

Pressure calibration



MOBILE CALIBRATION DEVICES

HIGH PRECISION ON-SITE MEASUREMENT AND CALIBRATION

The KAL range from halstrup-walcher comprises three pressure calibration devices that offer outstanding value for money and can be used either for stationary (e.g. in a customer's own laboratory) or mobile applications. They combine the following features:

- integrated pressure generation (for setting the calibration point)
- high precision pressure measurement (for recording the calibration value)

In the KAL 84, the pressure is generated using a manual pump and integrated pressure bellows. In the KAL 100/200, the calibration point (target pressure) is entered via a keyboard/display and automatically generated using a high precision pump. With these devices, the user can select not only the display language but also the unit of pressure. In addition, the KAL 200 has a USB interface so that pressure sequences can be programmed using supplied PC software. This makes it possible to produce time-optimised calibration sequences.

	KAL 200	KAL 100	KAL 84
Details on	p. 44	p. 44	p. 45
			
Pressure generation	automatic		manual
Applications	mobile or stationary (laboratory)		
Measurement ranges	0..100 Pa/0..200 Pa/0..500 Pa/0..1 kPa/0..2 kPa/ 0..5 kPa/0..10 kPa/0..20 kPa/0..50 kPa/0..100 kPa/ ±100 Pa/±200 Pa/±500 Pa/±1 kPa/±2 kPa/±5 kPa/ ±10 kPa/±20 kPa/±50 kPa/±100 kPa		0..100 Pa (0..1 mbar) 0..1 kPa (0..10 mbar) 0..10 kPa (0..100 mbar) 0..100 kPa (0..1000 mbar) 0..300 mmHg (0..400 mbar) 0..750 mmHg (0..1000 mbar)
Margin of error	0.1 % of max. value ± 1 digit Measurement ranges > 0..200 Pa/±200 Pa 0.2 % of max. value ± 1 digit Measurement ranges 0..200 Pa/±200 Pa 0.3 % of max. value ± 1 digit Measurement ranges 0..100 Pa/±100 Pa	0.2 % of max. value ± 1 digit Measurement ranges > 0..200 Pa/±200 Pa 0.5 % of max. value ± 1 digit Measurement ranges ≤ 0..200 Pa/±200 Pa	0.2 % of max. value ± 1 digit Measurement ranges 0..50 kPa 0.5 % of max. value ± 1 digit
Interface	USB (standard)	USB (optional)	-
Analog measurement input for test object	✓	optional	-
Battery life (rechargeable)	8 h	8 h	2 h
Factory calibration certificate	✓	Accessory	Accessory

ACCESSORIES

Carrying bag KAL 84
Hand pump KAL 84
Transport case KAL 100/200
Carrying bag KAL 100/200
DAkKS calibration certificate, German
DAkKS calibration certificate, English
ISO factory calibration certificate

Order no.
9062.0001 ①
9601.0036 ②
9220.0001 ③
supplied as standard
9601.0003
9601.0004
9601.0002 (included for KAL 200)



Hand pump KAL 84
Order no. 9601.0036



Carrying bag KAL 84
Order no. 9062.0001



Transport case KAL 100/200
Order no. 9220.0001



Carrying bag KAL 100/200
supplied as standard

APPLICATIONS FOR THE "KAL" CALIBRATION DEVICE

The high performance rechargeable battery makes the KAL range ideal for on-site applications. "Mobile calibration" removes the need to send pressure measurement devices to an external calibration laboratory and thus saves a great deal of time and expense. Customers can now perform ISO calibrations *themselves* by using a DAkkS-calibrated KAL device.

The KAL range provides the optimum solution for the following typical applications:

- mobile or stationary calibration of pressure values in cleanrooms (pharma, semiconductors etc.)
- mobile or stationary calibration of blood pressure monitoring equipment in hospitals etc.
- mobile or stationary calibration of differential pressures in air-conditioning systems

EFFICIENCY AND REGULATORY COMPLIANCE – CALIBRATING BLOOD PRESSURE MONITORS ON-SITE

Every hospital and nursing home now uses blood pressure monitors. It is vital that these instruments operate precisely and reliably. Moreover, the equipment must retain its accuracy over months and years of use. False readings from blood pressure monitors are a matter of life and death. The greatest risk, however, is posed by drug dosage errors, which risk straining the patient's circulatory system. Instruments are calibrated each year to prevent incidents such as these from occurring, a process that involves comparing measured values to highly precise control values.

If measurements are relevant to human health, regular instrument calibration is required by law. The "Ordinance on Medical Devices" stipulates that regular testing be performed and documented. The responsibility for risk assessment lies with the operator.

One legally secure method accepted by auditors is to document the calibration in the facilities management software. But how can a calibration of this type be performed efficiently?

On-site calibration by a qualified technical service is more efficient than removing a number of the blood pressure monitors from the wards every few weeks and sending them to an external laboratory for calibration.

The battery powered KAL200 pressure calibration device from halstrup-walcher is the ideal solution. Pressure sequences can be pre-programmed using the supplied software. The KAL 200 pressure generator then generates each pressure (*the target value*) with extreme precision and reads the *actual value* on the test object (blood pressure monitor).

The actual value is then entered on-site in standardised test records that are administrated by the facilities management software. The data are now available at any time – ensuring efficiency and regulatory compliance.



In practice: Blood pressure monitors in the nursing home Solina in Spiez (Switzerland) are calibrated by the technician responsible.

Margin of error KAL 100	0.2% of max. value ± 1 digit Measurement ranges > 0..200 Pa/±200 Pa 0.5% of max. value ± 1 digit Measurement ranges ≤ 0..200 Pa/±200 Pa
Margin of error KAL 200	0.1% of max. value ± 1 digit Measurement ranges > 0..200 Pa/±200 Pa 0.2% of max. value ± 1 digit Measurement ranges 0..200 Pa/±200 Pa 0.3% of max. value ± 1 digit Measurement ranges 0..100 Pa/±100 Pa
Hysteresis	0.1% of max. value
Overload capacity	600 kPa for measurement ranges > 3 kPa 200 X for measurement ranges ≤ 3 kPa
Temperature coefficient zero point	± 0% (cyclical zero-point correction)
Temperature coefficient span	KAL 100: 0.04% of max. value/K (10..40°C) KAL 200: 0.03% of max. value/K (10..40°C)
Calibration temperature	22 °C
Medium	Air, all non-aggressive gases
Measurement input/ supply voltage (test object)	0..10 V, 0/4..20 mA Accuracy: 0.2% of max. value 24 VDC/100 mA
Display	Alphanumeric display with 2 x 20 characters, backlighting
Operating temperature	10..40 °C
Storage temperature	-10..70 °C
Weight	approx. 4.5 kg
Pressure ports	Ø 6 mm, for tubing NW 5 mm
Certificates	CE

Model	A
KAL 100	100
KAL 200	200

Power supply	C
115 VAC, 6% /-15% (50/60 Hz)	1
230 VAC, 6% /-15% (50/60 Hz)	2
115 VAC, 6% /-15% (50/60 Hz) and rechargeable lithium ion battery	1A
230 VAC, 6% /-15% (50/60 Hz) and rechargeable lithium ion battery	2A

Data interface	D
none	0
USB + measurement input for test object (standard for KAL 200)	1

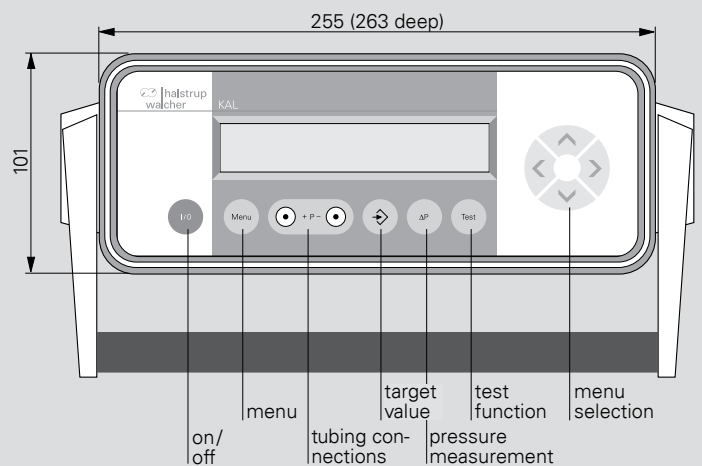
Measurement ranges	B
0..100 Pa	0
0..200 Pa	02
0..500 Pa	05
0..1 kPa	1
0..2 kPa	2
0..5 kPa	5
0..10 kPa	10
0..20 kPa	20
0..50 kPa	50
0..100 kPa	100
± 100 Pa	0A
± 200 Pa	02A
± 500 Pa	05A
± 1 kPa	1A
± 2 kPa	2A
± 5 kPa	5A
± 10 kPa	10A
± 20 kPa	20A
± 50 kPa	50A
± 100 kPa	100A

Order code	A	B	C	D
KAL	-	-	-	-



Features

- High precision measurement and calibration device in one
- Runs on mains supply or battery, highly flexible (optional)
- Battery life approx. 8 hours, ideal for mobile applications
- Automatic zero-point calibration provides high zero-point stability
- Internal pump quickly and accurately generates negative or positive differential pressures of up to 100 kPa
- Optional USB interface available (Standard for KAL 200)
- Factory calibration certificate supplied as standard (KAL 200)
- Unit conversion (e.g. mmHg, mmH₂O, psi, etc.)
- Multilingual menu (German/English/Italian/French/Spanish)
- With power supply and measurement input for the external test object (transmitter being calibrated)



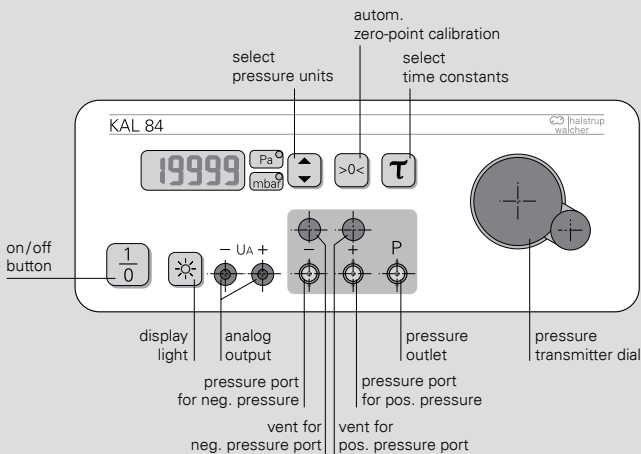
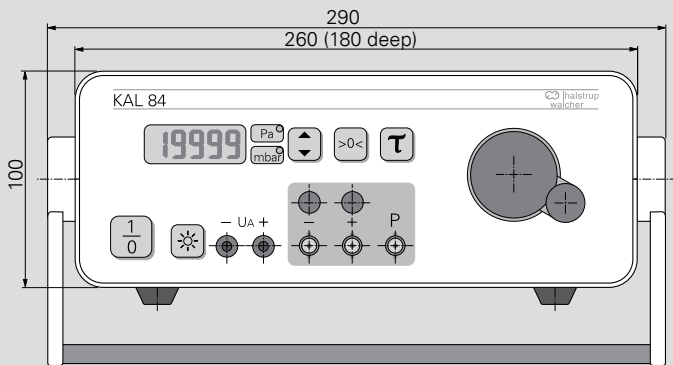
User software





Features

- Highly accurate, reproducible results
- Internal pressure generation using pressure transmitter dial
- Very rugged and light
- Excellent for service applications
- Unit conversion, e.g. mmHg/kPa, mbar/kPa
- Rechargeable battery allows for portable operation



Margin of error ¹⁾	0.2 % of max. value ± 1 digit or for measurement ranges 1 .. 50 kPa 0.5 % of max. value ± 1 digit
Hysteresis	0.1 % of max. value
Temperature coefficient zero point	Not applicable; Push button for resetting zero-point
Temperature coefficient span	0.04 % of max. value/K (10 .. 40 °C)
Calibration temperature	22 °C
Medium	Air, all non-aggressive gases
Displacement volume	approx. 100 cm ³ (1, 10, 100 kPa) approx. 200 cm ³ (100 Pa)
Analog output	0 .. 1 V ($R_L \geq 2$ k Ω) 2 connectors \varnothing 4 mm
Display	4 ½ digit LCD character height = 10 mm
Time constants	toggles between 0.1 s; 1 s
Operating temperature	10 .. 40 °C
Storage temperature	-10 .. 70 °C
Power supply	NiCd rechargeable 9 V battery with AC adaptor
Weight	approx. 3 kg
Pressure ports	for tubing NW 6 mm
Certificates	CE

¹⁾ all measurement ranges have a 99 % overrange.

The display has 4 ½ digits and always uses round 10 s, 100 s etc. as the standard measurement ranges, i.e. 1.0000, 10.000, 100.00 or 1000.0 (exception 0 .. 300 mmHg). The theoretical display range, however, extends not up to 10.000 but 19.999, i.e. for a measurement range of 10.000 kPa, the device can display values of up to 19.999 kPa.

Measurement ranges ²⁾	A
0 .. 100 Pa (0 .. 1 mbar)	0
0 .. 1 kPa (0 .. 10 mbar)	1
0 .. 10 kPa (0 .. 100 mbar)	10
0 .. 100 kPa (0 .. 1000 mbar)	100
0 .. 300 mmHg (0 .. 400 mbar)	300
0 .. 750 mmHg (0 .. 1000 mbar)	750

²⁾ others available upon request

Margin of error	B
0.5 % of max. value	1
0.2 % of max. value (measurement range 1 .. 50 kPa) (optional)	2

Power supply	C
230 VAC adaptor	230
115 VAC adaptor	115

Order code	A	B	C
KAL 84	-	-	-

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