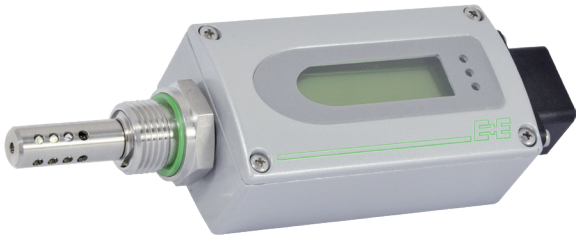
EE381

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.



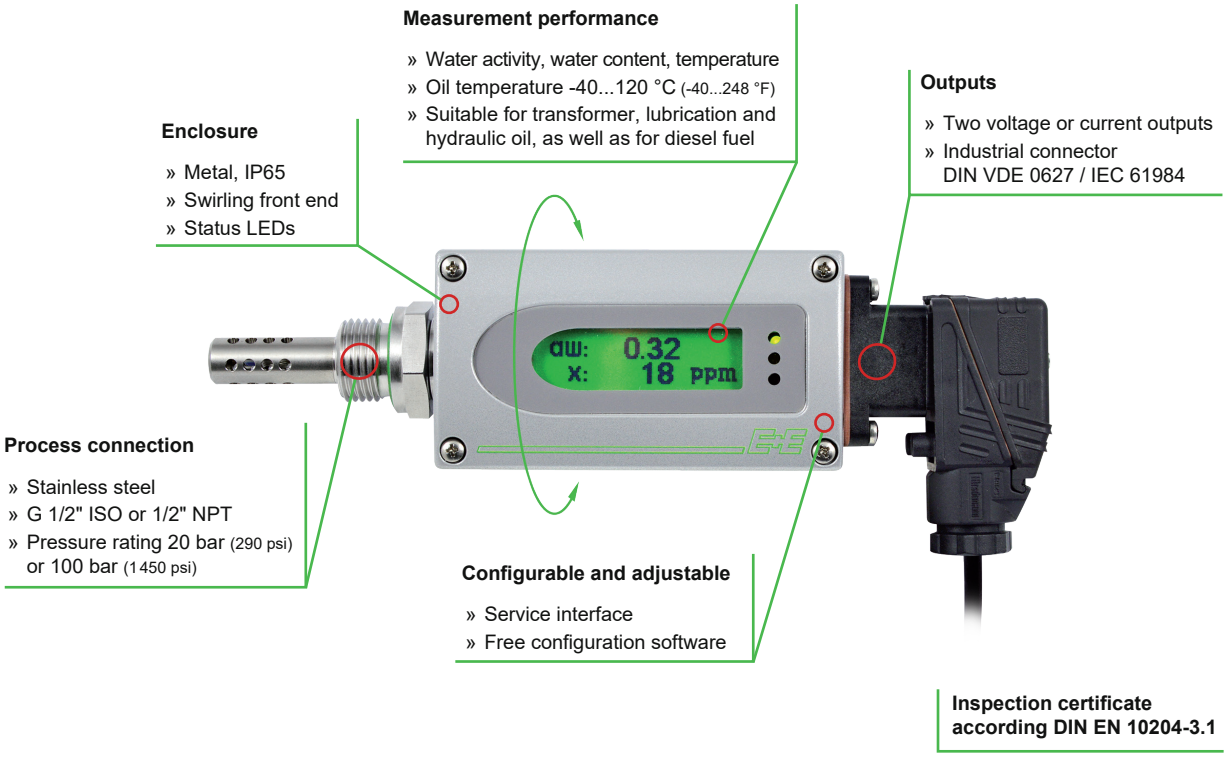
Measurement Performance
The device features the high end E+E humidity sensing elements of the HC series, which stand for long term stability and high resistance to pollution.

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



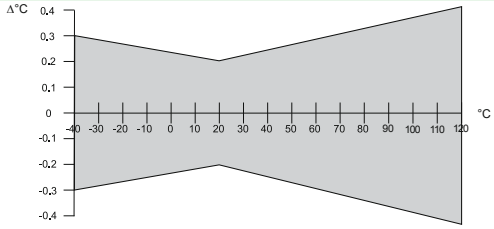
Technical Data

Measurands

Water activity

Measuring range	0...1 aw
Accuracy incl. hysteresis and non-linearity[1]	±0.02 aw (0...0.9 aw) ±0.03 aw (0.9...1 aw)
Temperature dependence	aw: ±(0.00022 + 0.0002 x aw) x ΔT [°C] ΔT = T - 20 °C T: ±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 [2]	-1 mA < I_L < 1 mA
	4 - 20 mA / 0 - 20 mA, 3-wire	R_L < 500 Ohm[2] R_L = load resistance

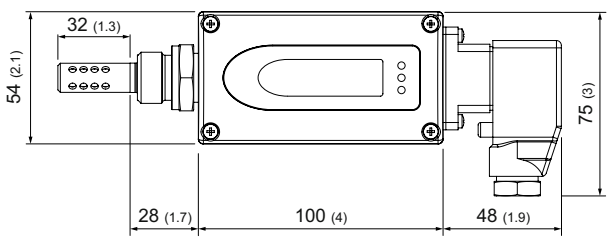
General

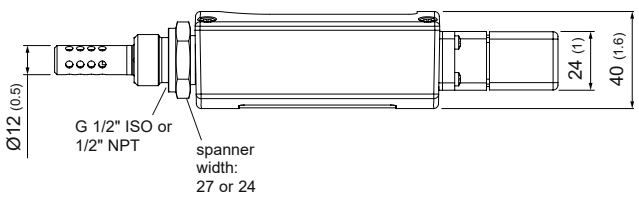
Supply voltage		10 - 30 V DC
Current consumption, typ. at 24 V DC	voltage output	40 mA
	current output	80 mA
Pressure rating		0...20 bar (0...290 psi) 0...100 bar (0...1450 psi)
Enclosure material		$AlSi_9Cu_3$
Protection class		IP65
Electrical connection		7-pole industrial plug: DIN VDE 0627 / IEC 61984 Wire cross-section: 0.25 - 1 mm² 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 EN 61326-2-3 ICES-003 ClassB Industrial Environment FCC Part15 ClassB CE

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

			EE381-
Hardware	**Process connection**	G 1/2" ISO thread	PA1
		1/2" NPT thread	PA2
	Pressure rating	20 bar (290 psi)	PN20
		100 bar (1450 psi)	PN100
	Filter	Stainless steel, for flow < 1 m/s	no code
		Stainless steel, for flow > 1 m/s	F18
	Display	Display with backlight	D2
Software Setup - Analogue Outputs	**Output 1**	Water activity a_w [ ]	no code
		Other measurand (xx see measurand code below)	MA*xx*
	Output signal 1[1]	0 - 5 V	GA2
		0 - 10 V	GA3
		0 - 20 mA	GA5
		4 - 20 mA	GA6
	Scaling 1 low	0	no code
		Value	SAL*Value*
	Scaling 1 high	1	no code
		Value	SAH*Value*
	Output 2	Temperature T [°C]	no code
		Other measurand (xx see measurand code below)	MB*xx*
	Output signal 2[1]	0 - 5 V	GB2
		0 - 10 V	GB3
		0 - 20 mA	GB5
		4 - 20 mA	GB6
	Scaling 2 low	0	no code
		Value	SBL*Value*
	Scaling 2 high	Value	SBH*Value*

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

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

Order Example

EE381-PA1PN20D2MA1GA2SAH100MB70GB2SBH100

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: www.epluse.com/Configurator)