Operating Instructions

for

Hand held Pressure Measuring Devices with Integrated Pressure Sensors

Model:

HND-P121 **HND-P123**

HND-P126 **HND-P127**

HND-P129

1. Contents

Manufactured and sold by:

Kobold Messring GmbH
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2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.
The instruction manuals on our website www.kobold.com are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email (info.de@kobold.com) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

3. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition.
Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:
The standard delivery includes:

- Hand held Pressure Measuring Devices with Integrated Pressure Sensors
  Model: HND-P121/-P123/-P126/-P127/-P129

4. Regulation Use

Any use of the device which exceeds the manufacturer's specification may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

5. Operating Principle

Nearly all measuring tasks for the determination of pressure can be performed with the HND-P series KOBOLD hand-held pressure measuring devices. Various housing designs make it possible to find the right housing with the appropriate characteristic for every application. In addition to the large selection of external pressure sensors up to max. 400 bar absolute, measuring devices with integrated sensors in the millibar range are also available.

6. Electrical Connection

6.1 Mains Operation with Power Supply

Warning: When using a power supply please note that operating voltage has to be 10.5 to 12 V_{DC}. Do not apply overvoltage!! Cheap 12 V-power supplies often have excessive no-load voltage. We, therefore, recommend using regulated voltage power supplies. Trouble-free operation is guaranteed by our power supply HND-Z002.

Prior to connecting the power supply to the mains makes sure that the operating voltage stated at the power supply is identical to the mains voltage.

7. Operation / Configuration / Adjustments

7.1 General

7.1.1 Safety Requirements

This device has been designed and tested in accordance with the safety regulations for electronic devices.
However, its trouble-free operation and reliability cannot be guaranteed unless the standard safety measures and special safety advises given in this manual will be adhered to when using the device.

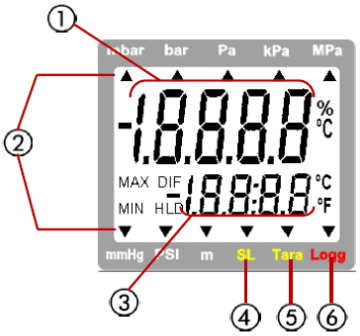
1. Trouble-free operation and reliability of the device can only be guaranteed if the device is not subjected to any other climatic conditions than those stated under *9 Technical Information*.
2. Device and sensors have to be handled with care (don't throw, hit, etc.). Protect plugs and sockets from soiling.
3. If the device is transported from a cold to a warm environment condensation may cause in a failure of the function. In such a case make sure the device temperature has adjusted to the ambient temperature before trying a new start-up.
4. If device is to be connected to other devices (e.g. via serial interface) the circuitry has to be designed most carefully. Internal connection in third party devices (e.g. connection GND and earth) may result in not-permissible voltages impairing or destroying the device or another device connected.

Warning: If device is operated with a defective mains power supply (e.g. short circuit from mains voltage to output voltage) this may result in hazardous voltages at the device (e.g. at sensor socket or interface).

5. If there is a risk whatsoever involved in running it, the device has to be switched off immediately and to be marked accordingly to avoid re-starting.
   Operator safety may be a risk if:
   - there is visible damage to the device
   - the device is not working as specified
   - the device has been stored under unsuitable conditions for a longer period of time.

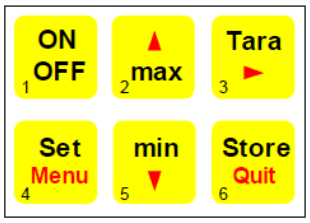
In case of doubt, please return device to manufacturer for repair or maintenance.

7.1.2 Display



1	**Main display:** shows actual value
2	Arrow points to the chosen measuring **unit**
3	**Secondary display:** shows min./max. or hold value
4	**SL:** appears if sea-level-correction is activated *(only HND-P129)*
5	**Tara:** appears if tara-function is activated
6	*Not used*

7.1.3 Basic Operation

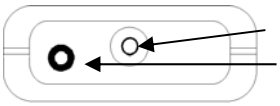


ON OFF	**On / Off**	
max + min	**min/max when taking measurement:**	
	press short:	shows the min./max. value
	press again:	hides min./max. value
	press 2 sec.:	clears particular value
Tara	**Tara, zero-point adjustment:**	
	press short:	display will be set to 0 The following measuring will be relatively displayed to the set tara value
	press 2 sec.:	deactivates tara-function
	press 5 sec.:	Zero-Point Adjustment[1)]
Set Menu	**Set/Menu:**	
	press short:	invokes configuration menu
Store Quit	**Store/Quit:**	
	press short:	hold-function, the last measuring value will be held in the secondary display.
	press again:	hides the value

Please Note: Activating/deactivating tara clears the max- & min-memories.

[1)] Zero-Point Adjustment: If there is no pressure or zero-pressure (absolute) applied to the pressure ports the device will display 0. If there is a permanent deviation (and device is operated under steady conditions), a permanent zero point adjustment can be carried out. To carry out the adjustment press button 3 for approx. 5 seconds (Auto Null will be displayed shortly). The adjustment is done via the OFFSET-value of the sensor (referring configuration menu).
To recall the manufacturer's calibration press button 3 for approx. 15 seconds.

7.1.4 Connections



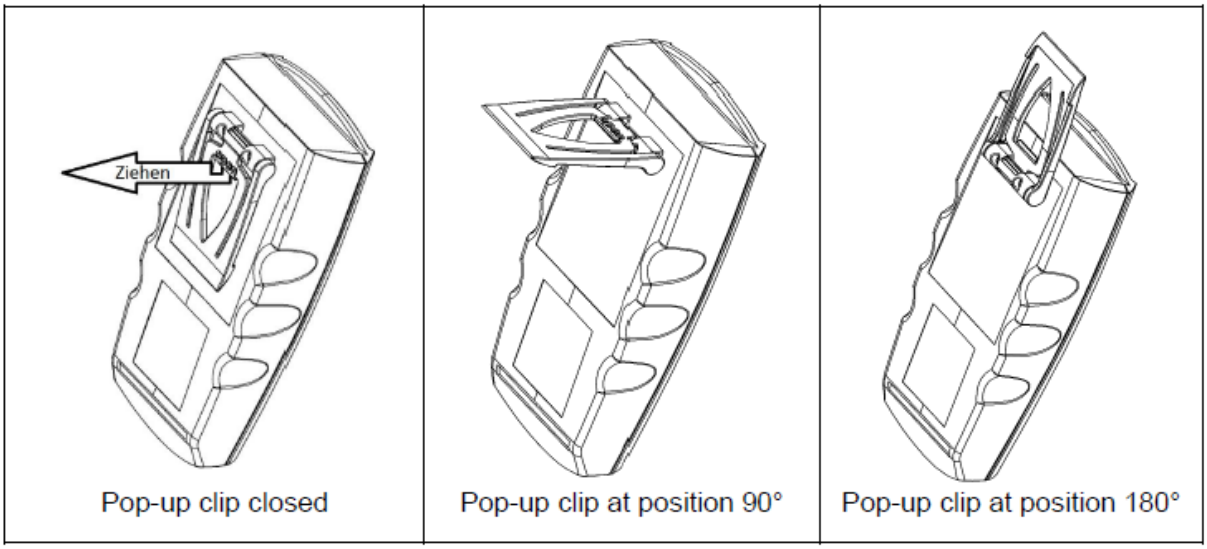
Connection for pressure tube
Interface: Connection for el. isolated interface adapter (p.r.t. chapter *7.5 The Serial Interface*)

The mains adapter socket is located at the left side of the device.

7.2 Pop-up clip

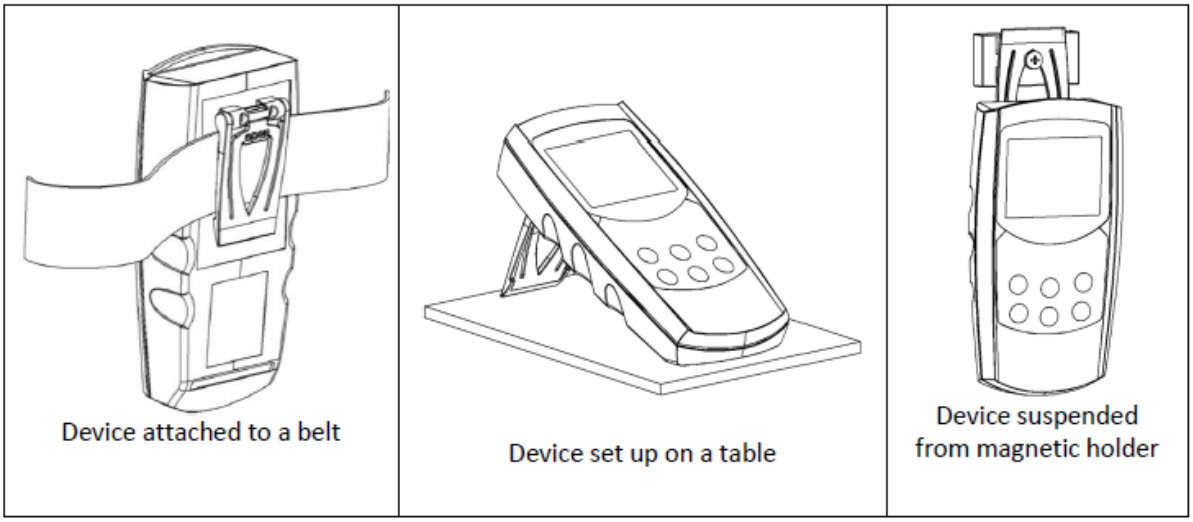
Handling:

- Pull at label “open” in order to swing open the pop-up clip.
- Pull at label “open” again to swing open the pop-up clip further.



Function:

- The device with a closed pop-up clip can be plainly laid onto a table or attached to a belt, etc.
- The device with pop-up clip at position 90° can be set up on a table, etc.
- The device with pop-up clip at position 180° can be suspended from a screw or the magnetic holder.

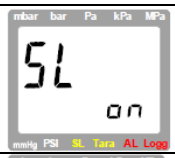


7.3 Calibration Services

Calibration certificates – DKD-certificates – other certificates:
If device should be certificated for its accuracy, it is the best solution to return it with the referring sensors to the manufacturer.
Only the manufacturer is capable to do efficient recalibration if necessary to get results of highest accuracy!

7.4 Configuration

To change device settings, press ***Menu*** (key 4) for 2 seconds. This will call the configuration menu.
Pressing key ***Menu*** jumps between the parameters.
The parameters can be changed with ▲ (key 2) or ▼ (key 5).
Quit (key 6) finishes the configuration and returns to standard measuring operation.

Parameter	Value	Description
‚Menu'	▲ or▼	
	mbar, bar, …	**Unit**: Unit of display
	oFF/on	**Sea-Level**: Sea level correction: on or off (only available at HND-P129)
	-2000 … 9999	**Altitude**: Input of altitude above sea level [m], only if SL=on (only available at HND-P129)
	1…120	**Auto Power-Off** time in minutes
	oFF	Auto Power-Off deactivated
	0,1, 11…91	Base **adress** of interface
OFFS	***refer to list below***	The **offset of sensor** will be displaced by this value to compensate for deviations in the probe or in the measuring device.
	oFF	Zero displacement inactive (=0.00)
SCAL	-2.000 … 2.000	The measuring **scale of sensor** will be changed by this factor [%] to compensate deviations of temperature probe or measuring device.
	oFF	Scale correction factor inactive (=0.000)

Device type	adjustable offset
HND-P121	-5.00…5.00 mbar
HND-P123	-50.0…50.0 mbar
HND-P127	-50.0…50.0 mbar
HND-P126	-500…500 mbar
HND-P129	-500…500 mbar

7.4.1 Sea Level Correction for Absolute Pressure Sensors (HND-P129)

The device displays the absolute pressure measured at the sensor. This is not necessarily the same like the values given by weather stations! The weather stations‘ values are pressure at sea level. Usually, the sensor is placed above sea level and therefore, if the value at sea level (zero) is to be measured, the pressure loss resulting from the actual level above zero has to be considered! To correct the measuring display, activate the “Sea-Level-Function” (SL, p.r.t. chapter 7.4).
If the sea level correction is active this will be shown by the functional arrow „SL“ in the display, the device now displays the absolute pressure at sea level (zero).

7.4.2 Power off Time

The device will be automatically switched off if no key is pressed/no interface communication takes place for the time of the power off time.
It can be completely deactivated by setting the parameter to ‚P.oFF = oFF“.

7.5 The Serial Interface

By means of the serial interface and a suitable electrically isolated interface adapter HND-Z031, HND-Z032 (accessories) the device can be connected to a computer for data transfer.
To avoid transmission errors, there are several security checks implemented e.g. CRC.
The following standard software packages are available:

BUS-S20M: 20-channel software to display the measuring values

Note: The measuring and display range values read back from the interface are always in the selected measurement unit (mbar, bar...)!

Supported functions:

Code	Name/Function	Code	Name/Function
0	Read measurement value	200	Read min display range
3	Read system state	201	Read max display range
6	Read min memory	202	Read display range - unit
7	Read max memory	204	Read display range – decimal point
12	Read ID number	208	Read # of channels
32	Read configuration flag BitCorrectToSealevel:32	214	Read scale adjustment [%]
		216	Read offset adjustment
160	Set configuration flag (see above)	220	Read altitude (only abs. press sensors)
174	Clear min memory	221	Set altitude (only abs. press sensors)
175	Clear max memory	222	Read power off time (Conf-P.oFF)
176	Read min measuring range	223	Set power off time (Conf-P.oFF)
177	Read max measuring range	240	Reset
178	Read measuring range – measuring unit	254	Program version
179	Read measuring range – decimal point		
180	Read kind of measuring of sensor		
199	Read kind of measuring of display		

7.6 Zero Displacement Sensor ('OFFS')

A zero displacement can be carried out for the measured value:

value displayed = value measured - offset

Standard setting: 'off' = 0.0°, i.e. no zero displacement will be carried out. Together with the scale correction (see below) this factor is mainly used to compensate for sensor deviations. Input is in the display unit.

7.7 Scale Correction Sensor ('SCAL')

The scale of the measuring can be influenced by this setting (factor is in %):

displayed value = measured value * (1+Scal/100)

Standard setting: 'off' =0.000, i.e. value is not corrected. Together with the zero displacement (see above) this factor is mainly used to compensate for sensor deviations.

7.8 Pressure Connection

2 (or 1) universal pressure connector for 6 x 1 mm (4 mm tube inner diameter) or 8 x 1 mm (6 mm tube inner diameter) plastic tubes.

7.8.1 Device type with absolute pressure (HND-P129)

Connect plastic tube to pressure port.

7.8.2 Device type with relative pressure

- For measurements of overpressure (refer to summary):
  Connect plastic tube to pressure port "+". Port "-" will not be used!

- For measurements of under pressure (refer to summary):
  Plug the tube to pressure port "-". The measuring range covers then up to max. overpressure range

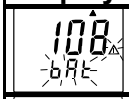
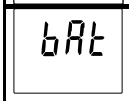
Note: All values are displayed now as positive values. No minus sign will be shown. Example: it is possible to measure under pressure down to -25.00 mbar, the display shows then the value 25.00 (no minus sign).

- For measurements of pressure differences:
  Connect both plastic tubes to pressure port "+" and "-"; make sure to apply higher pressure to port "+".

Measure ranges:

Device type	Over- or under pressure	Under pressure
HND-P121	-1.00…25.00 mbar	-25.00…0.00 mbar
HND-P123	-10.0…350.0 mbar	-350.0…0.0 mbar
HND-P127	-10.0…420.0 mbar	-420.0…0.0 mbar
HND-P126	-100…2000 mbar	-2000…0 mbar

7.9 Error and System Messages

Display	Meaning	What to do?
	Low battery power, device will only continue operation for a short period of time	Replace battery
	Battery empty	Replace battery
	Mains operation without battery: wrong voltage	Check power supply, replace it when necessary
No display or confused characters, device does not react on keypress	Battery empty	Replace battery
	Mains operation without battery: wrong voltage or polarity	Check power supply, replace it when necessary
	System error	Disconnect battery and power supplies, wait shortly, then reconnect
	Device defective	Return to manufacturer for repair
Err.1	Measured value above allowable range	Check: pressure above 1300 mbar? -> measuring value to high
	Sensor defective	Return to manufacturer for repair
Err.2	Measured value below allowable range	-> measuring value to low
	Sensor defective	Return to manufacturer for repair
Err.4	Value is too low to be displayed, tara is set	Check: display below -2000 (tara?)?
Err.9	Measured value far out of allowable range	Check: pressure not within sensor range?
Err.7	System error	Return to manufacturer for repair

8. Maintenance

8.1 Battery Operation

If ´bAt´ is shown in the secondary display the battery has been used up and needs to be replaced. The device will, however, operate correctly for a certain amount of time. If ´bAt´ is shown in the upper display the voltage is too low to operate the device; the battery has been completely used up.

Please note: We recommend taking out battery if device is not used for a longer period of time!

9. Technical Information

HND-P121:

Measuring range:	-1.00...25.00 mbar
Accuracy:	±0.3 % F.S. (hysteresis and linearity) ±0.4 % F.S. (temperature dependency 0...50 °C)
Resolution:	1 Pa (0.01 mbar)
Pressure units:	mbar, bar, Pa, kPa, MPa, mmHg, PSI, m H_2O (display “m”)
Overload:	max. 100 mbar

HND-P123:

Measuring range:	-10.0...350.0 mbar
Accuracy:	±0.2 % F.S. (hysteresis and linearity) ±0.4 % F.S. (temperature dependency 0...50 °C)
Resolution:	0.01 mbar
Pressure units:	mbar, bar, kPa, MPa, mmHg, PSI, m H_2O (display “m”)
Overload:	max. 1 bar

HND-P127:

Measuring range:	-10.0...420.0 mbar
Accuracy:	±0.1 % F.S. (hysteresis and linearity) ±0.4 % F.S. (temperature dependency 0...50 °C)
Resolution:	0.1 mbar
Pressure units:	mbar, bar, kPa, MPa, mmHg, PSI, m H_2O (display “m”)
Overload:	max. 1 bar

HND-P126:

Measuring range:	-100...2000 mbar
Accuracy:	±0.2 % F.S. (hysteresis and linearity) ±0.4 % F.S. (temperature dependency 0...50 °C)
Resolution:	0.1 mbar
Pressure units:	mbar, bar, kPa, MPa, mmHg, PSI, m H_2O (display “m”)
Overload:	max. 4 bar

HND-P129:

Measuring range:	0...1300 mbar abs.
Accuracy:	±0.2 % F.S. (hysteresis and linearity) ±0.4 % F.S. (temperature dependency 0...50 °C)
Resolution:	1 Pa (0.01 mbar)
Pressure units:	mbar, bar, Pa, kPa, MPa, mmHg, PSI, m H_2O (display “m”)
Overload:	max. 4 bar abs.
Measuring input:	by means of a metal-hose stems
Sensor:	**piezo-resistive absolute pressure sensor, for air or non-corrosive and non-ionising gases and liquids, not for water!**
Display:	2 x 4 ½ digit LC-displays
Operating temperature:	0…+50 °C
Storage temperature:	-20…+70 °C
Relative humidity:	0...95 % r.H. (non-condensing)
Output:	serial interface (via 3.5 mm jack, transformer on RS232 or USB optional)
Power supply:	9V-monobloc battery (included in the scope of delivery), extern 10.5...12 V_{DC} via jack
Current consumption:	~0.6 mA
Materials:	housing made of impact-resistant ABS plastic
Protection:	IP 65, front side
Dimensions:	142 x 71 x 26 mm (L x W x D)
Weight:	approx. 165g

Scope of functions:

- **Min-/Max-value memory**
- **Hold function:** »freezing« of the current value
- **Automatic-off function:** 1...120 min (can be deactivated)
- **Zero point adjustment** via keyboard possible
- **Tare function:** Display, minimum/maximum values are set to zero
- **Battery change notification**

10. Order Codes

Order-No.	Housing design
HND-P121	2 measuring inputs, standard
HND-P123	2 measuring inputs, standard
HND-P126	2 measuring inputs, standard
HND-P127	2 measuring inputs, greater sensor accuracy, standard
HND-P129	1x pressure sensor input, standard

10.1 Accessories

Order-no.	Description
HND-Z002	Plug power supply unit (220/240 V, 50/60 Hz), 10.5 V/10 mA
HND-Z011	Equipment protective housing bag, nappa leather, with 1 cut-out for round sensor connection
HND-Z012	Equipment protective housing bag, nappa leather, with 2 cut-outs for round sensor connection
HND-Z021*	Case with recess (275 x 229 x 83 mm)
HND-Z022*	Universal case with egg crate foam (275 x 229 x 83 mm)
HND-Z023*	Large case with recess (394 x 294 x 106 mm)
HND-Z031	Interface converter on RS232, galvanically isolated
HND-Z032	Interface converter on USB, galvanically isolated
HND-Z033	Adapter RS232 converter on USB- interface
HND-Z034	Windows software for setting and data read- and print-out of instruments of the HND- series with logger function
BUS-S20M	Software for recording measuring data on a PC for 20 modules, for devices of the HND-series without logging function
HND-Z081	Double nozzle for hose 6/4 on hose 6/4
HND-Z082	Hose clamp for hose 6/4
HND-Z083	Adapter made of brass for G 1/4 internal threads on hose 6/4
HND-Z084	PVC-hose (5 bar), 6 mm external / 4 mm internal
HND-Z085	PE-hose (10 bar), 6 mm external / 4 mm internal
HND-Z086	PU-hose (9 bar), 6 mm external / 4 mm internal
HND-Z087	PA-hose (25 bar), 6 mm external / 4 mm internal

* observe instrument dimensions

Additional accessories on request

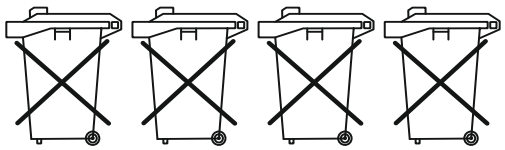
11. Disposal

Note!

- Avoid environmental damage caused by media-contaminated parts
- Dispose of the device and packaging in an environmentally friendly manner
- Comply with applicable national and international disposal regulations and environmental regulations.

Batteries

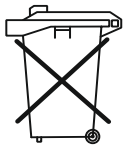
Batteries containing pollutants are marked with a sign consisting of a crossed-out garbage can and the chemical symbol (Cd, Hg, Li or Pb) of the heavy metal that is decisive for the classification as containing pollutants:



Cd[1] Hg[2] Pb[3] Li[4]

1. „Cd" stands for cadmium
2. „Hg" stands for mercury
3. „Pb" stands for lead
4. „Li" stands for lithium

Electrical and electronic equipment



12. EU Declaration of Conformance

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Hand held Pressure Measuring Devices with Integrated Pressure Sensors
Model: HND-P121/-P123/-P126/P127/-P129

to which this declaration relates is in conformity with the standards noted below:

EN 61326-1:2013
Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

EN IEC 63000:2018
Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährlicher Stoffe

Also, the following EU guidelines are fulfilled:

2014/30/EU	Electromagnetic compatibility
2011/65/EU	**RoHS** (Kategorie 9)
2015/863/EU	Delegierte Richtlinie (RoHS III)

Hofheim, den 23. Nov. 2021

H. Volz
Geschäftsführer

M. Wenzel
Prokurist