

# EE381

## Moisture in Oil Sensor

The EE381 is dedicated for the reliable measurement of the moisture in transformer, lubrication or hydraulic oil as well as in diesel fuel. It is ideal for the preventive maintenance of plant and machinery. In addition to the accurate measurement of water activity (aw) and temperature (T), EE381 calculates the absolute water content of the oil (x) in ppm.

### Measurement Performance

The device features the high end E+E humidity sensing elements of the HC series, which stand for long term stability and high resistance to pollution.

### Display and Outputs

The measured data is available on two freely configurable voltage or current outputs, as well as on the optional LCD display.

### Functional Design

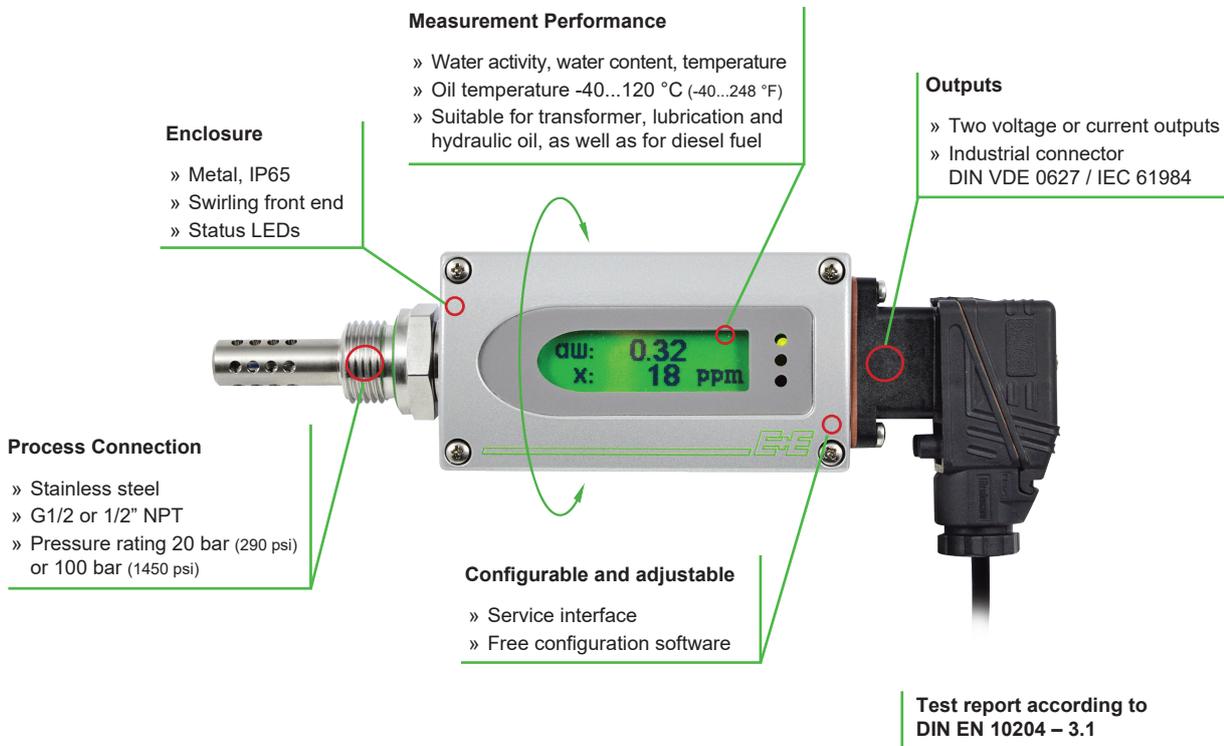
The compact, robust metal enclosure, the swirling front-end and various process connections allow for easy and comfortable design-in, mounting and operation.

### Configuration and Adjustment

An optional adapter and the free EE-PCS Product Configuration Software facilitate easy configuration and adjustment of the EE381.



## Features



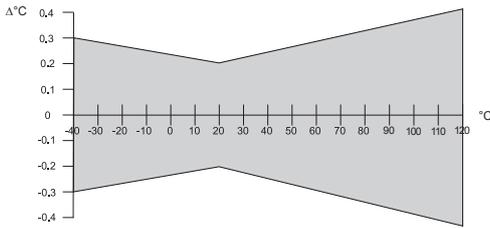
## Technical Data

### Measurands

#### Water activity

Humidity sensor	HC1000-400K	
Measuring range	0...1 a <sub>w</sub>	
Accuracy incl. hysteresis and non linearity <sup>1)</sup>	±0.02 a <sub>w</sub> (0...0.9 a <sub>w</sub> )	±0.03 a <sub>w</sub> (0.9...1 a <sub>w</sub> )
Temperature dependence	a <sub>w</sub> : ±(0.00022 + 0.0002 x a <sub>w</sub> ) x ΔT [°C]	ΔT = T - 20 °C
	T: ±0.0003 °C/°C	
Response time t <sub>90</sub> in still oil at 20 °C (68 °F)	typ. 10 min	

#### Temperature

Temperature sensor element	Pt 100 DIN A
Oil temperature	-40...120 °C (-40...248 °F)
Accuracy	

### Outputs

Two freely selectable and scaleable analogue outputs for a <sub>w</sub> , T or x [ppm]	0-1 V / 0-5 V / 0-10 V <sup>2)</sup>	-1 mA < I <sub>L</sub> < 1 mA
	4-20 mA / 0-20 mA, 3-wire	R <sub>L</sub> < 500 Ohm <sup>2)</sup> R <sub>L</sub> = load resistance

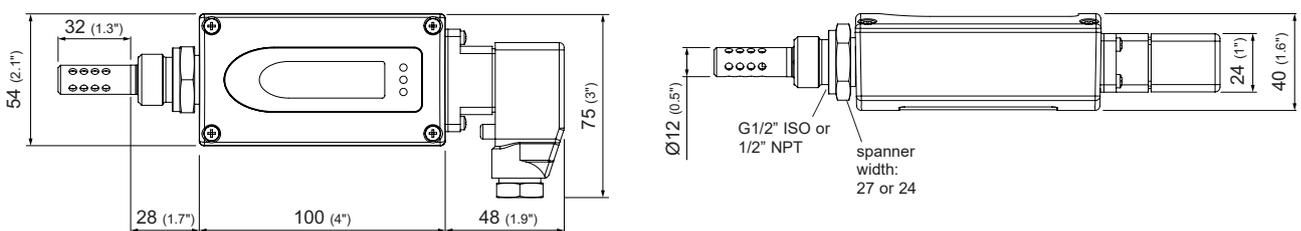
### General

Supply voltage	10...30 V DC	
Current consumption (typ.)	voltage output	40 mA
at 24 V DC	current output	80 mA
Pressure range	0...20 bar (0...290 psi)	
	0...100 bar (0...1450 psi)	
Enclosure material	Al Si 9 Cu 3	
Protection class	IP65	
Electrical connection	7-pole industrial plug: DIN VDE 0627 / IEC 61984	
	wire cross-section:	0.25 - 1 mm <sup>2</sup>
	cable outlet:	PG 11
Sensor protection	stainless steel filter	
Working temperature range	probe:	-40...120 °C (-40...248 °F)
	electronics:	-40...80 °C (-40...176 °F)
	display:	-20...50 °C (-4...122 °F)
Storage temperature range	-40...60 °C (-40...140 °F)	
Electromagnetic compatibility according to	EN 61326-1	EN61326-2-3
	Industrial Environment	ICES-003 ClassB
		FCC Part15 ClassB



- 1) The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation).  
The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement).
- 2) minimum supply voltage 15V DC

## Dimensions in mm (inch)



## Ordering Guide

			EE381-
Hardware	Pressure rating	20 bar (290 psi)	TE
		100 bar (1450 psi)	TI
	Process connection	G1/2" male thread	HA03
1/2" NPT thread		HA07	
Display	without display	no code	
	with display	D08	
Measurand output 1	temperature	T [°C/°F]	B
	water activity	a <sub>w</sub> [ ]	K
	water content in mineral transformer oil	x [ppm]	L
	water content in other oil <sup>1)</sup>	x [ppm]	M
	temperature	T [°C/°F]	B
	water activity	a <sub>w</sub> [ ]	K
Measurand output 2	water content in mineral transformer oil	x [ppm]	L
	water content in other oil <sup>1)</sup>	x [ppm]	M
	0-1 V		1
	0-5 V		2
Output signal	0-10 V		3
	0-20 mA		5
	4-20 mA		6
	metric / SI		no code
T unit	non metric / US		E01
	select according table „T output scale“ below		Txx
x output scale (other upon request)	0...100 ppm		X01
	0...500 ppm		X02
	0...1000 ppm		X03

1) Input of oil specific parameters necessary. Contact E+E sales representative.

## T Output Scale (other scaling upon request)

Txx - Temperature [°C or °F]							
T02	-40...60	T10	-20...120	T21	0...80	T83	-40...140
T04	0...50	T12	-40...120	T24	-20...80	T88	0...250
T05	0...100	T14	-20...100	T33	-40...160	T90	32...120
T08	-30...70	T16	0...120	T81	-40...250	T91	32...140

## Order Example

### EE381-TEHA03D08/BL2-T05-X01

Pressure rating: 20 bar (290 psi)  
 Process connection: G1/2" male thread  
 Display: with display

Output 1: T  
 Output 2: x  
 Output signal: 0-5 V  
 T unit: °C  
 T output scale: 0...100 °C  
 x output scale: 0...100 ppm

## Accessories

Product Configuration Adapter [see datasheet EE-PCA](#)  
 Product Configuration Software [EE-PCS](#) (Free download: [www.epluse.com/Configurator](http://www.epluse.com/Configurator))