

# EE381

## Moisture in Oil Sensor

The EE381 is designed for the reliable measurement of moisture in transformer, lubrication or hydraulic oil as well as in diesel fuel. It is ideal for the preventive maintenance of equipment and machinery. Besides the accurate measurement of water activity (aw) and temperature (T), the 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

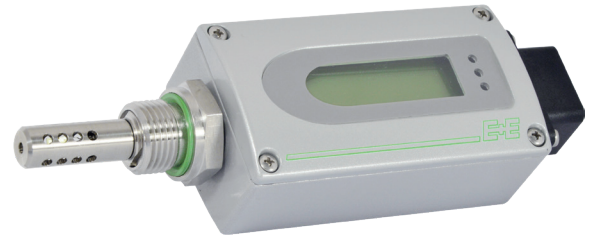
The measured data is available on two freely configurable voltage or current outputs, as well as on the optional LCD display.

### Functional Design

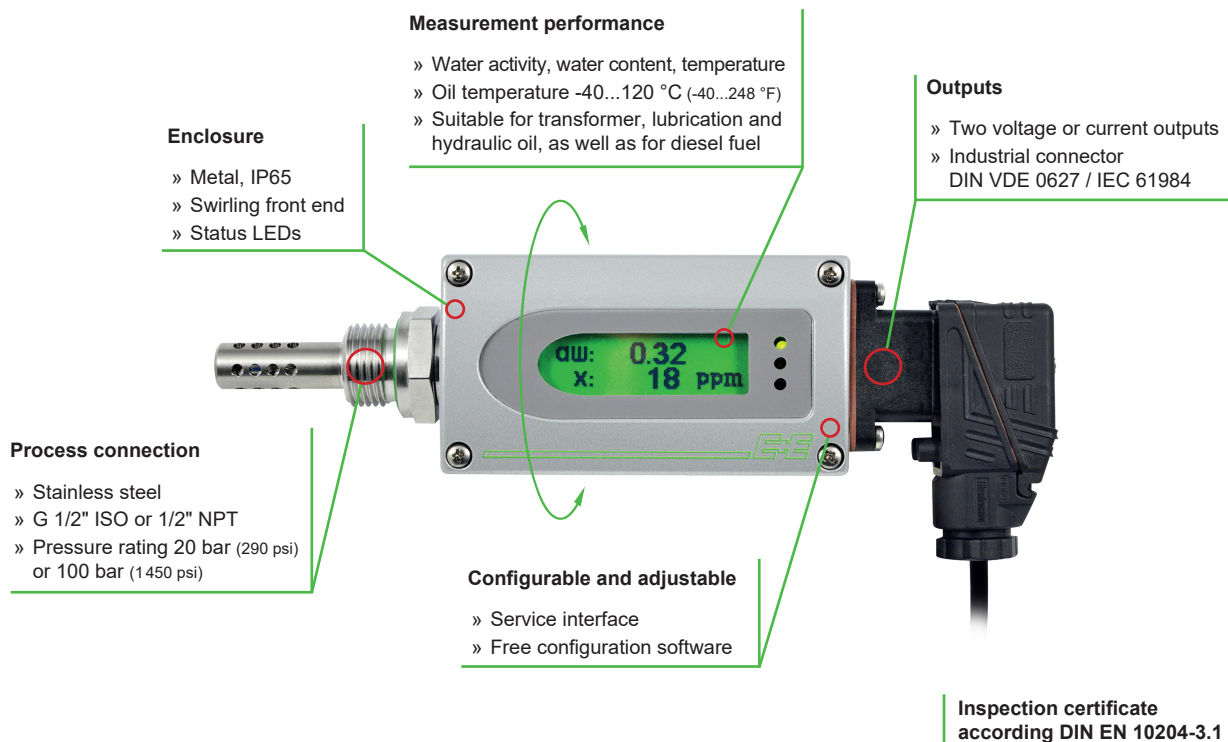
The compact, robust metal enclosure, the swirling front-end and various process connections allow for easy and comfortable design-in, mounting and maintenance.

### Configuration and Adjustment

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



## Features



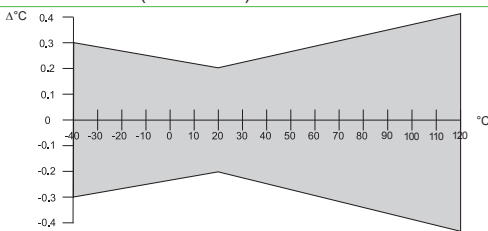
## Technical Data

### Measurands

#### Water activity

Measuring range	0...1 aw	
Accuracy incl. hysteresis and non-linearity <sup>1)</sup>	±0.02 aw (0...0.9 aw)	±0.03 aw (0.9...1 aw)
Temperature dependence	aw: $\pm(0.00022 + 0.0002 \times aw) \times \Delta T$ [°C] $\Delta T = T - 20$ °C T: $\pm 0.0003$ °C/°C	
Response time $t_{90}$ in still oil at 20 °C (68 °F), typ.	10 min	

#### Temperature

Oil temperature	-40...120 °C (-40...248 °F)
Accuracy	

### Outputs

Two freely selectable and scaleable analogue outputs for aw, T or x [ppm]	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 rating	0...20 bar (0...290 psi) 0...100 bar (0...1450 psi)	
Enclosure material	AlSi <sub>9</sub> Cu <sub>3</sub>	
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	
Filter	Stainless steel	
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      ICES-003 ClassB Industrial Environment      FCC Part15 ClassB

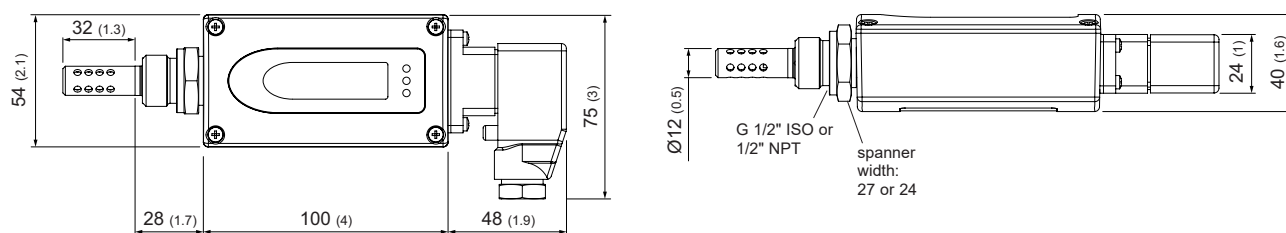


1) The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation).  
The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement).

2) Minimum supply voltage 15 V DC

## Dimensions

Values in mm (inch)



## Ordering Guide

		<b>EE381-</b>	
<b>Hardware</b>	<b>Process connection</b>	G 1/2" ISO thread 1/2" NPT thread	
	<b>Pressure rating</b>	20 bar (290 psi) 100 bar (1450 psi)	
	<b>Filter</b>	Stainless steel, for flow < 1 m/s Stainless steel, for flow > 1 m/s	
	<b>Display</b>	Display with backlight	
	<b>Output 1</b>	Water activity $a_w$ [ ] Other measurand (xx see measurand code below)	
<b>Software Setup - Analogue Outputs</b>	<b>Output signal 1<sup>1)</sup></b>	0 - 5 V 0 - 10 V 0 - 20 mA 4 - 20 mA	
	<b>Scaling 1 low</b>	0 Value	
	<b>Scaling 1 high</b>	1 Value	
	<b>Output 2</b>	Temperature T [°C] Other measurand (xx see measurand code below)	
	<b>Output signal 2<sup>1)</sup></b>	0 - 5 V 0 - 10 V 0 - 20 mA 4 - 20 mA	
	<b>Scaling 2 low</b>	0 Value	
	<b>Scaling 2 high</b>	1 Value	
			no code MAxx GA2 GA3 GA5 GA6 no code SALValue no code SAHValue no code MBxx GB2 GB3 GB5 GB6 no code SBLValue no code SBHValue

1) Both analogue outputs shall be either voltage or current.

Measurand code		MAxx / MBxx
Temperature T	[°C]	1
	[°F]	2
Water activity $a_w$	[ ]	67
Water content x	[ppm]	70

## Order Example

**EE381-PA1PN20D2MA1GA2SAL0SAH100MB70GB2SBL0SBLH100**

Process connection:	G 1/2" ISO thread	Output 1:	T [°C]
Pressure rating:	20 bar (290 psi)	Output signal 1:	0 - 5 V
Filter:	Stainless steel, for flow < 1 m/s	Scaling output 1:	0...100 °C
Display:	Display with backlight	Output 2:	x [ppm]
		Output signal 2:	0 - 5 V
		Scaling output 2:	0...100 ppm

## Accessories

Product Configuration Adapter	see datasheet EE-PCA
Product Configuration Software	EE-PCS (Free download: <a href="http://www.epluse.com/Configurator">www.epluse.com/Configurator</a> )