RS485 communication interface

Databits: 8 Parity: none Stop bits: 1 or 2 Protocol: Modbus RTU	Supported Modbus functions: 03 - read multiple registers 06 - write single register

Modbus registers (0-based, decimal format)

Reg	Description	Supported values
1	Hardware version	read only
2	Software version	read only
3	Product serial number	read only
4	Slave ID (network address)*	1...247, default 1
5	Baudrate*	1200...57600 baud, default 9600
6	Response delay, ms	10...255 ms, default 10
7	Stop bits*	1 / 2, default 1
17	Restart	write '42330' for soft restart
162	T shift adjustment	-32000...+32000 T units (0,01 °C)
163	T slope adjustment	-32000...+32000 (-32,000...+32,000 %)
164	T output change rate limit	1...32000 (0,01...320,00 °C/s), 0:none
165	RH shift adjustment	-32000...+32000 RH units (0,01 %RH)
166	RH slope adjustment	-32000...+32000 (-32,000...+32,000 %)
167	RH output change rate limit	1...32000 (0,01...320,00 %RH/s), 0:no
168	Integrating filter time constant	1...32000 s, 0:no integrating filter
201	Parameter assigned to OUT1	0:no, 1:T, 2:RH, 3:DP, 9:forced by 203
202	Parameter assigned to OUT2	0:no, 1:T, 2:RH, 3:DP, 9:forced by 204
203	Forced value for OUT1	0...1000 (0.0...100.0% of full scale)
204	Forced value for OUT2	0...1000 (0.0...100.0% of full scale)
211	Parameter assigned to RE1	0:no, 1:T, 2:RH, 3:DP, 9:forced by 213
212	Parameter assigned to RE2	0:no, 1:T, 2:RH, 3:DP, 9:forced by 214
213	Forced state for RE1	0:off, 1:on (relay control by Modbus)
214	Forced state for RE2	0:off, 1:on (relay control by Modbus)
215	Switch delay for RE1	0...1000 s, default 0
216	Switch delay for RE2	0...1000 s, default 0
217	Min on/off time for RE1	0...1000 s, default 0
218	Min on/off time for RE2	0...1000 s, default 0
219	Control logic for relay RE1	0:_, 1:_↓↑‾, 2:‾↑↓_, 3:_↑‾↓_, 4:‾↓_↑‾
220	Control logic for relay RE2	0:_, 1:_↓↑‾, 2:‾↑↓_, 3:_↑‾↓_, 4:‾↓_↑‾
221	LOW setpoint for relay RE1	-32000...+32000, RH or T units (×0,01)
222	HIGH setpoint for relay RE1	-32000...+32000, RH or T units (×0,01)
223	LOW setpoint for relay RE2	-32000...+32000, RH or T units (×0,01)
224	HIGH setpoint for relay RE2	-32000...+32000, RH or T units (×0,01)
258	Measured temperature T	-4000...+12500 T units (×0,01 °C)
259	Measured humidity RH	0...+10000 RH units (×0,01 %RH)
260	Calculated dewpoint DP	-8000...+10000 DP units (×0,01 °C DP)
261	0% value of OUT1	-1000...+1000 (-1000...+1000 °C/%RH)
262	100% value of OUT1	-1000...+1000 (-1000...+1000 °C/%RH)
263	0% value of OUT2	-1000...+1000 (-1000...+1000 °C/%RH)
264	100% value of OUT2	-1000...+1000 (-1000...+1000 °C/%RH)

* - the new value is applied after restart
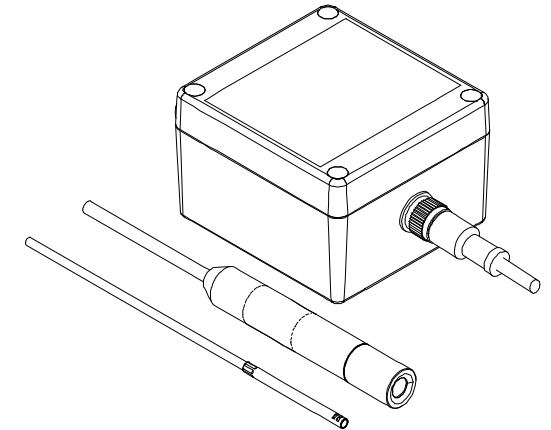Broadcast ID=0 may be used to assign a new ID to device with unknown ID

Specifications

Resolution	0,01 %RH; 0,01 °C
Accuracy	< ±3 %RH; < ±0,5 °C
Response time	~10 seconds

Humidity and temperature probes

HT-RP04	Ø4×50 mm,	-40...+85 °C
HT-RP16	Ø16×80 mm,	-40...+85 °C
HT-RP16H	Ø16×90 mm,	-40...+125 °C
HC2-HK25	Ø15×250 mm,	-100...+150 °C
HC2-HK40	Ø15×400 mm,	-100...+200 °C
HC2-IC102 / -IC105	Ø15×100 mm,	-100...+200 °C
HC2-IC302 / -IC305	Ø15×250 mm,	-100...+200 °C
HC2-IC402 / -IC405	Ø15×400 mm,	-100...+200 °C

Analog outputs	2 × 4-20 mA or 0-10 V

Load resistance
  for 4-20 mA output mode:
  for 0-10 V output mode:
	
	$R_L < (U_s - 3V) / 22$ mA
	$R_L > 100$ kOhm

Operating conditions	-40...+85 °C, 0...99 %RH
Power supply with integrated mains supply module	11...30 VDC 90...265 VAC
Power consumption	< 2 VA
Electromagnetic compatibility	according to 89-336-EEC and EN61326-1 requirements
Wall-mount enclosure	oyster white ABS 82×85×55 mm, IP65
Relays	2 × SPST, max 5 A, 30 VDC / 250 VAC

Factory default settings for supplied instrument

OUT1 assignment and scale	T; 4-20 mA; 0-100 °C
OUT2 assignment and scale	RH; 4-20 mA; 0-100 %RH
RE1 assignment and logic	0: no; 0: none
RE1 HIGH setpoint (set)	10000 units (100 °C / %RH)
RE1 LOW setpoint (release)	0 units (0 °C / %RH)
RE2 assignment and logic	0: no; 0: none
RE2 HIGH setpoint (set)	10000 units (100 °C / %RH)
RE2 LOW setpoint (release)	0 units (0 °C / %RH)

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PluraSens®

Humidity and Temperature Transmitter

E2228

**User Manual**

Evikon

Description

Humidity and temperature transmitter E2228 is intended for measurement of relative humidity, temperature and dew point of air in indoors and outdoors places with high accuracy. The instrument utilises fully calibrated and temperature compensated digital sensors with excellent repeatability and stability.
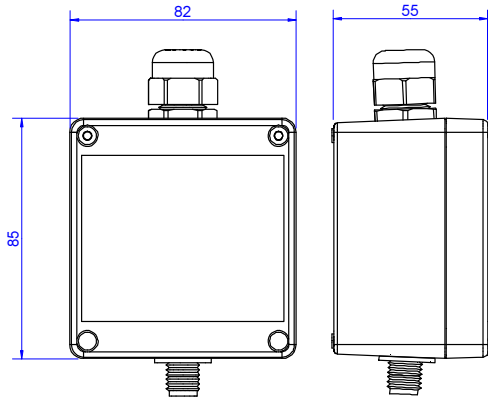
E2228 provides two independent analog outputs OUT1 and OUT2, user-selectable to 4-20 mA or 0-10 V, proportional either to humidity, temperature or dew-point value. RS485 Modbus RTU digital communication interface allows easy instrument configuration and integration into various automation systems.

Two relays RE1 and RE2 with closing contacts can be freely configured and used to switch various 24 V or 230 V powered actuators for alarming or humidity and/or temperature regulation.
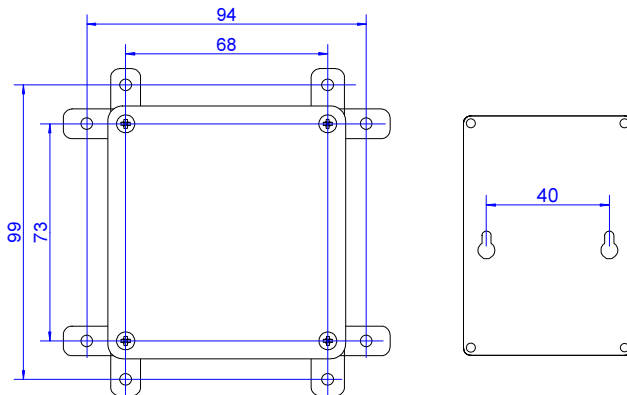

Installation and connections

The transmitter should be mounted not too close to heat sources. Fix E2228 on a wall by screws, using either mounting lugs or the mounting plate, supplied with the instrument. Fix the remote sensing probe in the measurement point and connect the probe cable to the circular connector on the bottom side of E2228. The standard HT-RP16 probe can be connected either directly to the transmitter or with 2 m or 5 m extension cable.

To power the instrument from an external 24 VDC source, connect terminals **0V** and **+U** to the source. If the integrated mains power supply module is used, connect terminals **L** and **N** to the mains.

NB! If the instrument is powered from mains, connect to **0V** and **+U** terminals only light external loads, which consume less than 30 mA in total, as the integrated mains supply module capacity is limited.
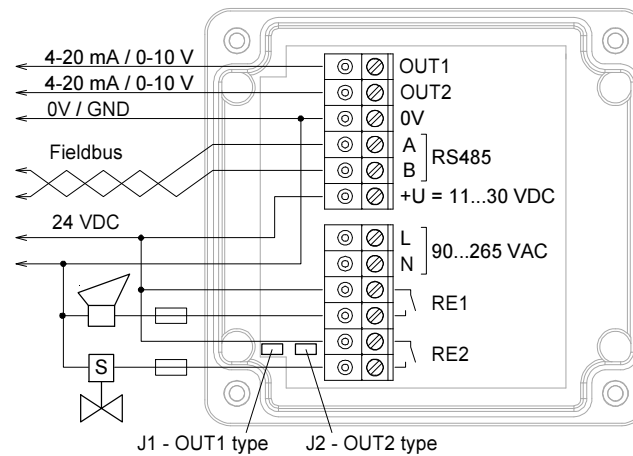
To use analog outputs, connect the terminals **OUT1** and/or **OUT2** and **0V** to the input of the secondary instrument (indicator or controller). NB! The outputs are not galvanically isolated from 24 V power supply and share common 0V. Allowed load resistance limits are stated in Specifications table.

The type of each analog output can be independently selected with the appropriate jumper (**J1** for OUT1 and **J2** for OUT2). With jumper open, the output type is 4-20 mA. With jumper closed, the output type is 0-10 V.

To use relay outputs, connect the chosen actuators to the relay terminals **RE1** and/or **RE2**. NB! Actuator short-circuits shall be avoided, to protect the instrument relays use external fuses or safety switches.

Configuring

Humidity and temperature transmitter E2228 shares all functionalities of the PluraSens® multifunctional transmitter platform. The features and options include:

- digital output change rate limiting filter
- digital integrating (averaging) filter
- free assignment of each analog output to chosen parameter
- flexible setting of analog output scales for each output
- output shift and slope adjustment for calibration
- free assignment of each of two relays to chosen parameter
- several relay control logic modes (HI or LO with hysteresis, Ц or П)
- switch delays and minimum on/off state durations for each relay
- Modbus controlled forced state option for analog outputs and relays.

E2228 can be configured through its RS485 interface by Modbus RTU commands. A standard configuration kit includes Model E1087 USB-RS485 converter and E22XX Configurator software. For configuration procedure details please refer to the configuration manual and protocol description PluraSens_Modbus.

Calibration

E2228 and the sensing probe has been calibrated by Manufacturer with appropriate humidity standards before delivery. If sensors are exposed to contaminated or agressive environment, the instrument requires regular, at least annual field recalibration with a calibration kit. For calibration procedure details please refer to the calibration manual E22XX_CM. The calibration should be preferably performed by Manufacturer's authorised representative.

Warranty

This product is warranted to be free from defects in material and workmanship for a period of one year from the date of original sale. During this warranty period Manufacturer will, at its option, either repair or replace product that proves to be defective. This warranty is void if the product has been operated in conditions outside ranges specified by Manufacturer or damaged by customer error or negligence or if there has been an unauthorised modification.