

Instruction Manual

Calibration Device KAL 100/200 Series 3



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Translation of the original instructions

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Purpose of instruction manual

The instruction manual is part of the product. Please read this instruction manual thoroughly before operating the instrument in order to avoid injury or equipment damage caused by improper use of this instrument or failure to follow these instructions.

This instruction manual describes the features of the **KAL 100 and KAL 200 calibration device** and provides guidelines for its use.

Any individual charged with handling this instrument must be trained in proper instrument operation and informed of all potential hazards. The instruction manual, and in particular the safety precautions contained therein, must be followed carefully. **Please contact the manufacturer immediately if you do not understand any part of this instruction manual or if you require additional information.**

Handle this manual with care and ensure that it

- is readily available throughout the lifecycle of the instrument
- is provided to any individuals who assume responsibility for operating the instrument at a later date, and
- includes any supplementary materials provided by the manufacturer

halstrup-walcher GmbH reserves the right to continue developing this instrument model without documenting such development in each individual case. We will be happy to determine whether this manual is up-to-date.

Conformity



This device is state of the art. It complies with the legal requirements of EC directives. This is shown by the CE mark.

1 Safety precautions

1.1 Qualified personell

These operating instructions are intended for qualified electricians and fitters who are authorized to install, electrically connect, commission and label devices and systems in accordance with safety standards, as well as for the operator and manufacturer of the system on which the drives are installed.

The personnel must be provided with all applicable accident prevention and safety regulations that arise during commissioning or installation of the system.

It must be ensured that the personnel are familiar with all applicable accident prevention and safety regulations.

1.2 Explanation of symbols

In these operating instructions, the following highlights are used to draw attention to the hazards described below when handling the system:

 DANGER!	DANGER! Indicates a situation of imminent danger, which will lead to a fatality or serious injuries if not prevented.
 WARNING!	WARNING! Indicates a potentially dangerous situation, which may lead to a fatality or serious injuries if not prevented
 CAUTION!	CAUTION! Indicates a potentially dangerous situation, which may lead to minor/slight injuries if not prevented.
NOTICE	NOTICE Indicates a potentially harmful situation, which may lead to material damage if not prevented.

1.3 Appropriate use

The KAL 100 and KAL 200 calibration device is used for testing and calibrating pressure sensors.

The instrument is designed for indoor use. To avoid damage, never expose the instrument to liquids or humidity. Avoid strong sunlight, heavy dirt and strong vibrations.

Dust and dirt deposits inside can damage the Instrument. Under appropriate environmental conditions (dust, smoke) the device should be serviced regularly by qualified personnel to prevent damage due to overheating and other malfunctions.

The operating requirements specified on the rating plate and in the technical data of the online data sheet (available at www.halstrup-walcher.de/technicaldocu), in particular the permissible supply voltage, must be complied with under all circumstances.

The instrument may only be handled as indicated in this manual. Modifications to the instrument are prohibited. The manufacturer is not liable for damages caused by improper use or failure to follow these instructions. Violations of this type render all warranty claims null and void.

If the appliance is not used as intended, situations may arise that result in damage to property and personal injury.

NOTICE

The device is used as intended if all instructions and information in these operating instructions are observed.

- Only operate the device in perfect technical condition.
- When attaching to a machine, observe the current safety regulations.
- Do not operate the product in all installed state unless all necessary protective measures have been taken.
- Observe the relevant regulations for the prevention of accidents (e.g. accident prevention regulations).
- Use appropriate protective equipment if necessary (e.g. safety helmet, safety goggles, safety shoes, protective gloves).
- Use appropriate assembly and transport equipment.
- Store and transport the product in its original packaging, reuse protective caps for plugs if necessary.
- During project planning, ensure that the device is always operated within its specifications. See technical data in chapter **12. Technical data**.

1.4 Inappropriate use

The use of the positioning devices outside of the operating conditions and technical data and specifications described in the documentation is considered “improper”.

The calibration device is designed for intended operation under normal ambient conditions (according to EN / IEC / UL 61010-1), with the exception of an extended temperature range.

- Operation inside buildings.
- Operation at altitudes up to 2000m above sea level.
- Ambient temperatures deviating from standard: 0°C to 40°C.
- Maximum relative humidity 80% at temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C.
- The IP-protection rating is a manufacturer specification.

Any use of the device that goes beyond the intended use and/or is used differently can lead to dangerous situations:

- To avoid damage, never expose the device to liquids or moisture. Avoid exposure to strong sunlight, heavy dirt and strong vibrations. The positioning system cannot be used for certain applications, such as the transport of people and animals or as a press-bending device for cold processing of metal.
- If the operating requirements specified on the rating plate and in chapter **12. Technical data** are exceeded, personal injury or damage to property may result.

1.5 Limitation of liability

The device may only be operated in accordance with these operating instructions.

All information and instructions in these operating instructions have been compiled taking into account the applicable standards and regulations, the state of the art and our many years of experience and knowledge.

The manufacturer accepts no liability arising from improper or unintended use. Warranty claims also expire in this case:

- non-observance of the operating instructions
- improper use
- improper installation
- improper use
- use by untrained personnel
- modifications to the device
- technical modifications
- unauthorized modifications

The user is responsible for carrying out commissioning in accordance with the safety regulations of the applicable standards and all other relevant national or local regulations regarding conductor dimensioning and protection, grounding, circuit breakers, overcurrent protection, etc. The person who carried out the assembly or installation is liable for any damage caused during assembly or connection.

1.6 Transport, installation, connection and start-up

NOTICE

Please do not close the pressure inlets during transport! Barometric pressure changes could damage devices with low measuring ranges

The appliance may only be put into operation by authorised specialist personnel.

NOTICE

- Please do not carry out a function test with pressurised or breathing air, otherwise devices with low measuring ranges will be damaged.
- The device must be protected from sunlight, otherwise measurement errors may occur.

You will find special safety instructions in the individual chapters.

1.7 Troubleshooting maintenance, repairs, disposal

The individual responsible for the electrical connections must be notified if the instrument is damaged or if errors occur that cannot be corrected as indicated in Section 11. **Troubleshooting.**

This individual must take the instrument out of service until the error has been corrected and ensure that it cannot be used unintentionally.

	WARNING! ELECTRICITY HAZARD!
	Electric shock due to high voltages inside the instrument.

Inside the instrument there are parts that are under high electrical voltage.

Never remove covers. There are no user-serviceable parts inside the unit. Do not use the instrument if any covers are missing or damaged.

This instrument requires no maintenance.

Only the manufacturer may perform repairs that require the housing to be opened.

The electronic components of the instrument and the optionally included rechargeable battery contain materials that can be reused. The instrument must therefore be sent to a recycling plant when you no longer wish to use it. The environment codes of your particular country must be complied with.

1.8 Important notes on batteries and rechargeable batteries

According to current international regulations, batteries, rechargeable batteries, and electrical and electronic devices must not be disposed of via household waste. Optional built-in lithium-ion batteries must be returned together with the device.

Proper Disposal:

Please use the return systems provided by retailers or commercial take-back schemes or your local municipal collection points. Check for a suitable collection point in your area.

Depending on the device's features, different instructions apply to the use and disposal of batteries/rechargeable batteries.

The device is equipped with a NiMH rechargeable battery:

Nominal voltage:	14.4V
Capacity:	3350 mAh
Replacement batteries:	The replacement of the battery/accumulator may only be performed by the manufacturer.



DANGER – Fire and explosion hazard!

- Never throw the battery/ rechargeable battery into a fire, open, damage, or short-circuit them
- do not expose the battery/ rechargeable battery to temperatures below $-10\text{ }^{\circ}\text{C}$ or above $+50\text{ }^{\circ}\text{C}$
- on-rechargeable batteries must never be recharged

Lithium-ion batteries can cause serious injuries in case of short-circuit, overheating, or mechanical damage.



WARNING – Risk of injury!

Improper handling of lithium-ion batteries may cause injuries

- If the device has a built-in battery, only charge it with the supplied or manufacturer-approved charger.
- In case of leakage or deformation, do not touch the battery/ the rechargeable battery. Rinse immediately with plenty of water if contact with skin or eyes occurs, and seek medical attention.



CAUTION – Avoid damage to property!

- Protect against moisture and direct sunlight.
- Unauthorized opening of the device may lead to injury and void the warranty.
- Observe polarity when connecting.

NOTICE

This product does not contain batteries with lead (Pb), cadmium (Cd), or mercury (Hg), in accordance with current EU regulations.

1.9 Product labeling

Warning symbol	Meaning
	Reference to further documentation Read the operating instructions and safety instructions before transportation, installation or commissioning
	Warning of hot surface The appliance can become very hot during operation. Temperatures of over 70°C can occur. In the event of a fault, internal components may be overloaded. Use personal protective equipment or wait long enough for the appliance to cool down.
	Warning of dangerous electrical voltage Before working on the product, check that all power connections are de-energized!
	Disposal of batteries, electrical and electronic equipment - The owner is legally obliged to dispose of these devices properly at the end of their service life. - WEEE: This symbol on the product, its packaging or in this document indicates that a product is subject to these regulations.
	CE marking CE stands for "Conformité Européenne". The CE marking expresses the conformity of a product with the relevant EC directives.
	UKCA marking UKCA stands for "UK Conformity Assessed". The UKCA marking expresses the conformity of a product with all applicable legal requirements of the United Kingdom.
	GROUNDING

2 Instrument description

2.1 Functions

The KAL 100 / 200 microprocessor-controlled pressure calibration device can be used for the following:

- Simply generating positive and negative reference pressures
- Measuring positive and negative pressures
- Measuring differential pressure
- Identifying leaks in a test object
- Determining dynamic response behaviour of a test object

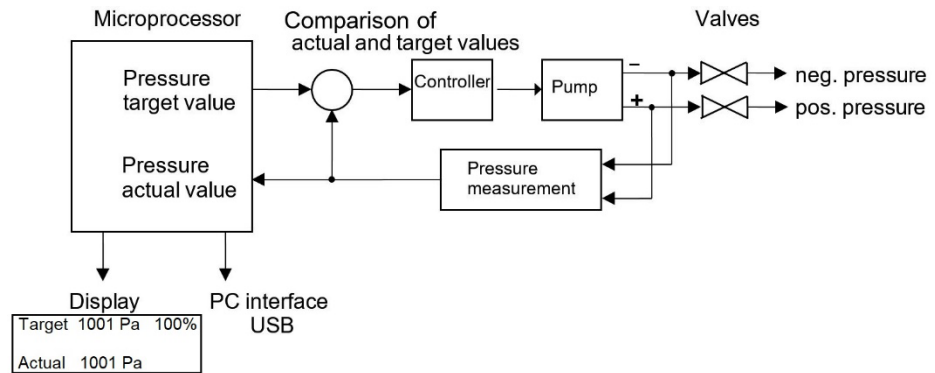


Fig. 1: Basic circuit diagram

3 Calibration cycle

3.1 Calibration data

The date of the last calibration is shown on the display for a short moment after each switch-on.

3.2 Recalibration

Depending on the application, it is recommended to have a recalibration performed after 12 or 24 months. For this purpose, please send the device back to the manufacturer.

Please use our online contact form at

<https://www.halstrup-walcher.de/en/contact/>

4 Control elements of the device

4.1 Control elements on the front panel



Fig. 2: Controls on the front

1	Secondary on/off switch
2	Menu
3	Positive pressure input/output
4	Negative pressure input/output
5	Target value
6	Pressure measurement
7	Test
8	Alphanumeric display
9	Navigation keys

Table 1: Controls on the front

4.1.1 I/O switch



Secondary on/off switch; in standby mode the power input is approx. 5 W.

Pressing the primary on/off switch, a double-pole switch located on the rear of the instrument, separates the instrument from the power supply.

4.1.2 Menu key



Pressing the menu key allows the operator to adjust the following 7 settings:

1. Target value increments: 5, 10, 20, 25, 50, 100%
2. Pressure input: +P, -P, Diff (both)
3. Units of pressure: kPa, hPa, Pa, mbar, Torr, mmHg, mmH₂O, inH₂O
4. (Optional) Unit in the 2nd line (unit of pressure, V, mA)
5. Zeroing: on, off
6. Language: German, English, French, Italian, Spanish
7. Default settings



Navigation keys

Item 1 is displayed when the menu function is first activated; users may select other items by pressing the right/left navigation keys. The arrows on the display indicate which navigation keys are active. Pressing any of the operating mode keys (target value, pressure, test) exits the menu. Exiting the menu saves user preferences, which will be automatically set the next time the instrument is switched on.

4.1.3 Target value key



The target value function and integrated hose pump allow the user to enter a predefined pressure. The target value is set using the navigation keys. The purge valve is activated or deactivated by repeated pressing of the target value key (see chapter 4.1.7).

Press the right/left navigation keys to position the blinking cursor over the digit to be changed. Select the desired value by pressing the up/down keys.

To change the sign of the target value, position the cursor over the +/- sign and press the up/down keys to change.

Move the cursor to the right positions over the percentage symbol, to change the percentage by the increments previously specified in the menu.

The target pressure to be set is the product of the target value and the percentage value.

Example: increment: 25 %; target value 1.000 Pa

0 % → 0 Pa; 25 % → 250 Pa; 50 % → 500 Pa; 75 % → 750 Pa; 100 % → 1.000 Pa

S +100.00 Pa	100 %
I + 99.98 Pa	+OK

Install the device with the pressure connections facing downwards so that any condensation that may occur in the hoses does not run into the sensor.

The actual pressure is shown in the lower portion of the display. It takes about 1s to adjust settings when small volumes are connected. An additional pump is advisable if connecting larger volumes, as it would otherwise take too long to adjust the settings. The maximum target value may not exceed 120% of the measurement range.

The "+OK" appears on the display when the adjusted setpoint is reached. The deviation between setpoint and actual value must be <0.05% of the device measuring range for this purpose.

NOTICE

Only one pressure port may be connected if using the KAL 100 / 200 to generate positive or negative overpressure. The hose pump draws in air through the other pressure port.

4.1.4 Test key



With the test function activated, the internal pressure regulator is deactivated. Under certain conditions, this allows for the detection of leaks either within the test specimen or its associated hose system.

It must be noted that pressing the test button creates a sealed, static pressure system between the KAL100/200 and the test object.

The displayed pressure depends on the total volume present (e.g., due to the hose between the KAL100/200 and the test specimen) and whether this volume is affected by temperature changes or other environmental influences.

Even minor heat sources may cause an adiabatic pressure increase, while cold sources may lead to a pressure decrease.

However, a rapid pressure drop typically indicates a leak in the test specimen or its hose connections.

Test	2s	-0.02 %
I + 99.98 Pa		

4.1.5 Pressure key



This allows the user to measure both positive and negative pressures up to a nominal pressure of +20%. In other words, a KAL 100 / 200 with a measurement range of 1000 Pa can measure up to ± 1200 Pa. The pressure measurement capsule is protected if this value is exceeded. Differential pressures can be measured by using both pressure ports. Navigation keys do not have any function in this case.

The purge valve is activated or deactivated by repeated pressing of the target value key (see chapter 4.1.7)

NOTICE

In order to achieve the highest possible accuracy in pressure measurements, it is necessary to set the correct pressure input port (see 4.1.6). In addition, the KAL 100 / 200 should be operated at a room temperature of 22°C and should be switched on for at least 30 minutes.

4.1.6 Pressure input port



For technical reasons, the sensitivity of the pressure sensor varies according to the pressure chamber used. Selecting the pressure input allows the user to compensate for these differences. The selected setting is displayed along with the "+P", "-P" or "dP" symbols.

4.1.7 Purge feature

If the instrument is in target value or pressure mode, the purge feature can be activated or deactivated by pressing the appropriate key again. This connects the two ports of the instrument with each other internally in order to release any overpressure.

This feature is also useful if sensitive sensors are to be connected. The use of short lengths of tubing can result in high pressures, which may damage or even destroy the sensor. No pressure can build if the purge feature is activated as the air can escape through the free port. When the purge feature is activated, the two pressure ports of the KAL 100 / 200 are displayed in the lower line on the right.

4.2 Rear panel

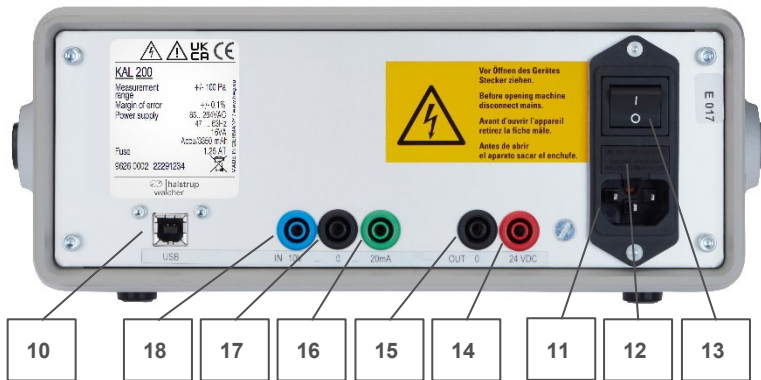


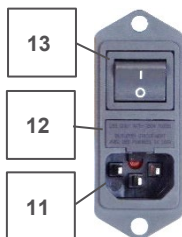
Fig. 3 Rear panel

10	USB-Port *
11	Inlet connector for non-heating apparatus
12	Micro fuse, 5 x 20 mm
13	Primary on/off switch
14	Power supply +24V/125mA, galvanic separation *
15	Ground for 24V/125mA *
16	Input port for current measurement 0...20 mA, input resistance 240 Ohm *
17	Ground connector for voltage and current input port *
18	Input port for voltage measurement 0...10V, Ri = approx. 40kOhm *

Table 2: Rear panel

* KAL 100 only optional

4.2.1 Power input, primary on/off switch, micro fuse



The KAL 100/200 calibration instrument is factory-equipped with an all-voltage power supply for voltages from 85 to 264 VAC and mains frequencies from 47 to 63Hz (tolerance is already included).

The supply voltage connector (11) is located on the rear of the instrument (inlet connector for non-heating apparatus + ground wire). The instrument's micro fuse (12) is located above this connector (Value see electrical data). Located above the micro fuse is the double-pole, primary on/off switch (13), which separates the KAL 100 / 200 from the supply voltage.



WARNING!

Risk of Electrical shock! Failure to unplug the power supply cord before replacing the fuse may result in fatal injuries!

5 Menu items

5.1 Incrementation

This feature allows the user to modify the percentage of the target value in the following increments: 5 %, 10 %, 20 %, 25 %, 50 % and 100 %.

5.2 P-input

This allows the user to select the pressure input as: +P, -P or DIFF.

5.3 Units of pressure

This feature allows the operator to select the units used for displaying pressures. Certain measurement ranges cannot be displayed meaningfully in some units, in which case the units in question are not available. The following units may be selected:

- hPa
- mbar
- Torr
- mmHg
- mmH₂O
- inH₂O
- kPa
- Pa

5.4 Unit 2 (KAL 200 as standard, KAL 100 optional)

The KAL 100 / 200 has one input for voltage measurement and one input for current measurement. This allows the settings of the measured variable displayed in the second line to be displayed and adjusted. For example, if the user selects V as the unit, the voltage measured at the voltage input port will be displayed in the second line.

This also applies for the pressure and target value features. The KAL 100 / 200 is therefore capable of measuring the voltage and output current of a sensor. These values can also be readout using the interface and, if necessary, processed directly in a form. The corresponding ports are located on the rear of the instrument.

5.5 Zeroing

By default the instrument resets the zero point approximately 6 minutes after it is initially switched on and then automatically every 30 minutes or after a major temperature change. Zeroing always results in changes in volume and thus to pressure. This can disrupt certain measurement sequences.

Zeroing is automatically suppressed when the instrument is in test mode. The instrument can also be zeroed by pressing and holding (approx. 0.5 s) any of the operating mode keys (target value, pressure, test).

5.6 Language

Here you can select the language used in the display. You can choose between the following languages:

- German
- English
- French
- Italian
- Spanish

5.7 Restore default settings

Press the UP or DOWN navigation keys to restore the default settings. Default settings are as follows:

Incrementation	25 %
P-input	+P
Unit	hPa
Zeroing	ON

Table 3:factory default settings

6 Battery operation (optional)

The device contains a rechargeable lithium ion battery, which allows the device to operate even when not connected to a mains electricity supply. The operating time provided by the battery depends on the mode of operation.

When measuring pressure, a fully charged battery is capable of powering the device for between 20 and 30 hours.

The operating time is less in **target value mode** as additional electricity is required to drive the device. However, even in this mode, an operating time of 8...10 hours should pose no problem.

NOTICE

In battery mode, the device switches off automatically after 30 minutes without pressing a key.

NOTICE

If you do not intend to use the device for a longer period of time, you should fully charge the rechargeable battery beforehand in order to avoid total discharge. A reload after 3 to 4 Months is highly recommended. The storage temperature is 0° to 40°C.

6.1 Charging the battery

In order to maximise the operating life of the rechargeable battery, it is important to ensure that it always has a sufficient residual charge. As the device continues to consume power when switched off, albeit at a very low level, this is particularly important if it is to be left switched off for a longer period of time. Consequently, there is a risk of the battery discharging completely over an extended period.

While operating in normal mode, the battery is charged using a low current in order to prevent additional heat being generated by the device itself. The charging time here is approx. 12 hours. When the device is switched off (key on the front panel), the quick-charging mode is activated automatically.

The display shows the following message:



The device switches itself off when the battery is fully charged. If you wish to use the device before charging has been completed, you can start the normal operating mode again at any time by pressing the on/off switch on the front panel. Switching off the mains power supply interrupts the charging process.

There are different 4 symbols for the charging status:

0 to 15 %: (flashing)		16 to 40%:		41 to 90%:		91 to 100%:	
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After switching on the KAL 100 / 200, the charge level must be evaluated and sent to the Display unit. Due to this the displayed charge level may be delayed or might show wrong values for some seconds.

In order to prevent damage to the battery due to deep discharge, the device switches itself off automatically at a residual charge of approx. 5%. This is indicated by the message "Battery low" on the display shortly before switching off.

If the device is not connected to the mains power when it is switched off or the mains switch on the rear is not switched on, charging is not possible.

If this happens, the device should be connected to the mains power supply to charge the battery. This is particularly important if the device will not be used for a longer period of time.

If, after switching on the power supply, the device reports with the normal operating mode (display: KAL200 Rev. X.X), it can be put into the quick-charge mode described above by pressing the on/off switch on the front panel.

Due to the four steps of the charge level, the level "91 to 100%" is shown for some time, but the battery will continue to charge. When the charging is completed the device switches itself off.

When the battery is fully charged (device has switched itself off), you can separate the device from the mains power supply again. The charged battery has enough power to work for 1 to 2 days with the KAL 100 / 200 or some month of not using the device.

6.2 Behavior with deeply discharged battery

The integrated battery has its own protective switch. This completely switches off the output voltage of the battery if it falls below a specified value.

If this happens, the display of the KAL 100 / 200 may not show the battery symbol. Whenever it is switched on, the KAL 100 / 200 will attempt to reactivate the rechargeable battery. It is therefore advisable in these circumstances to switch the device on and off until the rechargeable battery symbol is visible once again.

NOTICE

However, the most effective method is to avoid leaving the device with an empty battery for an extended period and always to charge the battery before any longer periods during which it will not be in use.

7 Zeroing

External influences such as temperature, position or ambient pressure can shift the instrument's zero point, i.e. the value displayed when the pressure ports are open. Zeroing is the process by which the instrument automatically registers this shift and figures it into the currently displayed pressure value.

The instrument always zeroes itself after it is switched on. If automatic zeroing has been activated, it will zero itself again after 6 min. and then every 30 minutes.

Zeroing switches the internal valves, which necessarily involves a loss in pressure. If this interferes with instrument operation, the automatic zeroing feature can be switched off.

Automatic zeroing is always suppressed when the instrument is in **test mode**.

Display when zeroing:



Zeroadjust

7.1 Manual Zeroing

Pressing and holding the 'pressure', 'target value' or 'test' keys will cause the instrument to zero itself regardless of the menu setting.

8 Overpressure protection

The KAL 100 / 200 has an internal overpressure safeguard that protects the precision pressure measurement capsule from damage. Nevertheless, great caution should be taken when connecting the instrument to an unknown pressure source.

9 USB port (KAL 100 optional)

The KAL 100 / 200 has a USB port, which is detected by a PC as a serial interface. This port allows the instrument to exchange information and commands with a PC. This feature allows the operator to save settings and to transfer results to a PC.

The interface (USB serial Port(COMx)) has following settings:

- 9.600 baud
- 8 data bits
- No parity
- One stop bit

The following table provides an overview of commands and the corresponding data.

9.1 Commands for the serial interface

9.1.1 Operating modes

Command	Meaning	Echo
MT	Mode – test	MT
MZ	Mode – zeroing	MZ
MS	Mode – target value	MS
MP	Mode – pressure measurement	MP
MK1	Keyboard on	MK1
MK0	Keyboard off	MK0
MB	Block ports. Instrument is inactive. Cancel using commands MS or MP	MB
ME	Cancel purge in pressure or target value mode using MM	
MM	Measure in pressure or target value mode	
MI0	Positive P-input	MI0
MI1	Negative P-input	MI1
MI2	Differential pressure measurement	MI2

Table 4: Commands for operating modes

9.1.2 Setting parameters

Command	Meaning	Format	Description	
>PSxxx.xxxxx	Target value in hPa	float		
>PDx	Incrementation	1 digit 8 bit 0 .. 5	0: 5 % 2: 20 % 4: 50 %	1: 10 % 3: 25 % 5: 100 %
>PEx	Units	1 digit 8 bit 0 .. 9	0: kPa 2: hPa 4: psi 6: mmHg 8: inHg	1: Pa 3: mbar 5: Torr 7: mmH ₂ O 9: inH ₂ O
>PLx	Language	1 digit 8 bit 0 .. 4	0: German 2: French 4: Spanish	1: English 3: Italian
>PPxxx	Percentage value	1 digit 8 bit 0 .. 100		
>PZx	Cyclic zeroing	1 digit 8 bit 0 or 1	0: inaktiv	1: aktiv

Table 5: Commands for setting parameters

9.1.3 Miscellaneous

Command	Meaning	Echo
STOS	Save setting parameters	OK
RCLS	Load setting parameters	OK
RCLP	Load device parameters	OK
RV	Retrieve device revision	KAL 200 Rev. X.X

Table 6: other commands

9.1.4 Query values

Command	Meaning	Format	Output string	Range
?PS	Target value in hPa	Floating	PS vxxx.xxxxx	
?PB	Measurement range in hPa	Floating	PB vxxx.xxxxx	
?PD	Incrementation	1 digit	PD x	0..5 (see also 9.1.2)
?PE	Units	1 digit	PE x	0..9 (see also 9.1.2)
?PL	Language	1 digit	PL x	0..4 (see also 9.1.2)
?PP	Percentage value	3 digits	PP xxx	0..100
?PZ	Zeroing activ/inactiv	1 digit	PZ x	0: inactiv 1: activ
?MI	Input mode	1 digit	MI x	0 .. 2 (see also 9.1.1)
?ST	Status	8 digits, binary	ST bbbbbbbb	- bit 7 MSB, pressure OK - bit 6, unused - bit 5, keys active - bit 4 pressure meas. - bit 3, test mode - bit 2, target value mode - bit 1, zeroing active - bit 0, teach mode
?BR	Readout measurement range	Floating, in hPa	BR vxxx.xxxxx	
?AL	Battery charge status	Floating in %	AQ xxx.x	
?AU	Battery voltage	Floating in %	AU xxx.x	
?AI	Battery current	Floating in mA	AI xxx	

USB port (KAL 100 optional)

Command	Meaning	Format	Output string	Range
?AQ	Active current source	String	"Mains" or "Battery"	
?IP	Readout actual pressure	Floating, in hPa	IP vxxx.xxxxx	
?IV	Readout voltage	Floating in V	IV vxxx.xxxxx	
?IA	Readout current	Floating in mA	IA vxxx.xxxxx	
?ID	Readout pressure diff. (test)	Floating, in hPa	ID vxxx.xxxxx	
?IZ	Readout duration (test)	5 places, in s	IZ xxxxx	

Table 7: Commands for query values

V = prefix x = number 0 .. 9 b = binary digit; 0 or 1

9.1.5 Converting pressure-units

You can convert from hPa/mbar to the desired unit:

Multiplikator	Einheit
100	Pa
0,0145038	psi
0,7500616827	Torr
0,7500616827	mmHg
10,1971623	mmH ₂ O
0,0295299875	inHg
0,40146307597	InH ₂ O

Table 8: pressure units

9.2 Interface configuration

Using Windows set up the following series interface configuration (COM port).

To find the interface configuration: go to Start/Settings/Control Panel: click on **System** and select the **Hardware** tab.

Click on **Device Manager** and select **Ports**.

Double-click on the used **COM** port and then select the **Port Settings** tab.

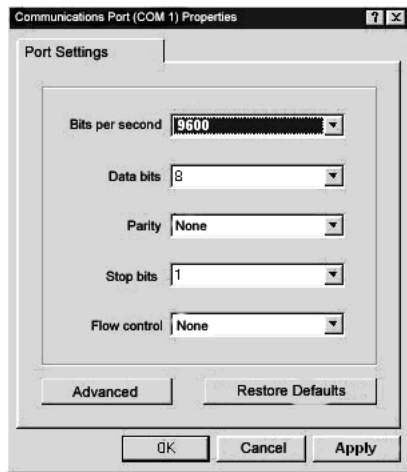


Fig. 4 Properties

10 PC software

You can download this PC software from the following link:

<https://www.halstrup-walcher.de/en/products/KAL100.php>

To find a short description go to the menu item “?” and select “help”.

11 Troubleshooting

Problem	Cause	Corrective action
Instrument is not functioning, display is dark	No power	→ Check to see if the electrical cord is plugged in properly at the inlet for non-heating apparatus → Switch on instrument at the primary switch (on rear panel) → Check fuse; replace if necessary (see electrical date) Caution: Unplug power cord!
Instrument does not reach set pressure; pump runs continuously	Leak in the system, diameter of tubing too large	→ Secure tubing properly; eliminate any leaks → Maximum tubing diameter 5 mm
Battery symbol does not appear in the display	No battery present	→ Switch the device on and off several times until the battery is charged again. Charge the battery before long breaks from use.

Table 9: Troubleshooting

12 Technical data

The technical data sheet and dimension drawings can be found on the website:

<https://www.halstrup-walcher.de/en/products/KAL100.php>

or

<https://www.halstrup-walcher.de/en/products/KAL200.php>

Please contact us should you require further details.

12.1 Appendix A: Parts in contact with measurement medium

Beryllium bronze CuBe2	Araldite CY236 / HY988
Mu metal (nickel alloy)	Loctite 242e
Brass CuZn39Pb3	Carbonyl iron
Aluminium AlMg3	Vepuran Vu 4457/51
KEL (FPM: (fluorinated rubber)	UHU-Plus endfest 300
Crastin (PTBP)	

Table 10: Messmedium berührende Teile

13 Certificate of Conformity



EU-Konformitätserklärung EU Declaration of Conformity

Company halstrup-walcher GmbH, Stegener Str. 10, 79199 Kirchzarten
erklärt als Hersteller in alleiniger Verantwortung, dass das Produkt
declares as manufacturer under sole responsibility, that the product

Product Kalibriergerät KAL100 / KAL200
Calibration Device

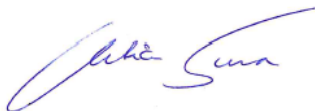
Regulations den folgenden Europäischen Richtlinien entspricht:
conforms to following European Directives:

LVD 2014/35/EU
EMC 2014/30/EU
RoHS 2011/65/EU

Standards angewandte harmonisierte Normen:
applied harmonized standards:

EN 61010-1:2010 +A1:2016
EN 61000-6-2:2019
EN IEC 63000:2018

Declaration EU Konformitätserklärung ausgestellt von
EC Type Examination Certificate issued by



Geschäftsführer

Managing Director

Kirchzarten, 03. Feb. 2022



UK Declaration of Conformity

Company halstrup-walcher GmbH, Stegener Str. 10, 79199 Kirchzarten
declares as manufacturer under sole responsibility, that the product

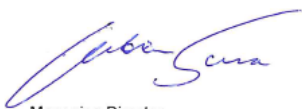
Product Pressure calibrators types
KAL100, KAL200

Regulations is in conformity with relevant statutory requirements:

LVD	Electrical Equipment (Safety) Regulations 2016 No. 1101
EMC	Electromagnetic Compatibility Regulations 2016 No. 1091
RoHS	RoHS Regulations 2012 No. 3032

Standards applied standards:
EN 61010-1:2010
EN 61000-6-2:2005
EN IEC 63000:2018

Declaration signed for and on behalf of



Managing Director
Kirchzarten 19. Jul.2022

14 Environmental protection

14.1 Disposal of packing material

Environmentally friendly materials have been selected for the packaging, which can be recycled normally.

Ensure that plastic covers, packaging, etc. are disposed of properly.

Do not simply throw these materials away, but make sure that they are recycled. Follow the instructions and markings on the packaging.

14.2 Disposal of batteries and rechargeable batteries

Batteries and accumulators must not be thrown away or incinerated, but must be disposed of in accordance with local regulations for the disposal of hazardous waste.

The optional build-in lithium-ion batteries must be disposed of together with the device. Please enquire about an appropriate collection point.

