Hand-held Humidity Precision Measuring Unit

KOBOLD

measuring
•
monitoring
•
analysing

HND-F

- Measuring range:
  4...100% weight moisture
  0...100% relative humidity

- Measuring accuracy
  starting with ± 0.1%

- Large selection of electrodes
  and accessories

- Temperature measurement
  and compensation

- Serial interface,
  min./max. memory,
  hold function, real-time clock,
  logger function

- Robust housing
  IP 65, front

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Nearly all measuring tasks for the determination of weight and gas moisture can be performed with the HND-F series KOBOLD hand-held humidity measuring units. 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 humidity sensors for weight and gas moisture, measuring probes are also available for measuring air and water flow.

In the following table, all KOBOLD hand-held humidity measuring units are listed with their respective equipment characteristics to ensure fast classification. Further technical details and additional information regarding the housings can be found on the subsequent pages.

Characteristics of hand-held humidity precision measuring units of the HND-F… series

Performance characteristics		HND-F105	HND-F205	HND-F110	HND-F215
Material moisture		×	×	×	-
Gas moisture		-	-	-	×
Flow		-	-	-	×
Temperature		×	×	×	×
Measuring range*	Humidity	0.0-100% GM	0.0-100% GM	0.0-100% GM	0.0-100% rH
	Temperature	-40.0…+200.0 °C		-25.0…+50.0 °C	
	Flow	-	-	-	×
Accuracy**		start with ±0.2%	start with ±0.2%	start with ±0.2%	start with ±0.1%
Display (LCD)		2x 4-digit	2x 4-digit	2x 4-digit	2x 4-digit
Output	0-1 Volt	×	×	-	-
	Interface	×	×	-	×
Connection		BNC-plug, NiCrNi-plug type K	BNC-plug, NiCrNi-plug type K	integrated measuring pin	Mini-DIN-plug, NiCrNi-plug type K
Min./max. value memory		-	-	-	×
Min./max. alarm		-	-	-	×
Auto-off function		×	×	×	×
Hold function		×	×	×	×
Logger function		-	×	-	×
Real time clock		-	×	-	×
Power supply	Battery	×	×	×	×
	External	×	×	-	×

*Measuring range depends upon the probe used

**Measuring unit accuracy, without taking the accuracy of the respective probe into consideration

HND-F105/205

● Material moisture measurement

● External and internal temperature measurement

● Analogue output or interface

● 494 material characteristic curves

● Humidity evaluation

HND-F110

● Material moisture measurement

● Internal temperature measurement

● Including integrated measuring pins

● 494 material characteristic curves

● Humidity evaluation

Description

The KOBOLD hand-held measuring units HND-F105/205/110 are a completely new development and offer decisive advantages in handling, user-friendliness, scope of functions, and accuracy during measuring work.

Technical Details

Measuring principle:	humidity: resistive material moisture measurement in accordance with DIN EN 13183-2: 2002 temperature intern: NTC
only HND-F105/205	temperature extern: thermocouple element, NiCr-Ni (type K)
Measuring range:	humidity: 0.0...100% weight moisture (depending upon the respective material characteristic curve)
HND-F105/205	Temperatur: -40.0...+200.0 °C (-40.0...+392.0 °F)
HND-F110	temperature: -25.0...+50.0 °C (-13.0...+122.0 °F)
Accuracy:	(at nominal temperature) wood: ±0.2% weight moisture (deviation from the respective characteristic curve in the range 6...30%) construct.: ±0.2% weight moisture (deviation from the resp. char. curve) temperature (external): ±0.5% of reading ±0.3 °C
Temperature compensation:	manually or automatically
Resolution:	0.1% or 0.1 °C (0.1 °F)
Display:	two 4-digit LC-displays
Permissible operating temperature:	-25...+50 °C
Storage temperature:	-25...+70 °C
Storage humidity:	0...95% rH (non-condensing)
Probe connection:	
HND-F105/205	humidity: BNC temperature: NiCr-Ni-plug that is free of thermoelectric voltage
HND-F110	two pin brackets M6 x 0.75 with 19 mm measuring pins (12 mm usable length)

Output:	only HND-F105 / 205: 0-1 V, freely scalable or serial interface (via 3-pin jack, transformer on RS232 or USB optional)
Power supply:	9 V-monobloc battery (included in the scope of delivery), only HND-F105/205: external 10.5 -12 V_{DC} via jack
Material:	housing made of impact-resistant ABS plastic
Protection:	IP65, front
Dimensions:	142 x 71 x 26 mm (H x W x D)
Weight:	approx. 155 g (HND-F105/205) approx. 175 g (HND-F110)

Scope of functions

● **Hold function:** »freezing« of the current value

● **Auto-hold:** autom. freezing of a constant measured value

● **Sort:** limitation of the material selection to max. 8 favorites

● **Automatic-off function:** 1...120 min (can be deactivated)

● **Individual humidity evaluation:** wet/moist/dry

● **Saved weight moisture of 494 materials**

Additional functions with model HND-F205

● **Logger function:** manual 99 datasets, cyclic 9999 datasets; adjustable cycle time: 1 min ... h

● **Real-time clock:** time with day, month and year

● **User characteristic curves:** 4 (freely programmable)

Order Details

Order-no.	Housing design
HND-F105	For material moisture, standard
HND-F205	For material moisture with additional functions (see technical details)
HND-F110	For material moisture (with integrated measuring pins)

1/06 - 2021

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3

HND-F215

- Gas moisture measurement
- Flow measurement
- Temperature measurement external
- Extensive functions
- Serial interface

Description

The KOBOLD HND-F215 hand-held measuring unit allows for the measurement of gas humidity and gas temperature or the gas or water flow. Appropriate probes are available for both measuring applications (for more technical details, see subsequent pages). The housing offers extensive functions, a high degree of accuracy, and decisive advantages in operation in order to support the user in determining the various measured quantities.

In addition to the standard basic functions like min./max. value memory, hold function, dew-point calculation, or a calibration function for humidity measurement, the improved housing design KOBOLD HND-F215 has a min./max. alarm, adjustable alarm, a real-time clock, and logger function.

Areas of application

- Air conditioning
- Exhaust ventilation systems
- General humidity measurement

Technical Details

(The data listed refers to the measuring unit without consideration for the respective sensors)

Measurement input:	humidity/temperature: external probe HND-FF31 (see datasheet probe) Flow: external probe HND-FF32/33 (see datasheet probe) (additional temperature input: NiCr-Ni thermocouple element, type K)
Measuring range:	relative humidity: 0.0...100.0% rH room temperature: -40.0...+120.0 °C (like probe HND-FF31) surface temperature:-80.0...+250.0 °C flow speed: see probe HND-FF32/33
Accuracy:	(±1 digit, at nominal temperature 25 °C) relative humidity: ±0.1% room temperature (Pt 1000): ±0.2% surface temperature (NiCr-Ni): ±0.5% of reading ±0.5 °C flow speed: ±0.1%
Resolution:	0.1% rH, 0.1 °C / 0.1 °F, 0.01 m/s

Display:	two 4-digit LC-displays
Permiss. operat. temp:	-25...+50 °C
Storage temperature:	-25...+70 °C
Storage humidity:	0...95% rH (non-condensing)
Probe connection:	humidity/flow: 6-pin shielded Mini-DIN plug temperature: miniature flat connector for NiCr-Ni thermocouple element (type K)
Output:	serial interface (transformer on RS232 or USB optional)
Power supply:	9 V-monobloc battery (included in the scope of delivery), external 10.5 - 12 V_{DC} via jack
Material:	housing made of impact-resistant ABS plastic
Protection:	IP 65, front
Dimensions:	142 x 71 x 26 mm (H x W x D)
Weight:	approx. 160 g

Scope of functions

- **Min.-/max. value memory:** for humidity, temperature, dew-point, etc.
- **Hold function:** »freezing« of the current value
- **Dew-point calculation:** based on humidity and temperature
- **Dew-point distance measurement:** with surface measurement
- **Calculation of enthalpy:** heat unit h of the air
- **Calibration function for measuring humidity flow measurement with average value display**
- **Min.-/max. alarm**
- **Logger function:** manual 99 datasets, cyclic 5400 datasets. Adjustable cycle time: 1 sec...h
- **Real-time clock:** current time with day, month, and year

Order Details

Order-no.	Housing design
HND-F215	For air or gas moisture/temperature or flow with additional functions (see technical details)

Suitable probe and accessories see pages 5 - 6

Humidity measurement probes for HND-F105/205/110

Cable HND-Z051/-Z056 for connection of probe with measuring unit must be ordered as a separate position!

Order-no.	Probe type
HND-FF01	Hollow hammer electrode
HND-FF02	Impact electrode
HND-FF03	Modified impact electrode with HND-FF02-front and handle
HND-FF04	Measuring sticks 300 mm long (pair) for woodchips, excelsior, paper, etc. (for screwing onto HND-FF03)
HND-FF05	Brush probe (pair), short, for depths of up to approx. 100 mm
HND-FF06	Brush probe (pair), long, for depths of up to approx. 300 mm
HND-FF07	Roller sensor for surface measurement continuous sheets made of paper, textiles, etc.
HND-FF09	Flat electrode (for screed, paper, etc.)
HND-FF10*	Floating external NiCr-Ni-temperature probes
HND-FF11	Sensor for surface measurement of paper, textiles, etc.
HND-FF12	Wood moisture set, contents: HND-Z023 / -Z051 / -Z053 / -FF02 / -FF10
HND-FF13	Wood and construction moisture set, contents: HND-Z023 /- Z051 / -Z052 / -Z053 / -FF02 / -FF04 / -FF05 / -FF10
HND-FF14	Injection probe 43 cm (without temperature sensor) for measurement up to a depth of 40 cm, incl. 1 m connection cable. Suitable for: wood chips, wood wool, straw, hay, grain, saw dust, etc.
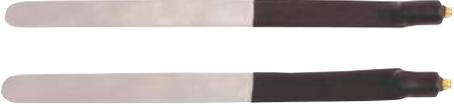
* Not for HND-F110

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Humidity measurement probes for HND-F105/205/110 (continuation)

Order-no.	Probe type	
HND-FF15	Injection probe 110 cm (without temperature sensor) for measurement up to a depth of 107 cm, incl. 1 m connection cable. Suitable for: wood chips, wood wool, straw, hay, grain, saw dust, etc.	
HND-FF16	Injection probe 43 cm (with temperature sensor) for measurement up to a depth of 40 cm, incl. 1 m connection cable. Suitable for: wood chips, wood wool, straw, hay, grain, saw dust, etc.	
HND-FF17	Injection probe 110 cm (with temperature sensor) for measurement up to a depth of 107 cm, incl. 1 m connection cable. Suitable for: wood chips, wood wool, straw, hay, grain, saw dust, etc.	

Probe for humidity, temperature, and flow measurement for HND-F215

HND-FF31	**Temperature/moisture probe, calibrated and completely replaceable** **Messbereich:** humidity 0.0...100.0 rH, temperature -40.0...120.0 °C **Accuracy:** humidity ±2.5% rH linearity, temperature ±0.5 °C **Sensors:** capacitive polymer probes / Pt 1000 $\frac{1}{3}$ DIN **Operating temperature:** handle / electronics -25...+60 °C, Sensor head and tube -40...+60 °C (short-term +120 °C) **Dimensions:** probe Ø 14 x 119 mm, handle Ø 19 x 135 mm, 1 m cable	
HND-FF32	**Flow meas. probe with spring head, calibrated and completely replaceable** **Measuring range:** 0.05...5.00 m/sec water **Accuracy:** ±1% of full scale, ±3% of reading **Sensors:** vane anemometer **Working conditions:** 0...+70 °C, 0...100% rH (non-condensing) **Dimensions:** measuring head Ø 11 x 15 mm, tube Ø 15 mm, insertion opening min. 16 mm, overall length 165 mm, 5 m cable	
HND-FF33	**Flow meas. probe with spring head, calibrated and completely replaceable** **Measuring range:** 0.55...20.00 m/sec air **Accuracy:** ±1% of full scale, ±3% of reading **Sensors:** vane anemometer **Working conditions:** 0...+70 °C, 0...100% rH (non-condensing) **Dimensions:** measuring head Ø 11 x 15 mm, tube Ø 15 mm, insertion opening min. 16 mm, overall length 165 mm, 5 m cable	

1/06 - 2021

Accessories for precision humidity measuring units HND-F and probe HND-FF

Order-no.	Description
HND-Z002*	Plug power supply unit (220/240 V_{AC}, 50/60 Hz), 10,5 V_{DC} / 10 mA
HND-Z015	Protective housing bag, nappa leather, with cut-out for 1x round / 1x square 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 RS 232 converter on USB-interface
HND-Z034	Windows software for setting, data read-out, and printing of the data of housings of the HND- series with logger function
BUS-S20M	Software for recording measurement data on a computer, for instruments of the HND-series without logger function
HND-Z051	Measuring cable (BNC on 2 x banana plugs) approximately 1 m long, for HND-F105/205
HND-Z052	100 ml conductivity paste for surface measurement and depth measurement in masonry, screed, etc. using brush probes
HND-Z053	Steel pins (3 units each 12 mm, 16 mm, and 25 mm long)
HND-Z054	Surface measuring caps (pair) for screwing onto HND-FF02/03
HND-Z055	Replacement sensor element for HND-FF11
HND-Z056	Measuring cable (2 x banana plugs, on 2 x banana plugs), length approx. 1 m, including plug adapter for HND-F110 (not for HND-FF08 and HND-FF10)
HND-Z057	Replacement measuring pins (10 units) for HND-F110
HND-Z058	Testing adapter
HND-Z061	Replacement spring head for HND-FF32
HND-Z062	Replacement spring head for HND-FF33

* Not for HND-F110

** Observe instrument dimensions

More accessories on request