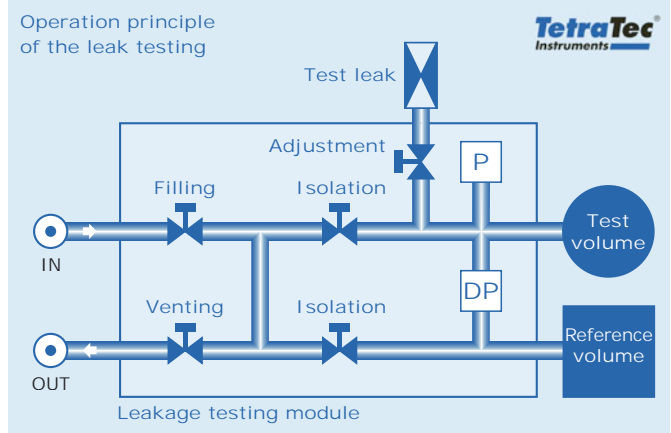
Operating principle of the leak testing

The LMS can be controlled by an external computer via different interfaces: digitally (PLC compatible, galvanically isolated), serial (RS232 or RS485) or Ethernet.

Quite the same applies to data acquisition. It can be done via serial or Ethernet interfaces or via the optional analog outputs. The two implemented RS485 interfaces allow furthermore to link and address up to 32 devices via RS485 bus structure.

Specifications

Sensor Type and Measuring Ranges

Differential pressure:	0 .. 20 / 60 mbar
Relative pressure:	0 .. 0,1 / 1 / 2,5 / 4 / 6 bar
Absolute pressure:	0 .. 0,1 / 1 / 2,5 / 4 / 6 bar

Accuracy

Pressure:　　　　　　　　≤ 0,1 % F.S.
Tare volume of the measuring section is < 10 ml.

Operating Conditions

Inlet pressure:	0 .. 10 bar abs
Inlet temperature:	0 .. +45 °C
Inlet humidity:	0 .. 100 %, non-condensing

Vacuum operation requires a sufficient low-pressure supply.

Ambient Conditions

Pressure:	Atmospheric
Temperature:	-10 .. +50 °C
Humidity:	0 .. 100 %, non-condensing

Media Compatibility

Clean, dry, non-condensing, non-corrosive gases and air. The measuring medium has to correspond with the requirements of ISO 8573-1. Additionally to a 5 µ filter, an oil/water separator in the compressed air supply is strongly recommended.

Overrange Limits

The overrange limits depend on the type of sensor and switching valve. Usually at least twice the range limit is permissible.

Display

Alphanumeric LED (red).
3 displays with 6 characters. Character height: 10 mm.
3 text-displays with 4 characters. Character height: 6 mm.

Housing

Type:		DIN 43700 **or**
		19" rack with 3 HU / 84 HP **or**
		19" rack with 6 HU / 84 HP
Dimensions	3 HU:	530 x 165 x 350 mm (WxHxD)
	6 HU:	530 x 330 x 350 mm (WxHxD)
Weight	3 HU:	≈ 5 kg
	6 HU:	≈ 10 kg
Ingress Protection		IP 20 to IP 54

Ingress Protection according to set-up, higher levels on request.

Process Connections

G1/8" to G1" or according to agreement.

Electrical Connections

Power supply:	VAC power connector
Analogue inputs/outputs:	Round connector (Lumberg)

Interfaces

1 x Ethernet, 1 x RS232 und 2 x RS485

Power Supply

90 .. 260 VAC (power supply unit), 50/60 Hz, max. 80 W.

Approvals

The device corresponds to European standard EN 61010-1 (safety regulations for electrical measuring, control and laboratory devices) and the regulations of the EC-Machinery Directive - 89/392.

Range of Delivery

- Measuring/control device incl. power cable
- Testing module incl. connection cable
- Operation manual with electrical connection circuit

Special Features

Mounting Options

Measuring/control device: the controller S320 is mounted in a stable 19" rack housing with 3 HU or 6 HU, ready for connection. Control valve and sensors are (also) available as separate components for external installation.

Sensor and Valve Technology

Sensors: as individual pressure sensors or, optional, as PDP sensor together with a differential pressure chamber in one housing.
Valve types: impulse valves with little pressure pulse or pneumatic valves without heat entry.

Measuring Medium

Usable media: the media property database supports the usage of air and more than 12 gases.

Operation

F1/*F2*/*F3*/*</>* key: 5 foil keys at the controller for setting of display (selectable are pressure drop/increase, leak related or other units like e.g. Pa, Pa/s, ml/min or ml/h and much more) and parameterisation.
Zero key: zeroing of diff. and gauge pressure sensors.
START/*STOP* key: begin/end of averaging measurement.
LEAK TEST key: start of leak test.

Parameter settings

10 programs: configuration of measuring sections, controller settings, display units, decimal places and limits, O.K. / N.O.K counter etc.
Testing parameters: pressure limits, testing volume, wait / fill / stabilisation / measuring / venting time, O.K. / N.O.K counter.
System parameters: superior settings and calibration data.
Password: protects the configuration against unauthorised and unintended changes.

Status Displays (optionally)

Coloured lamps: green (O.K.), red (N.O.K.).

Ordering Information

The LMS system will be customised to the needs of specific applications. For design and quotation please provide us with the following parameters:

- Leak testing range(s)
- Gas(es)
- Testing volume
- Operating conditions (pressure and temperature)
- Control requirements
- Measuring and control accuracy
- Ambient conditions
- Enclosure requirements
- Electrical supply
- Requirements concerning data acquisition
- Other special requirements