Modular
test system for diaphragm gas meters with critically operated Venturi nozzles

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- Unlimited test volumes
- Short process times
- Low maintenance costs
- Compact design

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Modular test system for diaphragm gas meters with critically operated Venturi nozzles: QR

In many countries around the world – from Argentina to China – Elster Kromschröder GmbH works as an efficient partner to metrological institutes, gas suppliers and equipment manufacturers providing them with appropriate test technology or operating such equipment in conjunction with them.

Today, modern test rigs for gas meters demand a maximum flexibility alongside a very high degree of accuracy and the shortest possible testing times. Our test rigs are ideal in meeting these requirements.

In detail, these are as follows:

- Carrying out calibration tests
- Quality assessments
- Tests on domestic and commercial diaphragm gas meters under laboratory conditions
- Statistical rechecks

For series production, the use of the reference standard developed by us using critically operated nozzles provides significant benefits:

- Highly stable volume flow
- Unlimited test volumes
- Short process times, as there are no periodic errors
- Low maintenance costs
- Compact design

The measuring technology, test procedure and system tests all meet PTB Testing Instructions. The system is approved by both the German PTB (National Metrological Institute in Braunschweig, Germany) and the metrology services of other countries.

During the design stage, the focus of development was on a modular construction to enable the system to be adapted to the individual needs of the customer with reference to test volumes, system capacity and the types of test specimen. Requirements such as the testing of meters with temperature conversion can thus be met.

Our range of services extends from individual nozzle reference standards that generate the volume flows required for the test, through complete test rigs with series-connected test specimens, to the expansion and conversion of customers' existing installations (including those consisting of externally supplied products).

Components of the new test system

Nozzle reference standard QR	Testing line QL
Reference standard for testing diaphragm gas meters	Testing line module with up to 9 test positions
Automatic test procedure control	Adaptation to all meter types
Network integration, order management	Extensive testing line expansion
Database system, Statistics	Handheld terminal Barcode reader
Testing facility for temperature-compensating diaphragm gas meters	Temperature-controlled testing line

Reference standard

Qmax-nozzle

Qmin-nozzle

Reference standard

Critically operated nozzles are used to generate the highly stable volume flow in the reference standard. Their operating principle is based on the fact that sound velocity is set up in the neck section of an appropriately shaped nozzle on reaching a defined critical pressure ratio. The volume flow is then principally dependent only on the cross-section through which it flows. The volumetric measurement can thus essentially be traced back to a measurement of time. This can significantly reduce the test duration.

In the overall design of the nozzle reference standard, our design engineers were able to provide nozzles that can be independently replaced by the user through the use of innovative clamping technology and freely-configurable removable baseplates (for three nozzles).

This solution provides the following benefits for the user:

- Individual and flexible adaptation to the test task
- Simple, visual status checks on the nozzles by operating personnel
- Safe, selective and economical replacement of worn nozzles
- Low-cost, non-stationary testing of the reference standards used
- No cost-intensive downtime required for calibrating the whole system

In addition, the standard product series can be supplemented later on with additional volume flows (QRLab) or by a second reference standard operated in parallel (QRManufacturer), without taking up any more space.

Connecting additional testing lines (temperature test cabinet, domestic and industrial meters) allows the implementation of all standard requirements.

Removable nozzle baseplate

Testing line

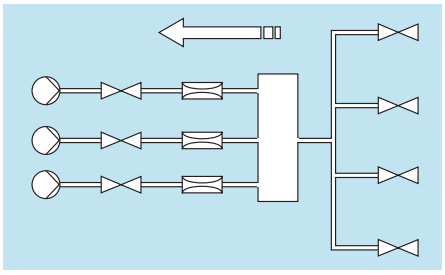
Reference standard

Signal recording

Modules for customer-specific solutions

QRB

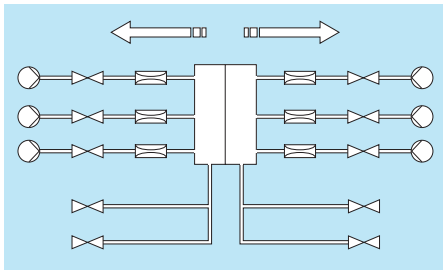
QRBasic



The basic variant has been designed for the industrial user for testing and/ or recalibrating small numbers of meters. A maximum of four testing lines can be operated alternately.

QRM

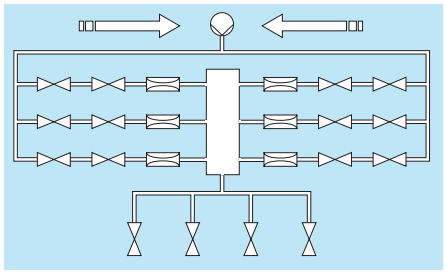
QRManufacturer



In the case of larger numbers of meters, we recommend the use of our QRManufacturer systems. They can control and monitor two testing lines in separate parallel operation using a double reference standard.

QRL

QRLab



The QRLab variant is suitable for carrying out approval and laboratory tests and for test series using individual test volumes.

Legend

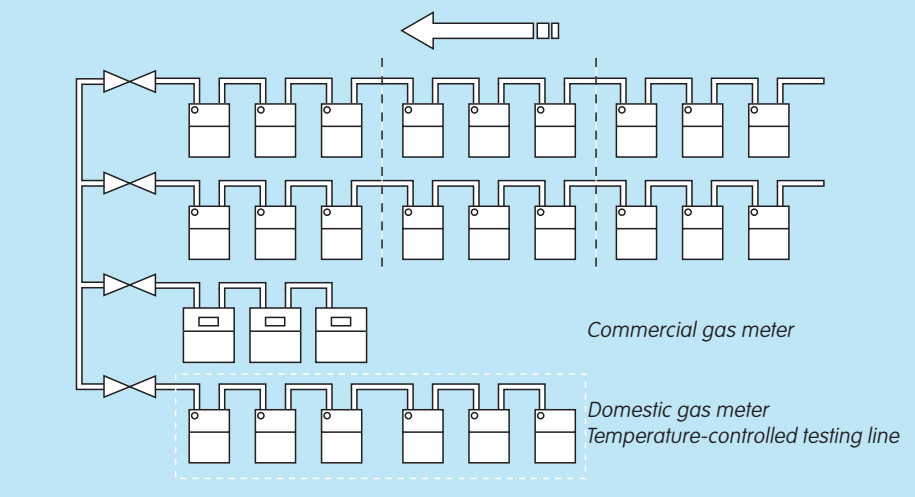
- Vacuum pump
- Valve
- Venturi nozzles
- Equalising tank

Mobile test van: mobile nozzle test rig for unit tests of BK G2,5 – BK G25

In addition, we can provide special, customised products to meet your needs. Just let us know your intentions.

View of the mobile test van

Test operation



Example of the structure of different testing lines

Handheld terminal

Testing line

The testing line module allows for pneumatic clamping of the gas meters under test. In the basic design, one module consists of one or three test positions. It is possible to expand this to include up to three modules totalling nine test positions.

A maximum of four testing line modules can be connected to the reference standard.

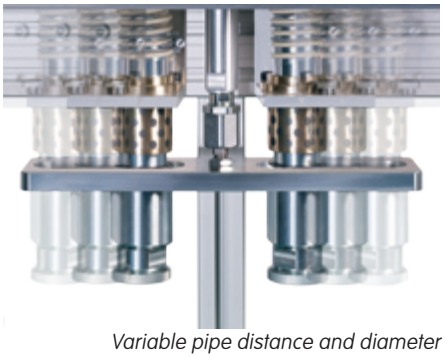
A run-in device can be integrated for running-in and balancing the temperature of the test specimens.

The signal can be recorded optionally using optical or inductive sensors. In addition, the volumes can be entered using a keyboard or a handheld terminal.

The whole system is equipped with components that suit industrial needs, as well as measuring and sensor technology with long-term stability. Vacuums are provided using maintenance-free vacuum pumps.

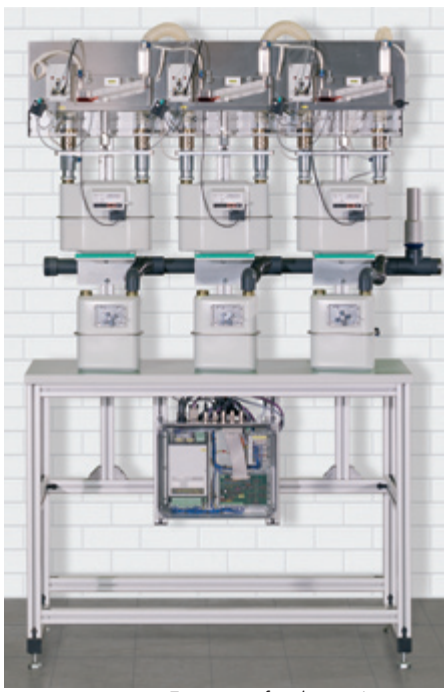
The uniform software of all installations operated around the world allows troubleshooting, data analysis and software updates through remote maintenance.

Based on our experience from the very many customer projects we have carried out, we can offer numerous interfaces to other software solutions (e.g. SAP, Oracle, MS-SQL servers). Naturally, it is also possible to program interfaces that we have not yet provided.



Variable pipe distance and diameter

Test setup for commercial meters



Test setup for domestic meters

Control unit

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The recently designed, straightforward software user interface helps you to operate the system quickly and safely.

User-friendliness takes priority here. All of the important functions can be immediately reached.

Special buttons for routine activities save you time.

User interface

Elster Kromschröder test systems for gas meters are used worldwide

- Algeria
- Argentina
- Belarus
- Chile
- China
- Egypt
- France
- Germany
- Hungary
- Iran
- Italy
- Mexico
- The Netherlands
- Poland
- Romania
- Russia
- Serbia
- Slovakia
- Slovenia
- Spain
- Turkey

Test system in Hungary, 2005

Technical data

Sizes

- Gas meters G1,6 – G25
  Calibration, testing of results and samples, test measurements

Accuracy

- Reference standard with PTB certificate
- 0.3% ≤ 2m³/h
- 0.2% > 2m³/h

Capacity

- ~250 gas meters per shift
  depending on the system configuration

Dimensions in mm (W x H x D)

- Standard 1250 x 1200 x 700
- Testing line 3750 x 1900 x 700

Voltage supply

- 220 V AC, 1.5 kW domestic gas meter
- 380 V AC, 5.5 kW commercial gas meter

Compressed air supply

- 6 bar, on average 50 l/min

Further information

Special products and other sizes can be supplied on request. The descriptions in this brochure only provide a brief overview of the test system.

We would be glad to provide you with a more detailed presentation and an explanation of the technical details in a meeting with you.

We would be happy to show you around our installations at the Osnabrück works.

Your points of contact look forward to dealing with your enquiries:

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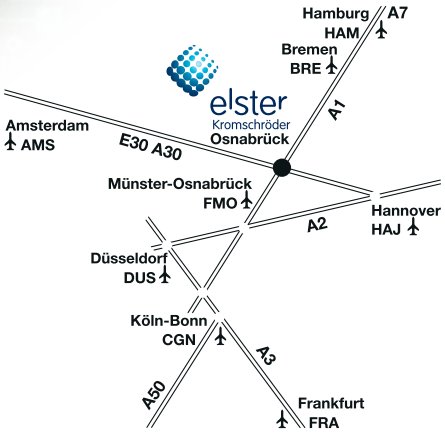

Detailed information on this product

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