



Operating Instructions
for
Manual Pressure Measuring Devices
with External and Integrated Pressure
Sensors

Model:

HND-P231

HND-P233

HND-P236

HND-P239



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Manufactured and sold by:

Kobold Messring GmbH
Nordring 22-24
D-65719 Hofheim
Tel.: +49(0)6192-2990
Fax: +49(0)6192-23398
E-Mail: info.de@kobold.com
Internet: www.kobold.com

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:

- Manual Pressure Measuring Devices with External and Integrated Pressure Sensors model: HND-P231/HND-P233/HND-P236/HND-P239

4. Regulation Use

Any use of the Manual Pressure Measuring Devices with External and Integrated Pressure Sensors, 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

The highly precise KOBOLD hand-held pressure measuring devices HND-P231/-P233/-P236 are measuring devices with integrated pressure sensors. They have two pressure measurement inputs on the top of the housing, which are connected to the measuring points by means of stable metal connections and plastic hoses that are available as accessories. Numerous measuring ranges in the overpressure and under pressure range are available for various measurement tasks, such as differential pressure measurement. In addition to pressure display, these first-rate, compact, universally applicable measuring units offer additional functions such as minimum/maximum value memory, a hold function, tare function, automatic self-shut-off, or zero point offset. The devices with an expanded spectrum of functions also have a logger function, a peak value memory, minimum/maximum alarm, an adjustable measuring cycle, and averaging.

The KOBOLD hand-held pressure measuring devices HND-P239 have an integrated pressure sensor for absolute pressure measurement. The measuring device is connected to the measuring point by means of a stable, metal connection on the top of the housing and an optional plastic hose. This device design offers the possibility of also displaying the barometric air pressure in relation to sea level »zero«. In this case, air pressure is corrected by entering the height above »zero« in meters. Naturally, these devices also have the minimum/maximum value memory, a hold function, a tare function, automatic self-shut-off function, and zero point adjustment. The KOBOLD HND-P239 devices also offer additional functions like the logger function, peak value memory, minimum/maximum alarm, an adjustable measuring cycle, and averaging.

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, make sure that the operating voltage stated at the power supply is identical to the mains voltage.

6.2 Battery operation

The devices are always delivered with the battery disconnected.



The battery must be connected before commissioning.



7. Operation

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 *Technical Information*.

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.

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.

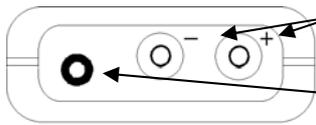
In case of doubt, please return device to manufacturer for repair or maintenance.

2. When connecting the device to other devices the connection has to be designed most thoroughly as internal connections in third-party devices (e.g. connection GND with protective earth) may lead to undesired voltage potentials that can lead to malfunctions or destroying of the device and the connected devices.
3. Do not use these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury or material damage. Failure to comply with these instructions could result in death or serious injury and material damage.



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).

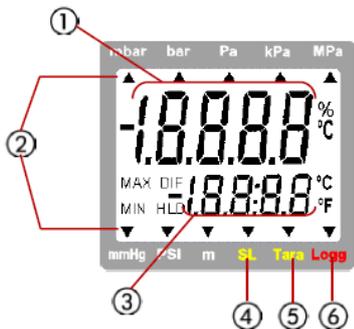
7.2 Connections



Connection for pressure tubes:
 „+“ = higher pressure, „-“ = lower pressure
 Interface: Connection for el. isolated interface adapter
 (p.r.t. chapter 8.5 Serial Interface)

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

7.3 Display

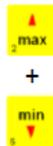


- | | |
|---|--|
| 1 | Main display: shows actual value |
| 2 | Arrow points to the chosen measuring unit |
| 3 | Secondary display: shows min./max. or hold value |
| 4 | SL: appears if sea-level-correction is activated (only HND-P239) |
| 5 | Tara: appears if tara-function is activated |
| 6 | Logg: appears if logger function is chosen, flashes while logger is running |

7.4 Basic Operation



On / Off



min/max bei Messung:

press short: shows the min./max. value
 press again: hides min./max. value
 press 2 sec.: clears particular value

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 Adjustment¹⁾



Set/Menu:

press short: invokes configuration menu



Store/Quit:

press short: hold-function, the last measuring value will be held in the secondary display.
 press again: hides the value
 at active logger: invokes logger functions



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.



Please Note: A zero-point adjustment can only be carried out if the difference between the value on display is less than 500 digits!

If a zero point adjustment was carried out the display shows "Corr" after a restart .

7.5 Operation

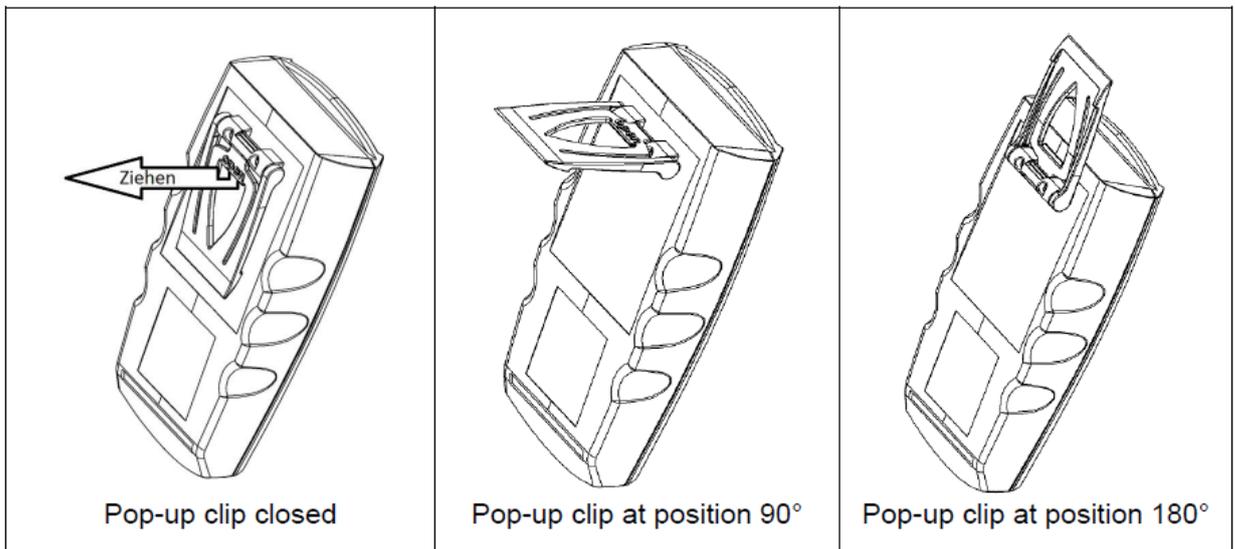
After turning on, if the logger function is not off, the time of the integrated clock will shortly be displayed. If a zero point adjustment was carried out the display shows shortly „nuLL Corr“.

After changing the battery the clock-setting menu is activated automatically (,CLOC'). Check the clock and adjust, if necessary (p.r.t. chapter 7.7).

7.6 Pop-up clip

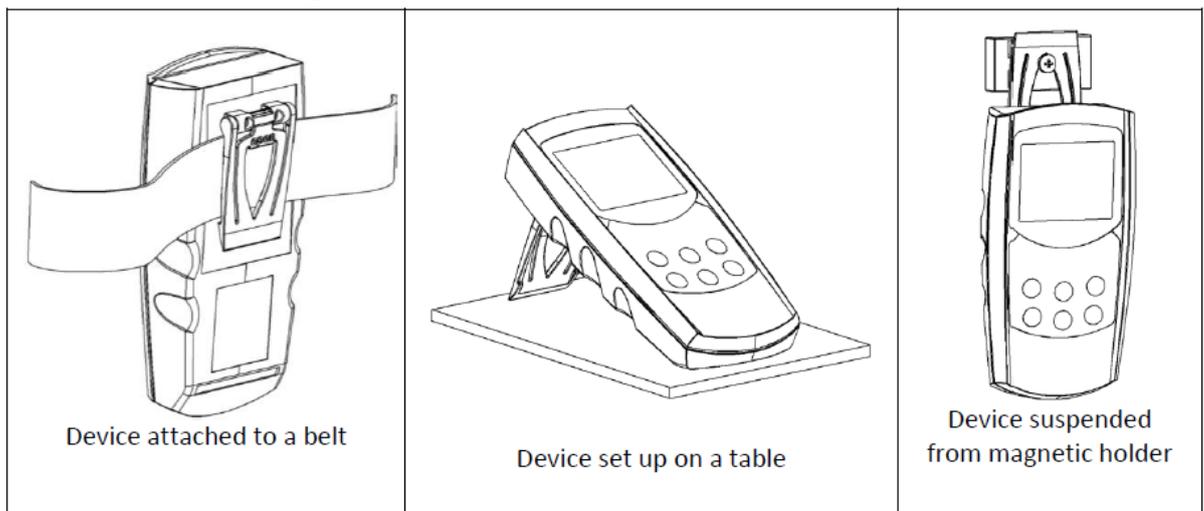
Handling:

- 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.



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7.7 Configuration

To change device settings, press **Menu** (key 4) for 2 seconds. This will call the configuration menu (main display: „SET“).

Pressing key **Menu** changes between the menus, pressing **▶** (key 3) jumps to the referring parameters, which can be selected with key **▶** (key 3).

The parameters can be changed with **▲** (key 2) or **▼** (key 5).

Pressing **Menu** again jumps back to the main configuration menu and saves the settings.

Quit (key 6) finishes the configuration and returns to standard measuring operation.

Menu	PARAM.	Values	Meaning	c_log	c_dat	Stor
,Menu‘	▶	▲ or ▼				
Set Conf	Set Configuration: Generic Configurations					
	Unit	mbar,bar..	Unit: Unit of display	*		*
	SL	oFF/on	Sea-Level: Sea level correction on/off (only HND-P239)	*		*
	Alti	-2000...9999	Altitude: Input of altitude above sea level [m] (only if SL=on) (only for HND-P239)	*		*
	rAtE		Rate: Measuring rate (p.r.t. chapter 8.1)	*		*
		Slo	Slow measuring rate (4 Hz filtered, low power consumption)	*		*
		FAST	Fast measuring rate, filtered (>1000 Hz)	*		*
		P.dEt	Peak detection: fast measuring rate, unfiltered (>1000 Hz)	*		*
	t.AVG	1-120	Averaging period in seconds, used by the averaging function	*		*
		oFF	Averaging function deactivated	*		*
	P.oFF	1-120	Auto Power Off time in minutes			
		oFF	Auto Power Off deactivated			
	Out	oFF	Function of the outout: No outout function, lowest power consumption			
		SEr	Output is serial interface			
		dAC	Outout is analogue output 0...1 V			
Adr.	01,11...91	Base address of interface				
dAC.0	p.r.t. chart	Enter desired value at which the analogue output potential should be 0 V (if Out=dAC)				
dAC.1	p.r.t. chart	Enter desired value at which the analogue output potential should be 1 V (if Out=dAC)				
Set CAL	Set Calibration: Adjustment of Sensor			*		
	OFFS	p.r.t. chart	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 devices	*		
oFF		Scale correction factor inactive (=0.000)	*			

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Menu	PARAM.	Values	Meaning	c_log	c_dat	Stor
,Menu'	▶	▲ or ▼				
Set AL.	Set Alarm: Settings Of Alarm Function					
	AL.	On	Alarm on, with horn-sound			
		no.So	Alarm on, without horn-sound			
		oFF	Alarm deactivated			
AL.Lo	p.r.t. chart	Min alarm rail (not when AL. oFF, Sensor-Min is the lower display range of connected sensor)				
AL.Hi	p.r.t. chart	Max alarm rail (not when AL. oFF, Sensor-Max is the upper display range of connected sensor)				
SET LOGG	Set Logger: Configuration Of Logger Function			*		*
	Func	CYCL	Cyclic: logger function ,cyclic logger'	*	*	*
		Stor	Store: logger function ,individual value logger'	*	*	*
		oFF	no logger function	*	*	*
	CYCL	1..3600	Cycle time of cyclic logger [seconds]	*		*
Lo.Po	on/oFF	Low-power logger with very low power consumption (only for cyclic logger and slow measuring rate)	*		*	
SET CLOC	Set Clock: Setting Of Real Time Clock					
	CLOC	HH:MM	Clock: Setting of time hours:minutes			
	dAtE	TT.MM	Date: Setting of date day.month			
	YEAr	YYYY	Year: Setting of year			

C_log: cyclic Logger (active) C_dat: cyclic logger with data (no active logging) C_stor: individual value logger with data



Please Note: When using the logger function some settings in the menu may not be accessible (*). If these settings should be changed, the logger has to be stopped before, eventually the logger data has to be cleared. (key 6, p.r.t. chapter 8.4)

device type	analog output	adjustment of sensor	alarm function	
	dAC.0/dAC.1	OFFS	Al.Lo	Al.Hi
HND-P231	-1.00...25.00 mbar	-5.00...5.00 mbar	-1 mbar...AL.Hi	AL-Lo...25 mbar
HND-P233	-10.0...350.0 mbar	-50.0...50.0 mbar	-10 mbar...AL.Hi	AL.Lo...350 mbar
HND-P236	-100...2000 mbar	-500...500 mbar	-100 mbar...AL.Hi	AL.Lo...2000 mbar
HND-P239	0...13000 mbar abs.	-500...500 mbar	0 bar...AL.Hi	AL.LO...1300 mbar

8. Remarks to special features

8.1 Different Kinds of Measuring: „rAtE-Slo, -P.dEt, -FASt“

Three different kinds of measuring pressure are supported. Two of them are working with high measuring frequency of more than 100 measurings per second. If one of them was chosen in the configuration (see above), this will be displayed in the secondary display: „P.dEt“ or „FASt“.

8.1.1 rAtE-Slo: Standard Measuring

Measuring rate 4 Hz, averaging and filter functions are active.

Application: Measuring of slowly changing or static pressures, e.g. measuring of leakproofness, atmospheric pressure...

Highest accuracy, high noise immunity (EMI and unstable measuring signals), low power consumption.

8.1.2 rAtE-P.dEt: Peak detection

Measuring rate >1000 Hz, the value is displayed unfiltered.

Application with logger function: Measuring of short pressure peaks or fast changing pressures with a resolution of < 1 ms. The cyclic logger function records the arithmetic mean value, the highest and the lowest peak of the referring time interval.

Attention: higher power consumption, measuring is sensitive to noise (EMI,...).

8.1.3 rAtE-FASt: Fast filtered measuring

Measuring rate >1000 Hz, the value is filtered slightly (higher noise immunity than P.dEt, small peaks will be filtered out), apart from that identical behavior like P.dEt.

8.2 Sea Level Correction (only for HND-P239)

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 giving the 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 sea level has to be considered! To correct the measuring display, activate the „Sea-Level-Function“. Then enter the altitude above sea level of the sensor's location in meters (Alti, p.r.t. chapter 7.7). When activated, the display shows the SL-arrow and the device displays the pressure value at sea level.

8.3 Averaging Function

The averaging function concerns the display values (LCD and interface). It is completely independent from the averaging of the logger function, please don't mix them up!

The averaging integrates the measuring values during a selectable period of time and then calculates the average display value. It is independent from the selected kind of measuring (slow, fast, peak detect).

As long as not enough values are collected (selected averaging time) to calculate a average value, the upper display shows "----", the lower display a 'countdown'.

During an active low-power-logging procedure the avering is always deactivated
Function of min/max-value memory during averaging:

- If averaging is activated and slow measuring is selected (rAtE-Slo), the min-/max-value memory refers to the average display value.
- If averaging is activated and fast measuring is selected (rAtE-FAST or P.dEt) , the min-/max-value memory refers to the internal measured values (fast peaks can be detected).

8.3.1 Power off Time

If there won't be pressed any key and no interface communication takes place for the time of the power off time setting (P.Off), the device will be switched off automatically to save battery power.

If P.oFF = oFF then the automatic switch off is deactivated.

8.3.2 Address

Up to 10 devices of the HND-handheld-family can be connected to a serial interface at once (depending on interface converter). To get access to each device the base addresses of the devices have to be different. For example, choose 01 for the first, 11 for the second device and so on. See also chapter 8.5 Serial Interface.

8.3.3 Alarm

There are three possible settings: Alarm off (AL. oFF), on with horn sound (AL. on), on without horn sound (AL. no.So).

Following conditions will display an alarm, when the function is activated (on or no.So):

- Value is below lower (AL. Lo) or above upper alarm rail (AL.Hi).
- Sensor error (Sens Erro)
- Low battery (bAt)
- Fe 7: System error (always with sound)

In case of an alarm and when polling the interface, the prio-flag is set in the returned interface message.

8.3.4 Real Time Clock

The real time clock is used for the logger function: Recorded values are also containing the point of time, when they were measured. Please check the settings when necessary.

If the battery was replaced the referring menu ‚CLOC‘ will automatically be started.

8.4 Operation of Logger

The device supports two different logger functions:

„Func-Stor“: each time when „store“ (key 6) is pressed a measurement will be recorded.

„Func-CYCL“: measurements will automatically be recorded each interval, which was set in the logger menu ‚CYCL‘ until the logger will be stopped or the logger memory is full. The recording is started by pressing „Store“ 2 seconds.

The logger records 3 measurement results each time:

current or mean value (depending on logger setting, see below), min peak and max peak.

Min and max peak are the minimum resp. the maximum of the measured values since the last recording.

Using them allows f.e. analysis of fluctuating pressures.

For the evaluation of the data the software HND-Z034 has to be used. The software also allows easy configuration and starting of the logger.

When the logger is activated (Func Stor or Func CYCL) the hold function is no more available, the key 6 is solely used for the operation of the logger functions.

8.4.1 Func-Stor“: Storing Single Measurements

Each time when „store“ (key 6) is pressed a measurement and its time stamp will be recorded.

The recorded data can be viewed either in the display (when calling the configuration an additional menu „REAd LoGG“ is displayed, see below) or by means of the interface and a PC.

Max. number of measurings 99

A measuring contains:

- current measuring value at the time of recording
- min peak, max peak since the last recording
- time and date of the recording

After each recording „St. XX“ will be displayed for a short time. XX represents the number of the recording.

If logger memory contains recordings already:

When „Store“ is pressed for 2 seconds, the choice for clearing the logger memory will be displayed:



Clear all recordings



Clear the last recording



Clear nothing (cancel menu)



If the logger memory is full, the display will show:

Viewing Recorded Measurements

Within the „LoGG Stor“ function the measurements can be viewed directly in the display not only by means of a computer (like at „Func CYCL“): press 2 seconds „Set“ (key 4): The first menu displayed now is „rEAd LoGG“ (read logger data). After pressing \blacktriangleright (key 3) the measurement recorded last will be displayed, changing between the different values referring to the measurement also is done by pressing \blacktriangleright .

Changing the measurement is done by pressing the keys \blacktriangle or \blacktriangledown .

8.4.2 „Func-CYCL“: Automatic Recording with Selectable Logger-Cycle-Time

The Logger-Cycle-Time is setable (p.r.t. configuration).

For example „CYCL“ = 60: A measuring is recorded after each 60 seconds.

When the slow measurement "rAtE-Slo" is chosen, additionally a low power function is available: „Lo.Po“.

If „Lo.Po“ is on, the device only will take a measurement at the point of time of the recording. In between the recordings the measuring shut's down. This decreases the power consumption enormously and therefore is recommended e.g. for long time recordings where no mains adapter is available.

Max. number of measurements: 10000

Cycle time: 1...3600 seconds (=1 h), selectable in the configuration

A measuring contains:

- rAtE SLo: - current measuring value at the time of recording
- min peak, max peak since the last recording
- rAtE FASt,P.dEt - arithmetic mean value since the last recording
- min peak, max peak since the last recording

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Starting a recording:

By pressing "Store" (key 6) for 2 seconds the recording will be initiated. After that the display shows 'St.XXXX' for a short time whenever a measuring is recorded. XXXX is the number of the measuring 1..10000.

If the logger memory is full, the display will show:  The recording

If Low-Power-Logger-Function „Lo.Po = on“ the device switches itself off as soon as the memory gets filled.

Stopping the recording manually:

By pressing "Store" (key 6) the recording can be stopped manually. Then the following choice appears:



Stop the recording



Do not stop the recording

The selection can be made by ▲ (key 2) and ▼ (key 5). "Quit" (key 6) enters the choice.



Note: If you try to switch off the instrument in the cyclic recording operation you will be asked once again if the recording is to be stopped. The device can only be switched off after the recording has been stopped! The Auto-Power-Off-function is deactivated during recording!

Clear Recordings:

When „Store“ is pressed for 2 seconds, the choice for clearing the logger memory will be displayed:



Clear all recordings



Clear nothing (cancel menu)

The selection can be made by ▲ (key 2) and ▼ (key 5). "Quit" (key 6) enters the choice.

8.5 The Serial Interface

By means of the serial interface and a suitable electrically isolated interface adapter (HND-Z031) 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:

- **HND-Z034**: Operation and read out of logger function, data display in diagrams and tables
- **BUS-S20M**: 20-channel software to display the measuring values

The device has 3 channels:

- 1: current measuring value (base address)
- 2: min peak (p.r.t. chapter 8.4)
- 3: max peak (p.r.t. chapter 8.4)



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

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Supported functions:

Channel			Code	Name/Function	Channel			Code	Name/Function
1	2	3			1	2	3		
x	x	x	0	Read measurement value	x	x	x	201	Read max display range
x	x	x	3	Read system state	x	x	x	202	Read display range - unit
x			6	Read min memory	x	x	x	204	Read display range – decimal point
x			7	Read max memory	x			208	Read # of channels
x	x	x	12	Read ID number	X			214	Read scale adjustment
x			22	Read min alarm rail (AL. - AL.Lo)	X			216	Read offset adjustment
x			23	Read max alarm rail (AL. - AL.Hi)	X			220	Read offset adjustment
x			32	Read configuration flag	X			221	Read altitude *
				BitAlarmOn:1; BitAlarmSound:3;	x			222	Set altitude *
				BitPeakDetection:33; BitFastFiltered:34;	x			223	Set power off time (Conf-P.oFF)
				BitLoggerOn:50; BitCyclicLogger:51;	x	x	x	224	Logger: Read data of CYCL-Logger
			BitLowPowerLogger:52						
x			102	Set min alarm rail (AL. - AL.Lo)	x			225	Logger: Read cycle time (LoGG - CYCL)
x			103	Set max alarm rail (AL. - AL.Hi)	x			226	Logger: set cycle time (LoGG - CYCL)
x			160	Set configuration flag (refer to 32)	x			227	Logger: start recording
x			174	Clear min memory	x			228	Logger: Read # of recordings made
x			175	Clear max memory	x			229	Logger: Read state
x	x	x	176	Read min measuring range	x			231	Logger: Read stop time
x	x	x	177	Read max measuring range	x			233	Read real time clock (CLOC)
x	x	x	178	Read measuring range – measuring unit	x			234	Set real time clock (CLOC)
x	x	x	179	Read measuring range – decimal point	X			236	Read logger memory size
x	x	x	180	Read kind of measuring of sensor	X			240	Reset
x	x	x	199	Read kind of measuring of display	X			254	Program version
x	x	x	200	Read min display range	x			260	Logger: read data of STOR logger

* only available at HND-P239

8.6 Pressure Connection

8.6.1 Device type with absolute pressure (HND-P239)

Connect plastic tube to pressure port.

8.6.2 Device type with relative pressure

- **For measurements of over pressure** (refer to summary):
Connect plastic tube with internal dia of 4 mm 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 with an internal dia of 4 mm to pressure port "+" and "-"; make sure to apply higher pressure to port "+".

Measure ranges:

device type	over- or underpressure	underpressure
HND-P231	-1.00...25.00 mbar	-25.00...0.00 mbar
HND-P233	-10.00...350.0 mbar	-350.0...0.0 mbar
HND-P236	-100...2000 mbar	-2000...0 mbar

8.7 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
	Logger data are read by the interface	When transfer completed the device will automatically return to normal measuring display, no remedy 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 350 mbar? -> measuring value to high
	Sensor defective	Return to manufacturer for repair
Err.2	Measured value below allowable range	Check: pressure below -10 mbar? -> measuring value to low
Err.4	Sensor defective	Return to manufacturer for repair
Err.9	Value is too low to be displayed, tara is set	Check: display below -2000 (tara?)?
Err.7	System error	Return to manufacturer for repair

8.8 Calibration Services

Calibration certificates – DKD-certificates – other certificates:

If device should be certificated for its accuracy, it is the best solution to return it to the manufacturer.

Only the manufacturer is capable to do efficient recalibration if necessary to get results of highest accuracy!

9. Maintenance

9.1 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. The battery has to be taken out, when storing device above 50 °C.



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

10. Technical Information

HND-P231:

Measuring range¹⁾: -1.0 to 25.0 mbar
Overload²⁾: max. 100 mbar
Resolution: 1 Pa (0.01 mbar)
Accuracy: ± 0.3 % F.S.
(Hysteresis and linearity)
 ± 0.4 % F.S.
(in the range of 0-50 °C)
Units: mbar, bar, Pa, kPa, PSI, m H₂O
(display "m")

HND-P233:

Measuring range¹⁾: -10.0 to 350.0 mbar
Overload²⁾: max. 1 bar
Resolution: 0.1 mbar
Accuracy: ± 0.2 % F.S.
(Hysteresis and linearity)
 ± 0.4 % F.S.
(in the range of 0-50 °C)
Units: mbar, bar, kPa, MPa, mmHg, PSI, m H₂O
(display "m")

HND-P236:

Measuring range¹⁾: -100.0 to 2000.0 mbar
Overload²⁾: max. 4 bar
Resolution: 1 mbar
Accuracy: ± 0.2 % F.S.
(Hysteresis and linearity)
 ± 0.4 % F.S.
(in the range of 0-50 °C)
Units: mbar, bar, kPa, MPa, mmHg, PSI, m H₂O
(display "m")

HND-P239:

Measuring range¹⁾: 0 to 1300.0 mbar absolute
Overload²⁾: max. 4 bar absolute
Resolution: 1 mbar
Accuracy: ± 0.2 % F.S.
(Hysteresis and linearity)
 ± 0.4 % F.S.
(in the range of 0-50 °C)
Units: mbar, bar, kPa, MPa, mmHg, PSI, m H₂O
(display "m")

¹⁾ *underpressure measurement up to the overpressure measuring range suitable (refer to chapter 8.6.2)*

²⁾ *without destruction or recalibration of sensor being necessary*

Measurement input:	by means of two (HND-P239: one) metal hose stems
Sensor:	piezo-resistive relative pressure sensor, for air or non-corrosive and non-ionising gases and liquids, not for water!
Display:	2 x 4½ - digit LC-displays
Operating temp.:	-20 to +50 °C
Storage temp.:	-20 to +70 °C
Storage humidity:	0 to 95 % r.H. (non-condensing)
Output:	serial interface (via 3-pin jack, transformer on RS232 or USB optional)
Power supply:	9 V-monobloc battery (included in the scope of delivery), extern 10.5-12 V _{DC} via jack
Current consumpt.:	< 1 mA (HND-P121...), max. 3 mA (HND-P231...)
Material:	housing made of impact-resistant ABS plastic
Degree of protect.:	IP65, front
Dimensions:	142 x 71 x 26 mm (HxWxD)
Weight:	approx. 170 g

Scope of functions:

Minimum/maximum 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

Minimum/maximum alarm can be deactivated

Alarm (3 alarm settings)

Off: Alarm function inactive

On: Alarm notification via display, internal horn
and serial interface

No Sound: Alarm notification only via display
and interface

Averaging

Peak value memory unfiltered pressure peaks ≥ 1 msec

Adjustable measuring cycle:

»slow« 4 measurements/sec

»fast« ≥ 1000 measurements/ sec (filtered)

»peak-detect« ≥ 1000 measurements/sec

Power saving mode for measuring cycle »slow«

Real-time clock: current time

HND-P231/-233/-236/-239

Logger functions:

Manual:

99 datasets

Cyclic:

10000 datasets

Adjustable cycle time: 1 sec...1 h

11. Order Codes

Order-no.	Housing design
HND-P231	2 measuring inputs with additional functions (see techn. data)
HND-P233	2 measuring inputs with additional functions (see techn. data)
HND-P236	2 measuring inputs with additional functions (see techn. data)
HND-P239	1 pressure sensor input with additional functions (see techn. data)

11.1 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
BUS-S20M	Software for recording measuring data on a PC for 20 modules, for devices of the HND-series without logger function
HND-Z034	Windows software for setting and data read- and print-out of instruments of the HND- series with logger function
HND-Z081	Double nozzle for hose $\frac{6}{4}$ on hose $\frac{6}{4}$
HND-Z082	Hose clamp for hose $\frac{6}{4}$
HND-Z083	Adapter made of brass for G $\frac{1}{4}$ internal threads on hose $\frac{6}{4}$
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

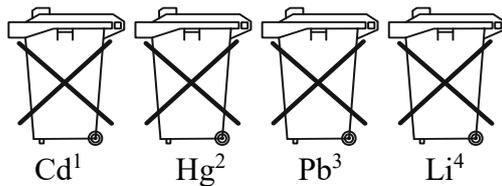
12. Disposal

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:



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

Electrical and electronic equipment



13. EU Declaration of Conformance

We, KOBOLD Messring GmbH, Nordring 22-24, 65719 Hofheim, Germany, declare under our sole responsibility that the product:

Manual Pressure Measuring Devices with External and Integrated Pressure Sensors Model: HND-P231/-P233/-P236/-P239

to which this declaration relates is in conformity with the following EU directives stated below:

2014/30/EU	Electromagnetic compatibility
2011/65/EU	RoHS (category 9)
2015/863/EU	Delegated Directive (RoHS III)

Also, the following standards are fulfilled:

EN 61326-1:2013

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

EN IEC 63000:2018

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Hofheim, 03 Jan. 2024



H. Volz
General Manager



J. Burke
Compliance Manager