Transmitter for pH-Value and ORP

EXPERT-LINE

- **Measuring range:**
  pH value: 0 to 14
  ORP: -1500 to +1500 mV
  (0-100 %)
- **For general-purpose use with:**
  Analogue output
  Alarm relay
  Two additional relays
  (for use as control contacts)
- **Simple operation with:**
  Clear menu structured programming
  Two-point calibration with CAL key
  Manual control of contacts
- **Large text display allowing:**
  User guidance notes
  Error indication
  Easy programming
- **Safe operation because of:**
  Overvoltage protection (lightning protection)
  Plausibility calibration check and sensor monitoring
  Custom alarm configuration for alarm contact and residual current

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Model:
APM-X

Description

The transmitter APM-X in a field or panel housing offers a convincing solution for all applications in the area of water and waste-water treatment as well as in industrial process applications.

The parameters to be measured (pH or ORP) are selected in the menu. The associated measured value can be displayed in the other measuring mode during measurement (for example pH can be switched to mV and mV/ORP can be switched to ORP %).

The temperature is shown simultaneously and can be toggled between °C and °F or removed as required.
Typically pH electrodes are always calibrated with the same pH values. The transmitter therefore provides the settings from the last calibration as a pre-selection for the next one. Should the buffer solutions be swapped by mistake during calibration, the plausibility check ensures that the calibration is accepted.
Due to the large display the user guidance is simple and elegant. The correctness of the measurement result is of the highest priority.

Different alarms are needed depending on the application. Therefore, the transmitter allows the configuration of the alarm contact, and the residual current, independently of one another and isolated for every possible fault. Unnecessary or undesired alarms can thus be removed. The two additional contacts can be used as limit contacts (and for temperature as well), as P(ID) controller and for electrode cleaning functions.

A full view

The actual value and temperature are shown simultaneously on the display. This gives you a full view of the most important process data. Text information in the configuration menu helps to adjust the device parameters.

Intelligent and simple

All operating functions for the device are arranged in a clear menu structure. Individual parameters can be selected easily and changed after entering a code.

Electrical connection

All connections to the panel-mounted instrument are made with terminal blocks at the back.
The entire wiring (including measuring cell cable) for field instruments is connected to terminals in the transmitter connection chamber.

A complete measuring device comprises:

- the pH/ORP transmitter model APM-X
- a pH combined electrode
  model APS-X1Q, APS-X2Q or APS-X5K

  or
- a ORP combined electrode
  model ARS-X1Q or ARS-X5K
- a suitable pH/ORP measuring cable
  model APK-X

  as well as one of the following:
- a separate temperature sensor Pt 100
  model AZT-X
- transmitter wall (AZM-Z1) or pipe mounting (AZM-Z2) accessory.
- flow or immersion assembly for installation and protection of the electrodes (see Accessories)

Application examples for ORP-measurement

Drinking water:

- Chlorine batching

Industrial waste-water treatment:

- Chromate reduction with iron(II) or bisulphite
- Cyanide oxidation with Hypochlorite
- Nitrite oxidation with Hypochlorite

Communal waste-water treatment:

- Controlling denitrification

Swimming pools:

- Regulating Chlorine dosing
- Monitoring the water quality according to DIN 19 643

Application examples for pH measurements

Drinking water:

- Monitoring parameters according to the ordinance on drinking water

Industrial waste-water treatment:

- Neutralization
- Detoxication
- Precipitation station
- Final inspection

Communal waste-water treatment plants:

- Inflow/sand-trap
- Activation tanks (for nitrification)
- Run-off
- Digestion tower

Production facilities of the following sectors:

- Chemical pulp/paper
- Paints
- Textiles
- Pharmaceuticals
- Chemical industry
- Food industry

Technical Data

Inputs	
Measured quantities:	pH, ORP, temperature

pH-measurement

Measuring range:	pH 0 - 14
Indicating range:	-2...+16 pH with indication of measuring range overflow and underflow
pH-offset-range:	±2 pH
Adaptation of rate of rise:	glass: 38.0...65.0 mV/pH (nominal 59.16 mV/pH) antimony: 25.0...65.0 mV/pH (nominal 59.16 mV/pH)
Zero-point:	glass: 5.0...9.0 pH (nominal 7.0 pH) antimony: -1.0...3.0 pH (nominal 1.0 pH)
Max. cable length pH electrode:	recommended: 10 m

pH-signal input

Input resistance under nominal reference conditions:	$>1 \times 10^{12}\ \Omega$

- **ORP measurement**

Indication and measuring range:	-1500...+1500 mV / 0...100 %
ORP-offset range:	±200 mV / ±10 %

- **ORP signal input**

Input resistance under nominal reference conditions:	> 1 x 10^{12} Ω

- **Temperature measurement**

Temperature sensor:	Pt 100
Measuring range:	-20...+150 °C
Temperature offset range:	±20 °C

- **Digital inputs 1 and 2**

Voltage:	10...50 V
Current consumption:	max 10 mA

Outputs

- **pH-signal output**

Current range:	0/4...20 mA, electrically isolated;
Residual current:	2.4 / 22 mA
Load:	max. 500 Ω
Output range:	adjustable, min. Δ 1 pH
Isolation voltage:	max. 350 V_{eff} / 500 V_{DC}
Overvoltage protection (lightning protection):	acc. EN 61000-4-5:1995

- **ORP-signal output**

Current range:	0/4 ... 20 mA, electrically isolated
Load:	max. 500 Ω
Transmission range:	absolute: adjustable, min. Δ 50 mV relative: fixed, 0...100 %
Isolation voltage:	max. 350 V_{eff} / 500 V_{DC}
Overvoltage protection (lightning protection):	acc. EN 61000-4-5:1995

- **Temperature signal output (optional)**

Current range:	0/4 ... 20 mA, electrically isolated
Load:	max. 500 Ω
Transmission range:	adjustable, Δ 10... Δ 100 % of full-scale value
Isolation voltage:	max. 350 V_{eff} / 500 V_{DC}
Overvoltage protection (lightning protection):	acc. EN 61000-4-5:1995

- **Auxiliary voltage output**

Output voltage:	15 V ± 0,6 V
Output current:	max. 30 mA

- **Contact outputs (floating changeover contacts)**

Current max. switched under resistive load (cos φ= 1):	max. 2 A
Current max. switched under inductive load (cos φ = 0.4):	max. 2 A
Switching voltage:	max. 250 V_{AC}, 30 V_{DC}
Breaking capacity under resistive load (cos φ = 1):	max. 1250 VA_{AC}, 150 W_{DC}
Breaking capacity under inductive load (cos φ = 0.4):	max. 500 VA_{AC}, 90 W_{DC}

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- **Limit contact**

Pickup/dropout delay:	0...2000 s

- **Controller**

Function (adjustable):	pulse length/pulse frequency control
Control response:	PID (programmable)
Proportional band:	Kp: 0.10 - 10.00
Pulse length range:	0.5...999.9 s
Pulse frequency range:	60...180 1/min

- **Alarm**

Function (switchable):	contact: steady/momentary-break/make
Alarm setting range:	pH / temperature: entire measuring range
Alarm delay:	0...2000 s

Measurement accuracy

- **pH-measurement**

Reference temperature:	+25 °C
Resolution:	0.01 pH
Operating errors[1] display:	max. 0.5 % of measuring range
Repeatability	max. 0.2 % of measuring range
Operating errors[1] output signal:	max. 0.75 % of measuring range

- **ORP-measurement**

Resolution	1 mV / 0.1 %
Operating errors[1] display:	max. 0.5 % of measuring range
Repeatability[1]:	max. 0.2 % of measuring range
Operating errors[1] output signal:	max. 0.75 % of measuring range

- **Temperature measurement**

Measured-value resolution:	0.1 °C
Operating errors[1] display:	max. 1.0 % of measuring range
Operating errors[1] output signal:	max. 1.25 % of current output

Environmental conditions

Ambient temperature:	-10...+55 °C (under nominal reference conditions)
Ambient temperature:	-20...+60 °C (for limit conditions of operation)
Storage and transport temperature:	-25...+65 °C
Relative humidity:	10...95 %, non-condensing (nominal reference conditions)
Protection for panel-mounted device:	IP 54 (front), IP 30 (rear)
Protection for field housing:	IP 65
Electromagnetic compatibility:	emitted interference according to EN 50081-1:1992 Noise immunity according to EN 50082-2:1995

[1] according to IEC 746-1, under nominal reference conditions

Mechanical Design

Dimensions of panel-mounted unit (H x W x L):	96 x 96 x 145 mm
Mounting depth:	approximately 175 mm
Dimensions of field housing (H x W x L):	117 x 117 x 222 mm
Weight of panel-mounted unit:	max. 0.7 kg
Weight with field housing:	max. 2.4 kg (with support or mounting bracket)
Readout display:	Liquid Cristal, 5+9 -digit alphanumeric and status

Materials

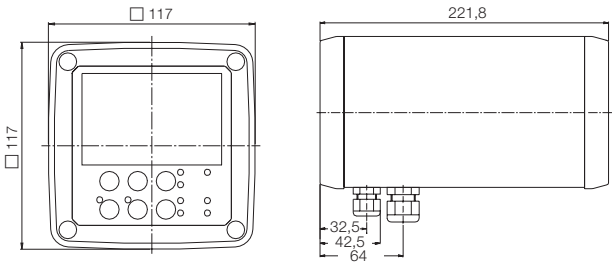
Housing panel-mounted unit:	polycarbonate
Front membrane:	polyester, fine matt
Field housing:	aluminium, powder coated

Power requirement

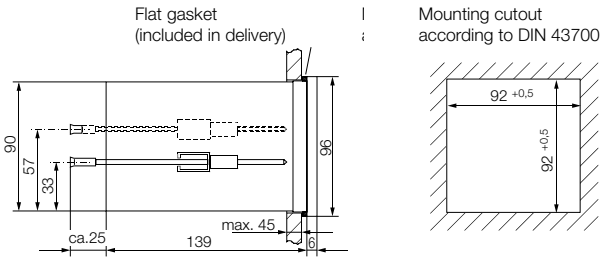
Supply voltage:	100 / 115 / 230 V_{AC} +10 % -15 %, 48 - 62 Hz 24 $V_{AC/DC}$ +20 % -15 %
Power consumption:	max. 7.5 VA
Fuse:	miniature, medium-time lag 250 V / 1 A

Dimensions

Field housing



Panel-mounted housing



Order Details Transmitter (Example: **APM-X 2 E 1 S O**)

Model	Contacts	Housing	Electrical power supply	Output	Interface
APM-X	**2** = 2 contacts (as limit value contacts or P(ID) controller or timer)	**E** = housing for panel mounting **F** = field housing **S** = field housing with wall mounting bracket (360° rotation) **R** = field housing with pipe mounting bracket for pipe 2"	**1** = 24 $V_{AC/DC}$ **2** = 230 V_{AC} **3** = 115 V_{AC} **4** = 100 V_{AC}	**S** = analogue output ph or ORP **T** = analogue output ph or ORP and temperature	**O** = no additional interface

Mounting brackets: see page 64