

## DO9785T - DO9765T



### DO9785T - DO9765T pH or mV TRANSMITTERS

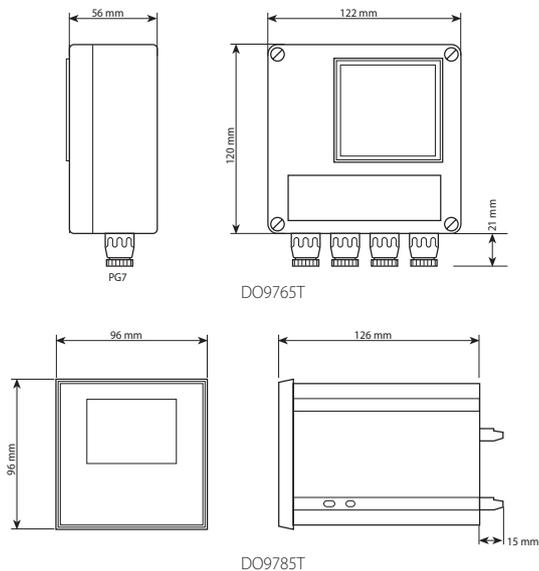
DO9785T and DO9765T pH transmitters convert the output of a pH electrode, with temperature compensation, into a 4...20 mA signal. The pH electrode input circuit is galvanically insulated against the 4...20 mA output signal.

An LCD indicator allows viewing of the process signal value and of the various parameters.

The accurate design and choice of components make the instrument precise and reliable for a long working life.

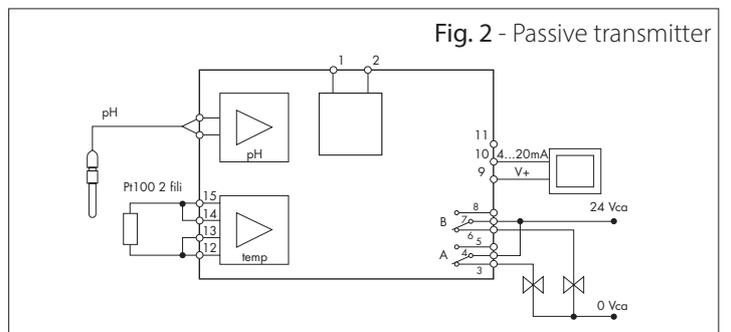
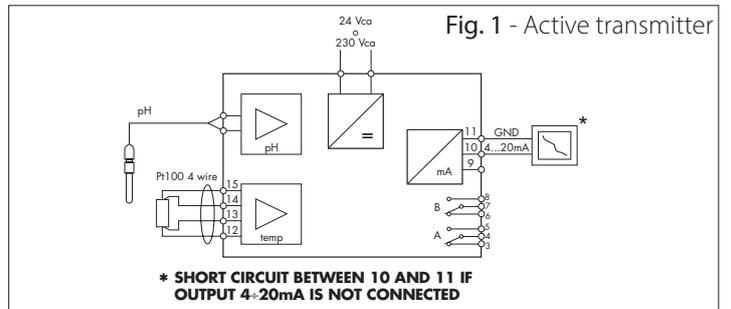
The instrument works with a pH electrode or Redox and a temperature probe (Pt 100 sensor, 100 Ω at 0°C).

#### Dimensions



#### Technical Characteristics

Combined electrode input	pH	-1.00 pH...15.00 pH (-500...+500 mV)
	ORP	-1999...+1999 mV
	Input impedance	>10 <sup>12</sup> Ω
	Cable length	< 50 screened (about 5 nF)
Temperature input	Accuracy	0.1% of reading ±1 digit ±0.01% pH per °C of drift in temperature
	Pt100 2/4 wires	-50...199.9°C
	Transducer energizing	0.5 mA DC
	Cable length	<10 metres unscreened <50 metres screened (about 2 nF)
pH electrode compensation temperature	Automatic	According to Nernst
	Manual	-50...200 °C
Current output	4...20 mA	Programmable and proportional to the pH or mV va al valore di pH o mV
	Accuracy	0.5% of reading ±0.02 mA
	Insulation	2500 Vac 1 minute
R Load	Load resistance	$R_{Lmax} = \frac{V_{dc} - 10}{0.022}$ $R_{Lmax} = 636 \Omega @ V_{dc} = 24 V_{dc}$
	Relay output	A and B Bistable, contact 3A/230 Vac free potential
Power supply	Active	24 or 230 Vca -15/+10%, 1 VA, 48...62 Hz, see fig. 1
	Passive	4...20 mA, 2 wire configuration, 10...35 V, see fig. 2
Housing DO9765T	External dimensions	120 x 122 x 56 mm wall mounting
	Protection class	IP64
Housing DO9785T	External dimensions	96 x 96 x 126 mm panel mounting
	Protection class	IP54



## Key functions

- PRG** Programming of the parameters is activated by pressing the PRG key plus the ▲ and ▼ keys. The message P1 appears on the display, indicating that the parameter P1 is being programmed. When the PRG key is pressed continuously, the messages P2, P3, P4, P5, P6, P7 and the corresponding parameters are displayed in sequence. After P7 the instrument returns to normal function.
- SET** Key for setting the relay intervention threshold. The ON or OFF symbol appears on the display, indicating the switching on or off threshold of relay A or of relay B.
- °C/°F** - If this key is pressed it changes the temperature measuring unit to degrees Celsius or degrees Fahrenheit.  
- When pressed together with the CAL key it activates the manual temperature setting function.  
- If pressed during the conductivity calibration function it quits the calibration function without storing the calibration.
- pH/mV** - If this key is pressed it changes the measuring unit to mV or pH.  
- When pressed together with the CAL key it activates the pH calibration function.
- OK** Confirms the programming parameters, or the relay SET values, and stores them.
- CAL** - When pressed together with the °C/°F key it activates the manual temperature setting function.  
- When pressed together with the pH/mV key it activates the pH calibration function.  
- Key used to confirm pH calibration and manual temperature calibration.
- ▲** - Key for increasing the value displayed in the parameter programming phase.  
- During the relay SET point programming phase.  
- During the calibration phase.
- ▼** - Key for decreasing the value displayed in the parameter programming phase.  
- During the relay SET point programming phase.  
- During the calibration phase.

## Setting the relay SET point

- Press the SET button; the ON symbol appears on the display with the letter A to indicate that the value shown corresponds to the switching on threshold of relay A.
  - To change this value press the ▲ and ▼ keys.
  - Press SET; the OFF symbol appears with the letter A to indicate that the switching off threshold of relay A is being displayed.
  - To change this value press the ▲ and ▼ keys.
  - Press the SET button; the ON symbol appears on the display with the letter B to indicate that the value shown corresponds to the switching on threshold of relay B.
  - To change this value press the ▲ and ▼ keys.
  - Press SET; the OFF symbol appears with the letter B to indicate that the switching off threshold of relay B is being displayed.
  - To change this value press the ▲ and ▼ keys.
  - Press SET, the instrument stores the values and returns to normal function.
- NOTE:** During the SET point setting phase (symbols ON or OFF lit) the instrument returns to normal function if no key is pressed for 2 minutes.

## Temperature setting for manual compensation

- If the temperature probe is not connected or if the probe is broken the measuring unit °C or °F flashes. In this case it is possible to set the temperature compensation value manually.
- Press the CAL key and the °C/°F key together; the message CAL appears at the bottom of the display.
  - Using the ▲ and ▼ keys, set the temperature value corresponding to the temperature of the liquid in which you wish to measure the pH value.
  - Press CAL to confirm this value. The message CAL disappears.

## Calibration of the transmitters with pH electrode

### Calibration of the offset of the pH electrode:

- Immerse the electrode in the buffer solution used for calibrating the offset (6.86 pH).
- Press the CAL key and the pH/mV key together; the message CAL appears at the top of the display.

- Using the ▲ and ▼ keys, adjust the pH value measured as a function of the liquid temperature.
- Press CAL to confirm this value. The message CAL disappears.

### Calibration of the slope of the pH electrode:

- Immerse the electrode in the buffer solution used for calibrating the slope (4.01 or 9.18 pH).
- Press the CAL key and the pH/mV key together; the message CAL appears at the top of the display.
- Using the ▲ and ▼ keys, adjust the pH value measured as a function of the liquid temperature.
- Press CAL to confirm this value. The message CAL disappears.

**NOTE:** If you want to quit without storing the new calibration, press the °C/°F key.

**N.B.:** The instrument can automatically recognize three standard calibration solutions: 4.01 pH, 6.86 pH and 9.18 pH.

## Programming the parameters

- P1** Relay control unit and analog output, pH or mV.
- P2** pH/mV value corresponding to 4 mA at output. May be set between -1.00 pH and 15.00 pH or between -1999 mV and +1999 mV.
- P3** pH/mV value corresponding to 20 mA at output. May be set between -1.00 pH and 15.00 pH or between -1999 mV and +1999 mV.
- P4** Delay time in the intervention of relay A. May be set between 0 and 255 seconds.
- P5** Delay time in the intervention of relay B. May be set between 0 and 255 seconds.
- P6** Calibration of Pt100 probe, calibration of output in current, calibration of output in voltage. **(Calibration procedure to be carried out at a laboratory by skilled personnel).**
- P7** Display of the offset voltage value and of the slope value of the electrode. To change one of these parameters press key PRG until the message corresponding to the parameter to be changed appears on the screen. Using the ▲ and ▼ keys, bring the parameter displayed to the desired value. Press OK to confirm. **Parameter P7 cannot be altered.**

## Calibrating the voltage input

### Calibration procedure to be carried out at a laboratory by skilled workers

- Press the PRG key until the message **P6** appears on the display.
- Press the **CAL key four times**; the message CAL appears at the top of the display and the mV value of the input at the bottom.
- Simulate a voltage of 0 mV at the input (if the value is between ±25 mV the zero is calibrated, otherwise the full scale value is calibrated).
- Using the ▲ and ▼ keys, adjust the voltage value so as to have the correct voltage value on the display.
- Press the **OK button** to confirm (instrument exits calibration).
- Press the **PRG key** until the message **P6** appears on the display.
- Press the **CAL key four times**; the message CAL appears at the top of the display and the mV value of the input at the bottom.
- Simulate a voltage of 1800 mV at the input.
- Using the ▲ and ▼ keys, adjust the voltage value so as to have the correct voltage value on the display.
- Press the **OK button** to confirm and exit calibration.

## Pt100 probe calibration (100 Ω at 0°C)

### Calibration procedure to be carried out at a laboratory by skilled workers

- Connect the Pt100 probe to the instrument. Press the PRG key until the message **P6** appears on the display.
- Press the CAL key; the message CAL appears at the bottom of the display and the temperature is shown at the top.
- Immerse the Pt100 probe and a precision thermometer for reference in the zero calibration bath. Wait long enough for the reading to become stable.
- Using the ▲ and ▼ keys, adjust the value of the temperature measured by the Pt100 probe so that it corresponds with the value on the reference thermometer.
- Immerse the Pt100 probe and a precision thermometer in the full scale calibration bath. Wait long enough for the reading to become stable.
- Using the ▲ and ▼ keys, adjust the value of the temperature measured by the Pt100 probe so that it corresponds with the value on the reference thermometer.
- Press OK to confirm.

**N.B.:** If the temperature shown by the instrument is between ±12 °C, the instrument calibrates the probe offset, otherwise it calibrates the gain.

## Calibrating the analog output

*Calibration procedure to be carried out at a laboratory by skilled workers*

- Press the PRG key until the message **P6** appears on the display.
- Connect a precision milliammeter to the analog output.
- Press the **CAL** key **twice**; the message CAL appears at the top of the display and the message 4.0 at the bottom, indicating calibration at 4 mA.
- Using the **▲** and **▼** keys, adjust the value of the output current so as to have an indication of 4.0 mA on the precision milliammeter.
- Press the CAL key; the message CAL appears at the top of the display and the message 20.0 at the bottom, indicating calibration at 20 mA.
- Using the **▲** and **▼** keys, adjust the value of the output current so as to have an indication of 20.0 mA on the precision milliammeter.
- Press OK to confirm.

## Display

### Symbol Description

°C	the value shown is in °C.
°F	the value shown is in °F.
pH	the unit of the value shown is pH.
mV	the unit of the value shown is milliVolts.
A	the relay A is in closed status.
B	the relay B is in closed status.
ON	the value shown corresponds to the closing thresholds of the contacts of relay A or B.
OFF	the value shown corresponds to the opening thresholds of the contacts of relay A or B.

## Error signal

- OFL - Warning which appears during measurement when the value to be displayed is out of scale.
- E1 - Error warning which appears during pH calibration to indicate that the offset value of the electrode is too high in absolute value.
- E2 - Error warning which appears during pH calibration to indicate that the difference between the mV readings given by the two buffer solutions used for calibration is too great.
- E3 - Error warning which appears during pH calibration to indicate that the mV readings given by the two buffer solutions used for calibration are too close (about 50 mV at 25°C).
- E4 - Reading error on the EEPROM.
- E5 - Error warning indicating that the slope calculation gives a value 20% lower than the nominal value or gives a negative value.
- E6 - Error warning indicating that the slope calculation gives a value 150% higher than the nominal value.

## ORDERING CODES

**DO9765T:** pH or mV completely configurable, for use on the field 122 x 120 x 57 mm with dual LCD (measurement + temperature), output 4...20mA insulated with 2 wires passive or 4 wires active. **Power supply in active mode 24 Vac, (on request 230 Vac – code: DO9765TR), in passive mode 10...35 Vdc.**

**DO9765:** Panel mounting pH or mV completely configurable, 96 x 96 mm with dual LCD (measurement + temperature), output 4...20 mA insulated with 2 wires passive or with 4 wires active. **Power supply in active mode 24 Vac, (on request 230 Vac – code: DO9785TR), in passive mode 10...35 Vdc.**

**HD882/L106:** Temperature probe for industrial use, Pt100 sensor, shaft Ø6 x 45 mm.

**HD882DM100/600:** Temperature probe with Pt100 sensor, DIN B head, stem length 600 mm.

**HD8600C:** ACCREDIA ISO 17025 certified buffer solutions kit: pH 4.01+ pH 7.00 + pH 10.01. Two 50 ml bottles for each type (6 bottles in total).

**KPI10:** Combined industrial electrode, S7 PG13.5 connector, glass body, Ag/AgCl sat KCl Ø 12 x 121 mm, temperature 0...130°C.

**KPI11:** Combined industrial electrode, S7 ¾" NPT connector, Rytron body, Ag/AgCl sat KCl, temperature 0...100°C.

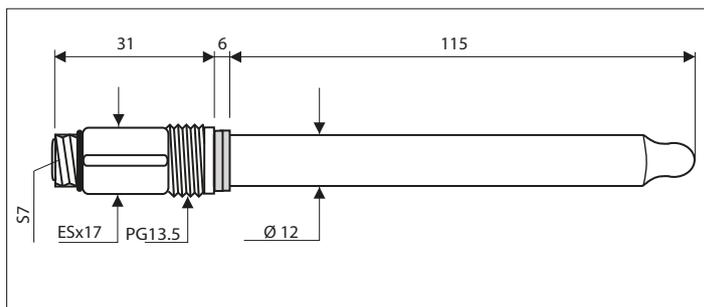
**KPI12:** Platinum electrode for Redox measurement, connector S7 PG13.5 pressure 6 bar, glass body, Ag/AgCl sat KCl.

**KPI13:** Platinum electrode for Redox measurement, Rytron body, S7 ¾" NPT connector, Ag/AgCl sat KCl

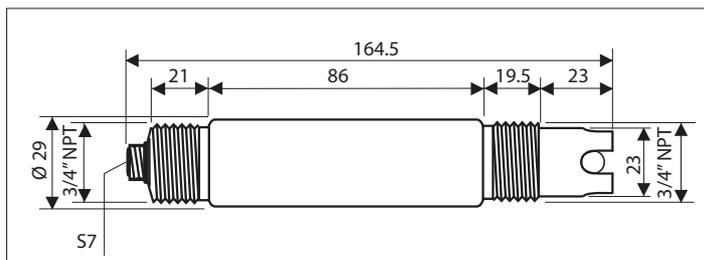
**CP5T:** 5 m extension cable for connecting the electrode to the transmitter. S7 on one side, wires on the other side.

**CP5/10T:** 10 m extension cable for connecting the electrode to the transmitter. S7 on one side, wires on the other side.

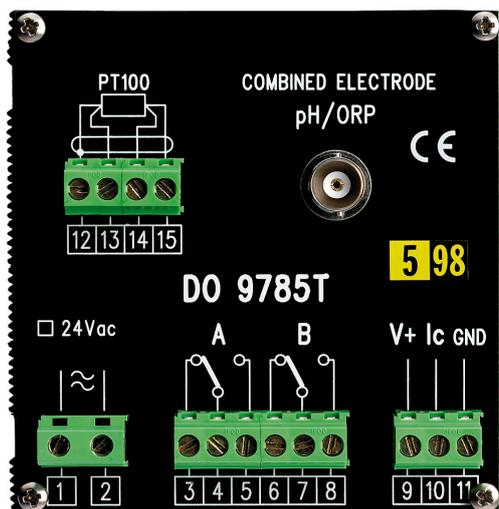
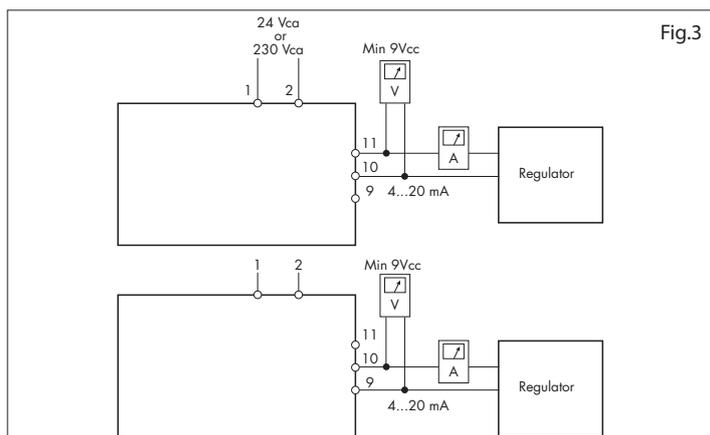
**CP:** Extension cable for connecting the electrode to the DO9785 (BNC-S7) L = 1.5 m.



KPI10 0...14 pH/ KPI12 Redox ±1999 mV, 0...130°C



KPI11 0...14 pH / KPI13 Redox ±1999 mV, 0...100°C





DICHIARAZIONE DI CONFORMITÀ UE  
EU DECLARATION OF CONFORMITY

Delta Ohm S.r.L. a socio unico – Via Marconi 5 – 35030 Caselle di Selvazzano – Padova – ITALY

Documento Nr. / Mese.Anno: **5154 / 02.2020**  
Document-No. / Month.Year :

Si dichiara con la presente, in qualità di produttore e sotto la propria responsabilità esclusiva, che i seguenti prodotti sono conformi ai requisiti di protezione definiti nelle direttive del Consiglio Europeo:  
*We declare as manufacturer herewith under our sole responsibility that the following products are in compliance with the protection requirements defined in the European Council directives:*

Codice prodotto: **DO9765T**  
Product identifier :

Descrizione prodotto: **Trasmettitore di pH/ORP**  
Product description : **pH/ORP transmitter**

I prodotti sono conformi alle seguenti Direttive Europee:  
*The products conform to following European Directives:*

Direttive / Directives	
2014/30/EU	Direttiva EMC / EMC Directive
2014/35/EU	Direttiva bassa tensione / Low Voltage Directive
2011/65/EU - 2015/863/EU	RoHS / RoHS

Norme armonizzate applicate o riferimento a specifiche tecniche:  
*Applied harmonized standards or mentioned technical specifications:*

Norme armonizzate / Harmonized standards	
EN 61010-1:2010	Requisiti di sicurezza elettrica / Electrical safety requirements
EN 61326-1:2013	Requisiti EMC / EMC requirements
EN 50581:2012	RoHS / RoHS

Il produttore è responsabile per la dichiarazione rilasciata da:  
*The manufacturer is responsible for the declaration released by:*

Johannes Overhues  
Amministratore delegato  
Chief Executive Officer

Caselle di Selvazzano, 21/02/2020



Questa dichiarazione certifica l'accordo con la legislazione armonizzata menzionata, non costituisce tuttavia garanzia delle caratteristiche.  
*This declaration certifies the agreement with the harmonization legislation mentioned, contained however no warranty of characteristics.*



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## WARRANTY

Delta OHM is required to respond to the "factory warranty" only in those cases provided by Legislative Decree 6 September 2005 - n. 206. Each instrument is sold after rigorous inspections; if any manufacturing defect is found, it is necessary to contact the distributor where the instrument was purchased from. During the warranty period (24 months from the date of invoice) any manufacturing defects found will be repaired free of charge. Misuse, wear, neglect, lack or inefficient maintenance as well as theft and damage during transport are excluded. Warranty does not apply if changes, tampering or unauthorized repairs are made on the product. Solutions, probes, electrodes and microphones are not guaranteed as the improper use, even for a few minutes, may cause irreparable damages.

Delta OHM repairs the products that show defects of construction in accordance with the terms and conditions of warranty included in the manual of the product. For any dispute, the competent court is the Court of Padua. The Italian law and the "Convention on Contracts for the International Sales of Goods" apply.

## TECHNICAL INFORMATION

The quality level of our instruments is the result of the continuous product development. This may lead to differences between the information reported in the manual and the instrument you have purchased. In case of discrepancies and/or inconsistencies, please write to sales@deltaohm.com. Delta OHM reserves the right to change technical specifications and dimensions to fit the product requirements without prior notice.

## DISPOSAL INFORMATION



Electrical and electronic equipment marked with specific symbol in compliance with 2012/19/EU Directive must be disposed of separately from household waste. European users can hand them over to the dealer or to the manufacturer when purchasing a new electrical and electronic equipment, or to a WEEE collection point designated by local authorities. Illegal disposal is punished by law.

Disposing of electrical and electronic equipment separately from normal waste helps to preserve natural resources and allows materials to be recycled in an environmentally friendly way without risks to human health.