Calibration system for gas density instrumentation Model ACS-10

Applications

- Fully automatic testing of SF_6 density measuring instruments through comparative measurements
- Simple measurement on-site, in the laboratory or in the workshop

Special features

- Fully automatic testing of leakage detection systems
- Pressure generation via an integrated compressor
- Highly accurate pressure reference sensors with an accuracy of 0.06 %
- Variable connection concept of the test items
- Suitable for a wide range of leakage detection systems

Calibration system, model ACS-10

Description

Simple operation
The calibration system model ACS-10 is used for the fully automated testing of the SF_6 gas density and pressure measuring instruments through comparative measurements. This calibration system is used to check quickly and easily both density-based and pressure-based mechanical measuring instruments.

Functional check in accordance with the F-gas regulation
With regard to switchgear safety, asset protection and environmental protection, it is common to perform functional checks of the leakage detection systems on a regular basis. Article 5 of the EU regulation on fluorinated greenhouse gases provides for checking of the leakage detection system at least every 6 years if it contains more than 22 kg [48.5 lbs] SF_6 gas and the electrical asset was installed after 01 January 2017.

Fast field recalibration
All necessary components required for a fully automatic recalibration are integrated in this calibration case.
The large touch display enables easy configuration of the test parameters, explains the test process step by step and enables clear management and viewing of historical test results.

WIKA
Smart in sensing

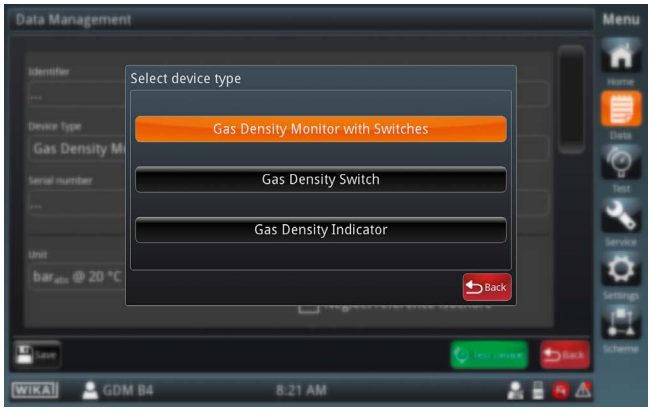
User interface

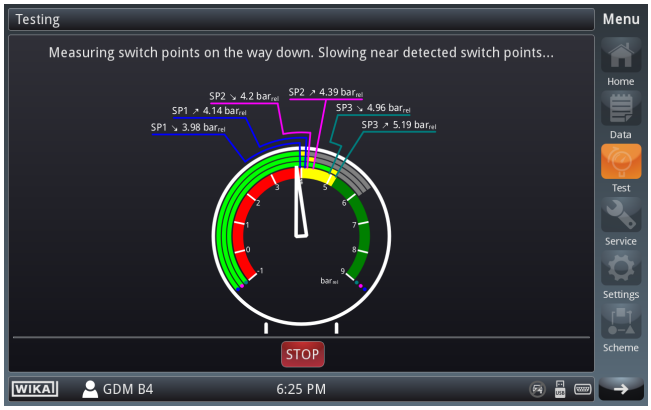
Operation

The user interface is intuitive and can be operated via a capacitive touchscreen.

Recalibration of leakage detection systems

A wide range of leakage detection systems with and without switch contacts can be recalibrated.





Detailed description of the measured values

The measuring results for rising and falling switching accuracy, hysteresis and contact resistance are displayed in detail after the measurement.
The evaluation of the results is based on the user specifications. For reference chamber instruments (e.g. model GDM-RC-100), the accuracy values can be given in absolute values. For bourdon tube based (e.g. model GDM-100), relative accuracies in % with respect to full scale can be selected.
Depending on the equipment, the results can be exported via the USB interface or printed directly on-site with a printer.

Functional principle

The model ACS-10 calibration system can recalibrate bourdon tube based (e.g. model GDM-100) or bellows-based gas density monitors (e.g. model GDM-RC-100), as well as gas density switches (e.g. model GDS-RC-HV).
Gas density indicators (e.g. model GDI-100) can perform a functional test, including a visual inspection.

The test item is connected to the calibration system by means of a metal flex hose and a connection kit, which are included in delivery.
After entering the respective switch points and the class or absolute accuracy of the leakage detection system, the test item is pressurised and subjected to a fully automated recalibration.

The calibration system is suitable for the following gases:
- SF_6 (calculation selectable in accordance with Döring, Bier or Beattie-Bridgeman)
- N_2
- Air
- 3M™ Novec™ 4710
- CO_2
- O_2
- He

The model ACS-10 calibration system consists of a main case and an accessory case. The accessory is not included in the standard scope of delivery.

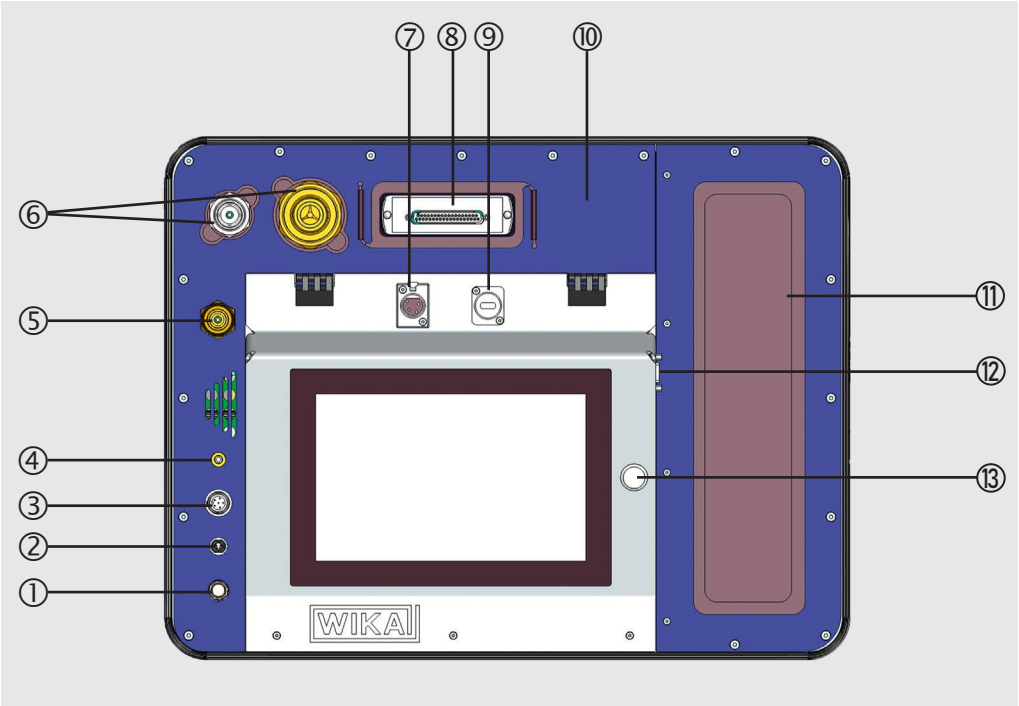
Test procedure

1. The pressure in the test item is reduced to the ambient pressure.
2. The pressure is built up, quickly and continuously, up to the end of the measuring range.
3. When the pressure is reduced to ambient pressure again, the contact resistances are measured and the approximate switch contact positions are determined.
4. Through a gradual pressure build-up and subsequent pressure reduction, the switch points are tested with an average pressure change rate of 20 mbar/s [0.29 psi/s] in the previously determined areas where switching events occur. During this process, DC 24 V is applied to the switch contacts. The exact pressure values at which switching events occur and also the hysteresis are determined.
5. Following the test, the original pressure, prevailing before the start of the measurement, is restored in the test item.

Requirements for the test items

- Gas density monitors with relative and absolute accuracy specification can be recalibrated
- Optimum test volume in which the specification of the ACS-10 applies: 50 ... 300 ml (in addition to the hose volume)
- Testing of up to 5 switch contacts in the range -1 ... 9 bar rel. [-14.50 ... 130.53 psi rel.] gauge as normally closed or normally open contacts.

Overview



① CON1: Pressure connection for test item
② Connection for the Pt100 thermometer
③ Connection for the connection kit
④ Grounding connection
⑤ CON2: Connection for filling and emptying the instrument
⑥ DN8 and DN20 couplings
⑦ Connection for the power supply
⑧ Storage compartment for the connection kit
⑨ USB interface for the export of files
⑩ Product label
⑪ Storage compartment for the hose pack and the connection cables for gas density monitors
⑫ RS-232 interface for the printer
⑬ On and Off switch

Specifications

Accuracy specifications	
Accuracy	
Accuracy of pressure reference sensors	0.06 % of full scale value (±9.6 mbar [0.13 psi])
Accuracy of the temperature measurement	±1 °C [±33,8 °F]
Accuracy of the switch contact resistance measurement	≤ ±2 % of full scale value (0.2 Ω)
Accuracy of restoring the original output pressure in the test item after measurement	±1 % of the accuracy of the output pressure
Compensated range	5 ... 40 °C [41 ... 104 °F]
Long-term stability of pressure reference sensors	≤ ±0.1 % of span/year

Measuring range	
Measuring range of reference sensors	0 ... 16 bar abs. [0 ... 232.06 psi abs.]
Pressure type	Absolute pressure
Measuring range of the contact resistance	0 … 10 Ω
Position of the switch points to be calibrated	■ -1 … +9 bar gauge at 20 °C [-14.50 ... +130.53 bar rel. at 68 °F] ■ 0 ... 70 g/l SF_6 gas

Output signal	
Communication	
Interface	USB
Export	■ List of test item data ■ Measuring point data ■ Measurement reports
Internal data storage	■ Min. 250 measuring points ■ Min. 500 measurement records

Voltage supply	
Voltage supply	AC 85 … 264 V, 47 … 63 Hz
Max. power consumption	120 W
Max. current supply	5 A

Switch contact testing	
Voltage for determining the switching status (applied to the switch contact pairs)	DC 24 V
Current for determining the contact resistance (on the closed switch contacts)	90 … 110 mA

Components	
Plastic case	
Transport	Telescopic handle and two castors
Dimensions of the main case	58 x 47 x 30 cm [22.8 x 18.5 x 11.8 in]
Weight of the main case	Approx. 29.4 kg [64.8 lbs] (with contents)

Components		
Internal gas tank		
Maximum residual pressure after the instrument has been pumped out	< 20 mbar abs. [< 0.29 psi abs.]	
Maximum residual pressure after evacuation of the instrument	■ < 500 mbar abs. [< 7.25 psi abs.] (in external gas cylinder with 5 bar abs. [72.51 psi abs.]) ■ < 200 mbar abs. [< 2.90 psi abs.] (in external empty gas bag)	
Max. permissible filling pressure in the internal tank	9 bar abs. [130.53 psi abs.]	
Touch display		
Size	25,7 cm [10.1 in]	
Format	16:9	
Hose (pneumatic connection)		
Length	4 m [157.48 in]	
Diameter	2,5 mm [0.09 in]	
Internal compressor	Average rate of pressure change when testing switch points with a test item volume of min. 50 ml (with hose)	20 mbar/s [0.29 psi/s]
	Maximum overshoot when approaching a target pressure	1 % of target pressure
Maximum connection pressure CON1 (test item)	16 bar abs. [232.06 psi abs.]	
Maximum connection pressure CON2 (filling and emptying)	10 bar abs. [145.03 psi abs.]	

Operating conditions	
Medium temperature	5 ... 40 °C [41 ... 104 °F]
Ambient temperature	5 ... 40 °C [41 ... 104 °F]
Storage temperature	-10 ... +60 °C [14 ... 140 °F]
Relative humidity	10 … 90 %
Ambient pressure	600 … 1,060 hPa
Vibration resistance	EN 30786-2, annex A.2.7
Shock resistance	EN 60068-2-31, chapter 5.1.3.3 (overturning) and chapter 5.2 (free fall)
Ingress protection	
Closed case, transport	IP65
Open case, operation	IP40
Transport	The instrument may only be transported in transport mode (pressure in the instrument < 2 bar abs. [29.00 psi abs.]).
Maintenance	Recommended calibration of the reference sensor in a WIKA service hub after two years or 7,000 measurements

Approvals

Logo	Description	Country
CE	**EU declaration of conformity**	European Union
	EMC directive EN 61326 emission (test basis: EN 55011, group 1, class B) and immunity (test basis: EN 61000-4-3, industrial application, evaluation criteria B/C)	
	Machinery directive	
	RoHS directive	

→ Approvals and certificates, see website

Accessory case
Equipped with all components from the accessories

Accessories [1)]

Description	Order number
Printer incl. spare castors	14329621 and 14436616
Malmquist adapter (M30 x 2, male) for quick coupling	14037946
Adapter G ¾ female to quick coupling	14037987
Adapter M26 x 1.5 for model GDM-100 with recalibration valve and model GLTC-CV to quick coupling	14146937
Adapter G ¼ female to quick coupling	14321474
Adapter G ½ female to quick coupling	14037984
Pressure reducer for the connection for filling and emptying (Gas cylinder connection W 21.8 x 1/14", max. initial pressure 200 bar [2900.75 psi], output pressure to 10 bar [145.03 psi])	13497678
Altimeter	14436753
Hand scanner	14382587

1) Accessory is not included in the standard scope of delivery

Scope of delivery

Main case
- Operating instructions
- Connection kit
- Adapter DN8 female to quick coupling
- Adapter DN20 female to quick coupling
- Hose pack 4 m [157.48 in]
- 16-core connection cable for gas density monitor and switch, for up to 5 change-over contacts
- Power supply unit with connector adapters for USA, China and the UK

Ordering information
Model / Measuring range of the reference pressure sensors / Length of the connection hose to the test item / Accessory case / Hand scanner / Printer / Altimeter / Pressure reducer / Adapter G ½ female to quick coupling / Adapter M26 x 1.5 to quick coupling / Adapter M30 x 2 male to quick coupling / Adapter G ¾ female to quick coupling / Adapter G ¼ female to quick coupling / Certificate / External rechargeable battery / Additional ordering information

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