E+E ELEKTRONIK Ges.m.b.H. — YOUR PARTNER IN SENSOR TECHNOLOGY

EE364

Compact moisture in oil transmitter

The EE364 is an innovative moisture in oil transmitter, suitable for OEM applications. The high measurement accuracy and excellent long-term stability make the EE364 ideal for online monitoring of moisture in transformer, lubricating and hydraulic oil, as well as diesel fuel.
The compact design and rugged stainless steel housing allow a space-saving installation in the most demanding applications. The EE364 measures water activity (aw), oil temperature (t) and calculates the absolute water content (x). The measured values are available on two 4-20mA outputs and one digital output with MODBUS RTU interface.
The analog outputs can be individually scaled and configured using the optional converter cable and the free EE-PCS Product Configuration software.

Typical applications

Monitoring of
- **Transformer oil**
- **Lubrication oil**
- **Hydraulic oil**
- **Engine oil**
- **Diesel fuel**

Features

Measurement of water activity (a_w), temperature and water content (x) in ppm
Two configurable 4…20 mA outputs
MODBUS-RTU interface
Pressure rating 20 bar
G ½" ISO or ½" NPT process connection

Technical data

Measurands

Water activity

Sensor	HC1000-400	
Measurement range	0...1 a_w	
Accuracy at 20°C[1)]	±0.02 a_w (0...0.9 a_w)	±0.03 a_w (0.9...1 a_w)
Response time t_{90}	< 10min. in still oil	

Temperature

Sensor	Pt1000 DIN A	
Accuracy at 20°C in oil	±0.2°C (0.36 °F)	

Output

2 x analogue output (freely selectable and scalable for a_w, T, ppm)	4 - 20mA (3-wire technology)	R_L < 500 Ohm
Digital output	MODBUS RTU	

General

Supply voltage	10*)...28V DC	*) 10V+0.02*R_L
Power consumption at 24V DC	<40mA	
Pressure rating	0...20 bar (0...290 psi)	
Housing / protection rating	Stainless steel 1.4404 / IP65	
Electrical connection	M12x1 8-pin plug	
Sensor protection	Stainless steel filter	
Oil temperature	-40...80°C (-40...176 °F)	
Ambient temperature	-40...60°C (-40...140 °F)	
Storage temperature	-40...60°C (-40...140 °F)	
Electromagnetic compatibility	EN61326-1 Industrial environment	EN61326-2-3

CE

1) The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2 x 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).

Modbus Map

The measured values are 32Bit float values. The factory-set slave ID is 243 as integer 16Bit value. This ID can be customised in the register 0x00 (value range 1 - 247 permitted). For Modbus settings please see Application Note AN0103.
Transmission rate factory settings are: baud rate 9600, parity even and stop bit 1.

32Bit FLOAT:

Register address	*Protocol address*	*Parameter name*
30052	0x33	Water activity Aw
30054	0x35	Water content Xm or Xk
30026	0x19	Temperature Tx
60101	0x64	Parameter A (write)
60103	0x66	Parameter B (write)

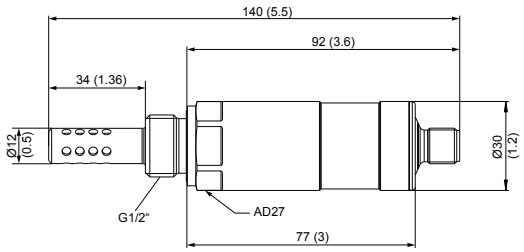
16Bit:

Register address	*Protocol address*	*Parameter name*
60001	0x00	Slave-ID
60002	0x01	RS485 Setting

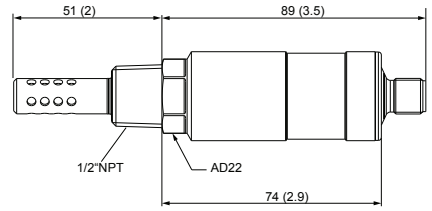
JLC INTERNATIONAL
JLC International, Inc.
Phone: 215-340-2650
Fax: 215-340-3670
958 Town Center, New Britain, PA 18901
jlcusa@jlcinternational.com
www.jlcinternational.com

Dimensions in mm (inch)

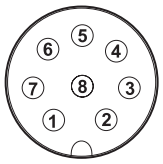
ISO



NPT



Connection diagram



Plug

1...NC
2...RS485 B
3...RS485 A
4...Analogue output 1
5...Analogue output 2
6...GND
7...NC
8...V+

Ordering information

MODEL	ANALOGUE	DIGITAL	PRESSURE RATING	PROCESS CONNECTION
Transmitter (T)	4-20mA (6)	MODBUS RTU (RS485) (3)	20bar (E)	G1/2" thread (A)
				1/2" NPT thread (C)
EE364-				

OUTPUT 1	SCALING 1[3]	OUTPUT 2	SCALING 2	UNIT
Water activity (Aw)[1]	0...100 (001)	Temperature (T)	-40... 60 (002)	metric (M)
Water content in mineral transformer oil (Xm)	0...500 (002)		0... 80 (021)	non-metric (N)
Water content in customer-specific oil (Xk)[2]	0...1000 (003)		-40... 80 (022)	
			-20... 80 (024)	
			-40...180 (052)	
			-40...140 (083)	
			32...132 (096)	

1) Factory setting Aw: 0...1
2) Oil-specific parameters can be determined on request.
3) Valid for Xm and Xk

Accessories (see accessories data sheet)

M12x1 8pin mating plug suitable for customer-specific assembly	HA010704	Stainless steel filter	HA010110
M12x1 8pin connection cable socket/flying leads 1.5m	HA010322	Modbus - USB converter cable	HA011013
M12x1 8pin connection cable socket/flying leads 5m	HA010324		
M12x1 8pin connection cable socket/flying leads 10m	HA010325		
Product Configuration Software	EE-PCS (free download: www.epluse.com/EE364)		

Order example

EE364-T63EA/AwT002M

Model:	Transmitter	Output 1:	Water activity
Analogue output:	4-20mA	Output 2:	Temperature
Digital output:	MODBUS RTU	Scaling 2:	-40...60
Pressure rating:	20bar	Units:	metric [°C]
Process connection:	G1/2" thread		

Scaling of T-outputs

Following Txx defines the scaling of the outputs for **temperature (T), dew point temperature (Td), frost point temperature (Tf) and wet bulb temperature (Tw)**. The Txx codes are chosen in the ordering information of the product.

The limits of the temperature scale shall be within the temperature working range of respective EExx transmitter.

For T scale in°C, please use Txx code alone:
Example :
EE31-PFTD3025AB6-**T57** T output scale: 4…20mA = -20…+140°C

For T scale in °F, please use E01-Txx:
Example:
EE31-PFTE3056AB5-**E01-T57** T output scale: 0...10V = -20...+140°F

T01	-30...+40	T37	0...+130	T73	-20...+70	T109	-40...+32
T02	-40...+60	T38	-40...+70	T74	-40...+356	T110	-35...+50
T03	-10...+50	T39	-30...+20	T75	+32...+212	T111	-60...0
T04	0...+50	T40	+20...+180	T76	+32...+122	T112	0...+30
T05	0...+100	T41	+60...+110	T77	+20...+140	T113	-23...+85
T06	-5...+45	T42	-10...+100	T78	-40...+248	T114	+60...+180
T07	0...+60	T43	-35...+35	T79	-40...+100	T115	+10...+40
T08	-30...+70	T44	-40...+50	T80	-40...+176	T116	-80...+180
T09	-30...+120	T45	-30...+50	T81	-40...+250	T117	+15...+35
T10	-20...+120	T46	0...+75	T82	-40...+350	T118	-70...+180
T11	-10...+70	T47	-20...+150	T83	-40...+140	T119	-25...+25
T12	-40...+120	T48	-20...+50	T84	-40...+300	T120	-70...+60
T13	+15...+25	T49	0...+170	T85	0...+140	T121	+55...+95
T14	-20...+100	T50	-10...+60	T86	0...+176	T122	-20...+20
T15	+20...+120	T51	-50...+70	T87	0...+248	T123	-80...+80
T16	0...+120	T52	-40...+180	T88	0...+250	T124	-30...+30
T17	0...+70	T53	+80...+120	T89	0...+350	T125	-60...+80
T18	-10...+40	T54	-30...+35	T90	+32...+120	T126	-40...+10
T19	+10...+100	T55	0...+40	T91	+32...+140	T127	-50...+10
T20	-30...+60	T56	0...+5	T92	+32...+180	T128	+20...+80
T21	0...+80	T57	-20...+140	T93	+32...+248	T129	-20...+85
T22	-40...+80	T58	+10...+30	T94	+32...+250	T130	+20...+85
T23	-30...+130	T59	-10...+30	T95	+32...+300	T131	-50...+150
T24	-20...+80	T60	-20...+40	T96	+32...+132	T132	-10...+35
T25	-20...+60	T61	-5...+100	T97	-60...+120	T133	-40...+20
T26	0...+180	T62	-5...+50	T98	-60...+212	T134	-5...+30
T27	-50... +50	T63	-80...+20	T99	-110...+70	T135	-50...+160
T28	-80...+60	T64	-60...+60	T100	-76...+140	T136	-40...+85
T29	-20...+180	T65	-60...+20	T101	+32...+350	T137	-25...+125
T30	0...+160	T66	-50...+100	T102	-15...+25	T138	-90...+10
T31	-5...+55	T67	-80...+100	T103	-30...+100	T139	-13...+257
T32	-80...0	T68	-40...+150	T104	-60...+40	T140	80...+180
T33	-40...+160	T69	0...+20	T105	-40...+40	T141	-100...+20
T34	-70...+40	T70	-10...+25	T106	+10...+50	T142	0...+65
T35	+100...+180	T71	+50...+130	T107	0...+200	T143	-20...+150
T36	0...+150	T72	+50...+140	T108	-112...+32	T144	-10...+90