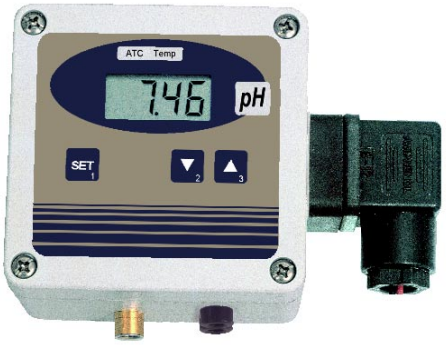
Operating Manual for pH-Measuring transducer

GPHU 014 MP

CE

Specification:



Measuring range:	0.00 to 14.00 pH or refer to type plate
Output signal:	refer to type plate
Accuracy: (device) (at nominal temperature)	
Display	±0.02 pH ±1 digit
Output signal:	±0.2 % FS
Connection:	4 - 20 mA (2-wire) Voltage (3- resp. 4-wire)
Electric isolation:	input electrically isolated
Auxiliary energy: (supply voltage)	Uv = 12 - 30 V DC (4-20mA) Uv = 18 - 30 V DC (0-10V) or refer to type plate
Reverse voltage protection:	50V permanent
Perm. impedance (at 4-20mA)**:**	R_A(Ohm) < ((Uv - 12V) / 0.02A) *Example: for Uv = 18V: R_A < (18V - 12V) / 0.02A => R_A < 300 Ohm*
Permissible load (at 0-...V)**:**	R_L(Ohm) > 3000 Ohm
Electrode:	any pH-Electrode of our program is suitable. - refer to suitable socket! (electrode not included in scope of supply!)
Input resistance:	10^{12} Ohm
Electrode socket:	Cinch-socket (standard), optionally available with BNC-socket
Temperature compensation:	-30 ... 150°C
Temperature input:	manually by means of 2 keys (input range: -30 ... 150°C) automatically when Pt1000 temperature probe is connected
Temperature sensor socket:	2 x banana plug (Ø4mm)
Calibration:	via 3 keys and integrated LCD
Acceptable electrode data:	asymmetry: approx. ±50 mV slope: approx. 45 ... 62 mV/pH
Display:	approx. 10 mm high, 3½-digit LCD-display
Nominal temperature:	25°C
Operating temperature:	0 to 50°C
Relative humidity:	0 to 95 %RH (non-condensing)
Storage temperature:	-20 to 70°C
Housing:	ABS (IP65 - with the exception of electrode and temperature probe connection sockets)
Dimensions:	82 x 80 x 55 mm (without elbow-type plug and sensor sockets)
Mounting:	With fixing holes for wall mounting (in housing - accessible after cover has been removed).
Mounting distance:	50 x 70mm, max. shaft diameter of mounting screws is 4 mm.
Electric connection:	elbow-type plug conforming to DIN 43650 (IP65), max. wire cross section: 1.5 mm², wire/cable diameter from 4.5 to 7 mm
EMC:	The GPHU014MP corresponds to the essential protection ratings established in the Regulations of the Council for the Approximation of Legislation for the member countries regarding electromagnetic compatibility (89/336/EWG). In accordance with EN50081-1 and EN50082-1 Additional error: <1%

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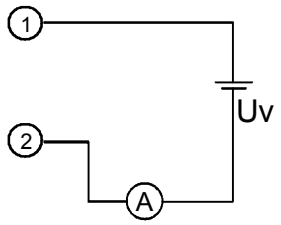
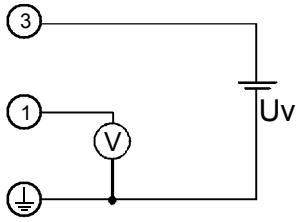
Assignment of elbow-type plug:

2-wire connection (4-20mA)



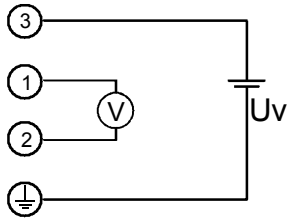
1 = supply voltage +Vs
2 = GND / signal

3-wire connection (voltage)



1 = signal +
3 = supply voltage +Vs
⏚ (4) = supply voltage -Vs
signal -

4- wire connection (voltage)



1 = signal +
2 = signal -
3 = supply voltage +Vs
⏚ (4) = supply voltage -Vs

General installation instructions:

To mount the connection cable (2-, 3-, or 4-wire depending on type of device) the angle plug screw has to be loosened and the coupling insert has to be removed by means of a screw driver at the position indicated (arrow).
Pull out connection cable through PG glanding and connect to the loose coupling insert as described in the wiring diagram. Replace loose coupling insert onto the pins at the transmitter housing and turn cover cap with PG glanding in the direction desired till it snaps on (4 different starting positions at 90° intervals). Re-tighten the screw at the angle plug.

⚠ Safety instructions:

This device has been designed and tested in accordance with the safety regulations for electronic devices.
However, its trouble-free operation and reliability cannot be guaranteed unless the standard safety measures and special safety advises given in this manual will be adhered to when using the device.

1. Trouble-free operation and reliability of the device can only be guaranteed if the device is not subjected to any other climatic conditions than those stated under "Specification". If the device is transported from a cold to a warm environment condensation may cause in a failure of the function. In such a case make sure the device temperature has adjusted to the ambient temperature before trying a new start-up.
2. General instructions and safety regulations for electric, light and heavy current plants, including domestic safety regulations (e.g. VDE), have to be observed.
3. If device is to be connected to other devices (e.g. via PC) the circuitry has to be designed most carefully. Internal connection in third party devices (e.g. connection GND and earth) may result in not-permissible voltages impairing or destroying the device or another device connected.
4. If there is a risk whatsoever involved in running it, the device has to be switched off immediately and to be marked accordingly to avoid re-starting.
   Operator safety may be a risk if:
   - there is visible damage to the device
   - the device is not working as specified
   - the device has been stored under unsuitable conditions for a longer time.

   In case of doubt, please return device to manufacturer for repair or maintenance.
5. **Warning:**
   Do not use these product as safety or emergency stop devices, or in any other application where failure of the product could result in personal injury or material damage.

   Failure to comply with these instructions could result in death or serious injury and material damage.

Disposal notes

This device must not be disposed as ‘residual waste’.
To dispose this device, please send it directly to us (adequately stamped). We will dispose it appropriately and environmentally friendly.

Calibration of the pH-transducer:

Necessary accessories: calibration buffer solutions pH7 and pH4 (or pH10, pH12) (special accessories)

How to prepare a calibration buffer solution:

• Fill two plastic bottles with 100ml distilled water each.
• Throw the pH7 capsule (green) into one of the bottles.
• Throw the pH4 capsule (orange, or pH10, pH12) into the other one.

The capsule shell will colour the liquid in the relevant colour:

orange = pH 4,0 ; green = pH 7,0 ; blue = pH 10,0; transparent (white capsule) = pH 12,0

Make sure to prepare buffer solutions in time as they can only be used after 3 hours.
If they are needed earlier the capsules can carefully be opened (turn one half of capsule while pulling and make sure not to spill any of the contained powder), throw both powder and capsule halves into the referring bottle.

Shake well before usage.

Carrying out the calibration:

For the optimum measuring accuracy the calibration values should be chosen according to the range to be measured.

We suggest the following:

- Measured values are below pH 7: pH 4,0 and pH 7,0
- Measured values are above pH 7: pH 7,0 and pH 10,0
  or : pH 7,0 and pH 12,0

Connect the pH-electrode and the temperature probe (if available) to the transmitter.
If no temperature probe is available, the temperature of the buffer solution has to be measured by any other way and has to be entered manually by means of the keys (please refer to chapter ‚Temperature Compensation')

Calibration of the first point:

Remove the electrode safety cap carefully (Attention! Contains 3 mol KCl !)
Rinse electrode with distilled water and dry.
Place electrode to the pH 7.0 buffer solution (if available, temperature probe, too).
Stir gently an wait at least 20 seconds until a stable measuring value is displayed and start calibration:

- press key 1 ("SET") for 2 seconds, the display will show "PH 7" and the currently measured pH value alternatingly.
- set the value of the pH 7 solution with the keys 2 and 3.
- acknowledge the pH 7 calibration by pressing key 1.
- the display now shows "PH -" alternating with the currently measured pH value.
  (next steps: please refer to calibration of the second point)

Note: If the value of the solution cannot be set, the maximum permissible range for the zero offset is exceeded. In this case the electrode is defective or the calibration solution is unfit for use.

The pH 7 calibration is restricted to a nominal pH value in between 6.75 to 7.25 pH.
When trying to perform a calibration outside this range the display will show "Err" on keypress of key 1 ("SET").
Therefore the transmitter doesn't accept this value and remains at the entering of the first calibration point.

Calibration of the second point:

Rinse electrode with distilled water and dry.
Place electrode to the pH 4.0 (or pH10, pH12) buffer solution (if available, temperature probe, too).
Stir gently an wait at least 20 seconds until a stable measuring value is displayed and continue the calibration:

- set the value of the buffer solution with the keys 2 and 3.
- acknowledge the calibration by pressing key 1.
- The calibration will now be saved in the device, it is now calibrated.

To check the calibration the electrode should be tested with the refering buffer solutions. If there are larger deviations of the measuring values, the calibration should be repeated..

Note: If the device does not allow the input of the buffer value, the permissible range of the electrode's slope is exceeded. In this case the electrode is defective or the calibration solution is unfit for use.

The calibration of the second point is restricted to values of < 5.00 pH respectively >9.00 pH. When trying to perform a calibration in between 5..9 pH the display will show "Err" on keypress of key 1 ("SET"). Therefore the transmitter doesn't accept this value and remains at the entering of the second calibration point.

Calibration should be done before each new measuring series to get highest accuracy. Refill the protection cap with 3 mol KCl solution after usage of the electrode and put it back on top of the electrode.
(press cap gently to displace most of the contained air – then it can be pushed to the electrode much easier.)

Important!! pH - electrodes are very sensitive. Please read manual of the electrode carefully before usage.

Temperature Compensation:

Temperature can be compensated automatically (when temperature probe is connected) or manually.

Automatic Temperature Compensation:

As soon as a Pt1000 temperature probe is connected and the temperature is within the temperature measuring range the transducer activates the automatic temperature compensation (ATC). The display now shows an arrow pointing to "ATC".
Display of the measured temperature: press key 2 or 3 shortly, the display will show the temperature value in degrees Celsius for approx. 4 seconds and the arrow "Temp".

Note: To connect electrodes with integrated Pt1000 and only one banana plug (e. g. GE 117) the plug has to be connected at the upper socket!
The lower jack is connected with the „Sig-„-connector (outside contact) of the electrode socket.

Manual Temperature Compensation:

If no temperature probe is connected the manually entered value will be used, the "ATC" arrow won't be shown.
Display of entered temperature: press key 2 or 3 shortly, the display will show the temperature value in degrees Celsius for approx. 4 seconds and the arrow "Temp".
Setting of temperature: press key 2 or 3 more often or longer lasting and enter the desired value in the range of: 0 ... 80 °C

Error and System Messages

Display	Description	Possible fault cause	Remedy
FE 1	Measuring values exceeding measuring range	pH value is out of the transducers measuring range	Transducer is unsuitable for application.
		Calibration is wrong	Recalibrate the transducer.
		Temperature of temperature compensation is different to the real temperature	Manual temp.comp.: enter the right value.
FE 2	Measuring values below measuring range		ATC: check if temperature probe is connected correctly and is placed in the measurand: Wait until the temperature value is adjusted, if necessary. .
		pH electrode defective	Replace electrode.
		transducer defective	Return to manufacturer for repair
FE 7	System fault	Error in transducer	Disconnect transducer from supply and reconnect. If error remains: Return to manufacturer for repair .
8.8.8.8	Segment test	The transducer performs a display test for 2 seconds after switch on. After that it will change the display of the measuring.	
	Input signal is not valid	pH electrode not connected	Check the connection and cable.
		Permissible input range is exceeded	Check if not a wrong electrode (redox or others) is connected. Replace electrode.