

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

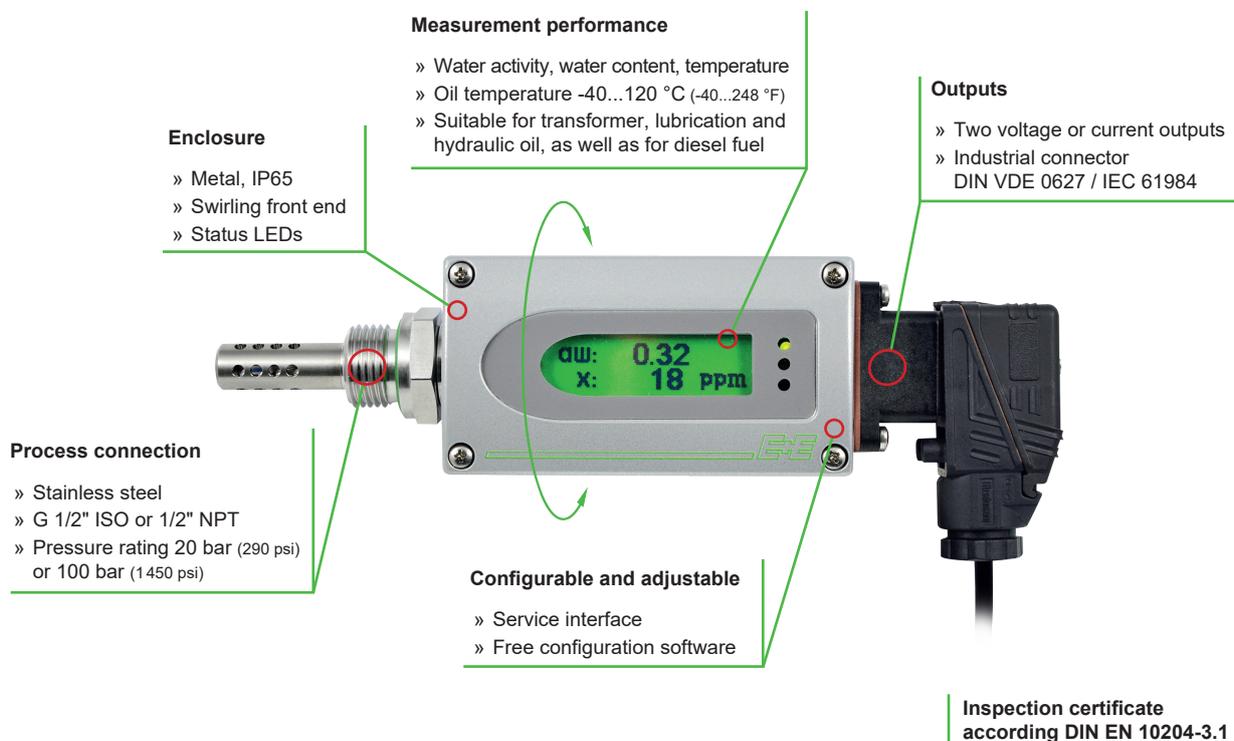
The compact, robust metal enclosure, the swirling front-end and various process connections allow for easy and comfortable design-in, mounting and maintenance.

Configuration and Adjustment

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



Features



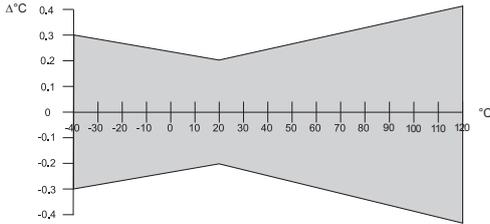
Technical Data

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: $\pm(0.00022 + 0.0002 \times aw) \times \Delta T$ [°C] $\Delta T = T - 20$ °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.	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 ₉ Cu ₃	
Protection class	IP65	
Electrical connection	7-pole industrial plug: DIN VDE 0627 / IEC 61984 Wire cross-section: 0.25 - 1 mm ² 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	FCC Part15 ClassB
	Industrial Environment	

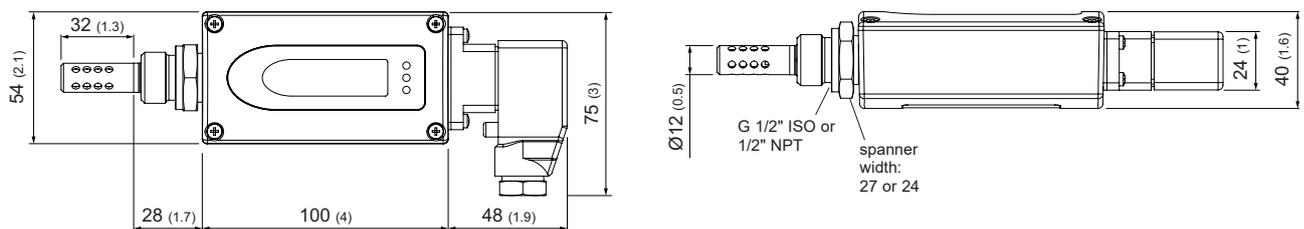


1) The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation).
The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement).

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
Display	Stainless steel, for flow > 1 m/s	F18	
		D2	
Software Setup - Analogue Outputs	Output 1	Water activity a_w []	no code
		Other measurand (xx see measurand code below)	MAxx
	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	SALValue
	Scaling 1 high	1	no code
		Value	SAHValue
	Output 2	Temperature T [°C]	no code
		Other measurand (xx see measurand code below)	MBxx
	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	SBLValue	
Scaling 2 high	1	no code	
	Value	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: www.epluse.com/Configurator)