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User Manual Omniport 40

Multifunctional Hand-Held Meter

www.jlcinternational.com

Content

1 General Information

This user manual is intended to ensure proper handling and optimal functioning of the device. The user manual shall be read before commissioning the equipment and it shall be provided to all staff involved in transport, installation, operation, maintenance and repair. E+E Elektronik Ges.m.b.H. accepts no liability for any warranty or liability claims arising from this publication or improper handling of the product(s) described.

All information, technical data and diagrams included in this document are based on the information available at the time of writing. The document may contain technical inaccuracies and typographical errors. The contents will be revised on a regular basis and changes will be implemented in subsequent versions. The product(s) described and the contents of this document may be changed or improved at any time without prior notice.

PLEASE NOTE

Find this document and further product information on our website at www.epluse.com/omniport40.

1.1 Explanation of Warning Notices and Symbols

Safety precautions

Precautionary statements warn of hazards in handling the device and provide information on their prevention. The safety instruction labeling is classified by hazard severity and is divided into the following groups:

DANGER

Danger indicates hazards for persons. If the safety instruction marked in this way is not followed, the hazard will verly likely result in severe injury or death.

WARNING

Warning indicates hazards for persons. If the safety instruction marked in this way is not followed, there is a risk of injury or death.

CAUTION

Caution indicates hazards for persons. If the safety instruction marked in this way is not followed, minor or moderate injuries may occur.

NOTICE

Notice signals danger to objects or data. If the notice is not observed, damage to property or data may occur.

Informative notes

Informative notes provide important information that is characterised by its relevance.

INFO

The information symbol indicates tips on handling the device or provides additional information on it. This information is useful to achieve optimum performance of the device.

The title field may deviate from “INFO” depending on the context. For instance, it may also read “PLEASE NOTE”.

1.2 Safety Instructions

1.2.1 General Safety Instructions

NOTICE

Improper handling of the hand-held meter may result in its damage.

- The Omniport 40, the hand-held probes and the process probes shall not be exposed to unnecessary mechanical stress.
- Use the Omniport 40 only as intended and observe all technical specifications.
- Do not use the hand-held meter in places with:
  - Rapid ambient temperature variations that may cause condensation.
  - Direct vibrations or shocks to the device.
  - High-intensity electromagnetic fields or static electricity.

⚠ DANGER

Danger indicates hazards for persons. If the safety instruction marked in this way is not followed, the hazard will result in severe injury or death.

- Do not use the Omniport 40 in explosive atmosphere or for measurement in aggressive gases.
- This device is not appropriate for safety, emergency stop or other critical applications where device malfunction or failure could cause injury to human beings.
- Not suitable for diagnostic or other medical purposes on patients.
- Not suitable for SIL (Safety Integrity Level).
- The device is not suitable for contact with food (use only appropriate probes).
- Not suitable for children.
- Do not use as PPE (Personal Protection Equipment).

1.2.2 Intended Use

The Omniport 40 is a multifunctional hand-held meter for temperature, humidity, moisture in oil, volume flow, dew point and CO_2. It accommodates a wide choice of plug and play E+E hand-held probes and process probes.

⚠ WARNING

Non-compliance with the product documentation may cause safety risks for people and the entire measurement installation.

The manufacturer is not liable for any damage caused by improper handling, installation and maintenance of the device

- The device may not be manipulated with tools other than specifically described in this manual.

NOTICE

Failing to follow the instructions in this user manual may lead to measurement inaccuracy and device failures.

- The Omniport 40 and the probes may only be operated under the conditions described in this user manual and within the specification included in chapter 9 Technical Data.
- Any unauthorised product modifications will invalidate all warranty claims. Modifications may only be carried out with express authorisation of E+E Elektronik Ges.m.b.H.!

1.2.3 Start-up and Operation

The Omniport 40 and the probes have been produced under state of the art manufacturing conditions, have been thoroughly tested and have left the factory after fulfilling all safety criteria. The manufacturer has taken all precautions to ensure safe operation of the device. The device shall be set up and installed in a way that does not impair its safe use. All applicable local and international safety guidelines for safe installation and operation of the device have to be observed. This user manual contains information and warnings that must be observed in order to ensure safe operation.

PLEASE NOTE

The manufacturer or his authorised agent can only be held liable in case of willful or gross negligence. In any case, the scope of liability is limited to the corresponding amount of the order issued to the manufacturer. The manufacturer assumes no liability for damage caused by non-compliance with the applicable regulations, operating instructions or the specified operating conditions. Any consequential damage is excluded from liability.

WARNING

Non-compliance with the product documentation may result in accidents, personal injury or property damage.

- Mounting, installation, commissioning, start-up, operation and maintenance of the device may only be carried out by qualified staff. Such staff must be authorised by the operator of the facility to carry out the mentioned activities.
- The qualified staff must have read and understood this user manual and must follow the instructions contained within. The manufacturer accepts no responsibility for non-compliance with instructions, recommendations and warnings.
- All process and electrical connections must be thoroughly checked by authorised staff before commissioning the device.
- Do not install or start-up a device suspected to be faulty. Mark it clearly as faulty and remove it from the process.
- Service operations other than described in this user manual may only be performed by the manufacturer. A faulty device may only be investigated and possibly repaired by qualified, trained and authorised staff. If the fault cannot be fixed, the device shall be removed from the process.

1.3 Environmental Aspects

PLEASE NOTE

Products from E+E Elektronik Ges.m.b.H. are developed and manufactured in compliance with relevant environmental protection requirements. Please observe local regulations for the disposal of the device.

For disposal, the individual components of the device must be separated according to local recycling regulations. The electronics shall be disposed of correctly as electronics waste.

2 Scope of Supply

- Omniport 40 - Multifunctional Hand-Held Meter
- 4x AA-NiMH rechargeable batteries
- USB-C to USB-A configuration cable
- Quick Guide

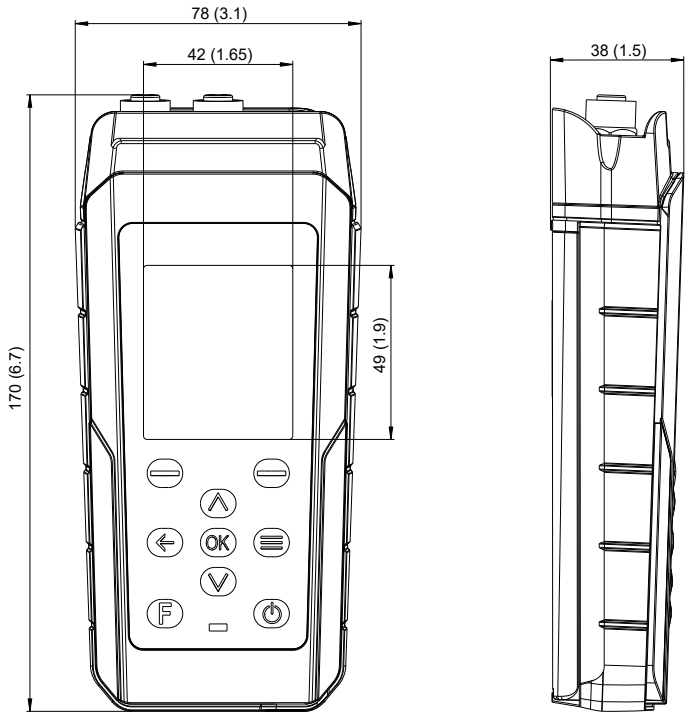
- Test report according to DIN EN 10204-2.2 for hand-held probes and process probe EE872
- Inspection certificate according to DIN EN 10204-3.1 for process probes EE072, EE074, EE680, HTP501, MOP301 or TDS401H

3 Product Description

3.1 Dimensions

Values in mm (inch)

Omniport 40



3.2 Components

Front Side

Back Side

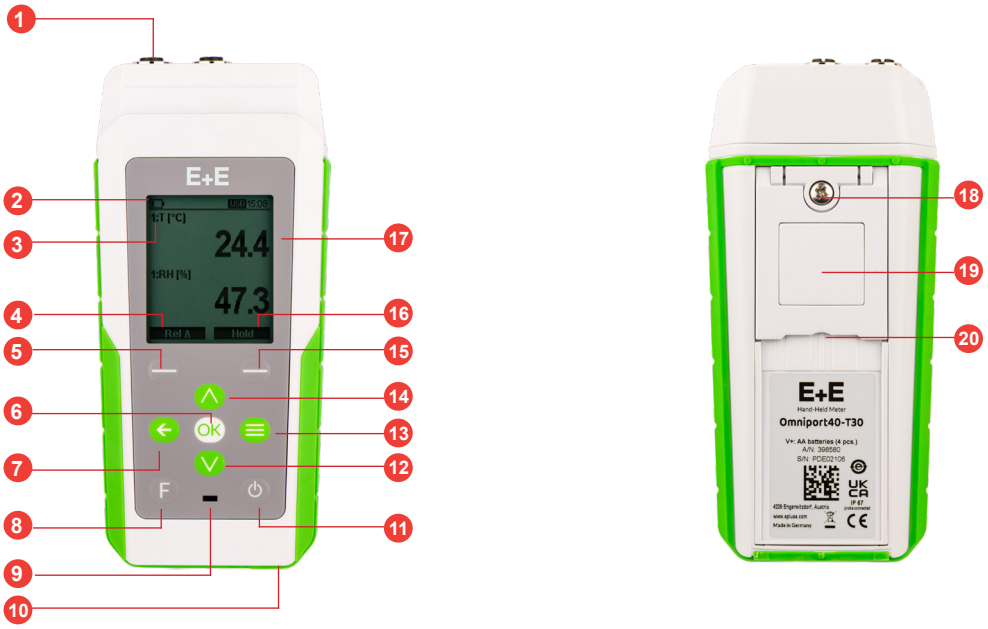


Fig. 1 Assignment of components

No.	Function
1	2x Probe connection
2	Status bar symbols[1)]
3	Input number, measured parameter and measurement unit
4	Function corresponding to left function button
5	“Left function” button
6	“OK” button: confirms selection
7	“←” button: cycles through the display modes (e.g. 2-line, stat., diagram,...) or move up one menu level
8	“F” button: favourites list
9	Status LED
10	USB-C port

No.	Function
11	“ON/OFF” button
12	“Down arrow” button: scrolls down a list or decreases a parameter value
13	“Menu” button
14	“Up arrow” button: scrolls up a list or increases a parameter value
15	“Right function” button
16	Function corresponding to right function key
17	Measured value
18	Battery compartment fixing screw
19	Magnet
20	Foldable stand

1) See Tab. 2 Description of the status bar symbols

Tab. 1 Functions of components

1) Status Bar Symbols	Description
	Battery charge level
	External power supply connected
	External power supply connected, missing or wrong batteries
hld	Hold function active
rec	Logging in progress
al.	Alarm
lck	Omniport 40 is locked
USB	Omniport 40 connected to PC
9:27	Current time
cor	Adjusted probes connected to the Omniport 40

Tab. 2 Description of the status bar symbols

USB Mode	
COM mode	Data download. Upload settings with the PCS10 Product Configuration Software.
Mass storage	Download the logger file (.csv) from the logged data. No software is required.
The rechargeable batteries are charged whenever Omniport 40 is connected to the PC.	

Tab. 3 Description of the different modes

3.3 Display

When the Omniport 40 is off and an external power supply is connected, the display indicates the battery status. During charging the symbols for empty, half-full and full battery are cyclically shown on the display. Fully charged batteries are indicated by "full battery" symbol. If the rechargeable batteries are not inserted or if the Omniport 40 is powered with non-rechargeable batteries, a warning message will be displayed when the hand-held meter is connected to the PC via USB interface.

The backlight mode of the Dot Matrix LC Display can be set under "MENU > Settings > Backlight". It is also possible to choose between "Backlight off / 5 sec on / 30 sec on / 1 minute on / Always on" as well as the backlight intensity levels "Low / Medium / High".

The display can be rotated by 180° for comfortable reading depending on application. The rotation can be selected under "Menu > Setting".

3.4 Electrical Connection

⚠ WARNING

Incorrect installation, wiring or power supply may cause overheating and result in personal injury or property damage.

The manufacturer cannot be held responsible for personal injury or damage to property caused by incorrect handling, installation, wiring, power supply or maintenance of the device.

The Omniport 40 can be powered by

- 4 NiMH rechargeable batteries (included in the scope of supply).
- 4x AA non-rechargeable batteries (1.5 V).
- External 5 V DC power supply via USB-C.

When using a power bank to supply the Omniport 40, ensure that it has sufficient capacity and does feature an automatic switch-off function at very low power consumption (e.g. power banks from the Varta Power Bank Energy series are suitable).

Ensure that the supply voltage is sufficiently high (5 V), otherwise charging or connection problems may occur.

To replace the batteries, unscrew and remove the back cover. The rechargeable batteries can be charged via USB-C while remaining in the Omniport 40.

PLEASE NOTE

The Omniport 40 is designed for use with commercially available NiMH rechargeable batteries.
It is recommended to use Varta 56706 (1.2 V / NiMH / 2100 mAh) batteries.
The use of alkaline batteries is possible in theory, but there is no guarantee that the battery condition will not cause problems with the charger electronics.

Prolonging the life of the rechargeable batteries:

- When first used, charge completely.
- Do not leave the batteries discharged for a long time.
- Do not allow batteries to discharge completely, recharge them when the battery symbol on the display reaches the minimum level.

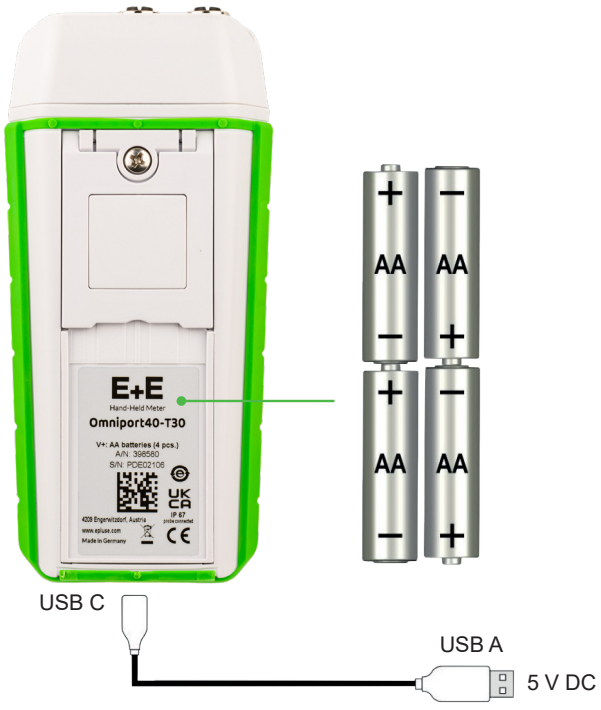


Fig. 2 Electrical connection

NOTICE

- The probes are powered by the Omniport 40.
- An external power supply unit connected via USB-C is recommended for continuous use over a long time, such as for data logging or for data collecting mode.
- The USB connection of the hand-held meter is not galvanically isolated. Connection to a PC or to an external power supply that is not isolated from earth can influence the measurement if a probe is used that is in contact with the medium to be measured. Such double grounding must be avoided.
- Under these conditions, always check the measurement with and without the USB connection: If a difference in the determined value is detected, disconnect the USB connection or use a suitable external USB isolator to obtain a reliable measurement.

NOTICE

Remove batteries to prevent leakage if the device is stored at a temperature above 50 °C (122 °C) or not used for an extended period of time.

⚠ DANGER

- Do not short-circuit the batteries, they may explode with serious risk to people.
- Do not expose the batteries to high temperature.
- Do not throw the batteries into fire.
- Do not use charging devices different from those indicated.
- Do not overcharge the batteries by leaving them on charge for a long time after reaching the full charge status.

3.5 First Start-Up

1. Remove the battery insulator.
2. Charge the recharcheable batteries until they are fully loaded.
3. Connect the probe to the hand-held meter using the appropriate cable, refer to chapter 4.1 Hand-Held-Probes and to chapter 4.2 Process Probes.
4. Switch on Omniport 40 using the start button.
5. Change the following settings, which can be changed at any time later under "Settings" if necessary.
   - Language
   - Time zone UTC/CET
   - Date and time
   - Auto turn off
   - Backlight
   - Backlight intensity

ⓘ PLEASE NOTE

To perform a firmware update, connect the Omniport 40 to the PC. Establish a connection to the PCS10 to check whether an update is required or not, if yes, see chapter 6.3 Firmware Update.

3.6 Navigation

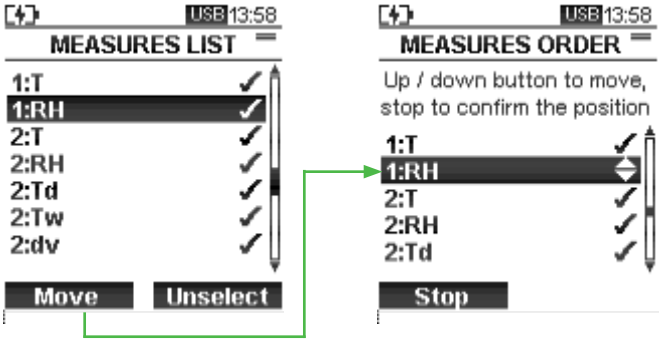
- Use the arrow buttons to navigate through the menu.
- Press "OK" to confirm.
- Press the "←" button to cancel any changes that have not yet been confirmed, and exit.
- Press "≡" to open the menu for configuration and settings or to return to the homescreen.

Configuring a Parameter by Setting a Numerical Value:

1. Select the desired digit using the function buttons (< >).
2. Change the digit value by using the "down / up arrow" buttons.
3. When finished, press "OK" to save the value.
4. Press the "←" button to cancel any changes that have not yet been confirmed, and exit.

Selecting and Sorting the Measurands to be Displayed:

- Enabled measurands are indicated by a check mark.
- To enable/disable a measurand select it with the "down / up arrow" buttons, then press the "right function" button.



- To move up one level within the menu, press the "←" button.
- Use the menu button to exit the menu and return to the measurement mode from any menu level (Exception: exit the parameter setting screens by first pressing the "←" button).

3.7 Menu Structure

The following table provides a detailed description of the menu structure. The level of each item is indicated by the "-, =, ≡" symbols.

Menu	Description
− Measures list	Selection of the measurands to display and log
− Recording = Start data log = Data log interval = Collecting mode = Data collecting	Only usable if USB mode = COM interface. Logging start Set of logging interval: 1/2/5/10/15/30 s, 1/2/5/10/15/30 min, 1 h Standard, Multiselect, On hold, refer to chapter 5.4 Data Collecting List of data collecting locations refer to chapter 5.4 Data Collecting
− Chart setup = Channel select = Chart interval	Set the chart display mode. Selection of the measurands for the chart selectable from those enabled in the "Measures list" menu). Set the chart refresh interval: 1/2/5/10/15/30 s, 1/2/5/10 min
− USB mode = COM interface = Mass storage	Refer to chapter 6 Setup and Configuration Data aquisition and advanced settings with PCS10 Read .csv file of data logging at the PC without the software
− Alarm settings	Off, acoustical (buzzer) and/or optical (flashing backlight and flashing status LED)
− Settings = Device info = Backlight ≡ BL activation ≡ BL intensity = Auto-off = Date & time = Time zone = Language = PIN configuration = Display rotation = Dark mode = Factory reset	 Display hand-held information (model, S/N, FW revision, …) Backlight settings Backlight duration: Off, 5 s, 30 s, 1 min, always On Backlight intensity: Low, Medium, High Auto-off setting: Off, 30 min, 1/2/4/6/12 h Set date and time (yyyy-mm-dd hh:mm:ss) Set UTC or CET time zone Select the menu language Set and activate the PIN code Activate the display rotation Enable / disable dark background Reset to factory settings
− Port x = Probe info = Measuring units = Alarm settings = Adjustment = Cross section = Oil library	Port number “x” measurement settings Information on the connected probe Select measurement unit The availability of the item depends on the probe connected Set alarm, refer to chapter 5.5 Alarm Settings Probe adjustment depending on the probe, refer to chapter 4.5 Calibration and Adjustment Only if the probe supports the cross-section, refer to chapter 5.8 Cross-Section Only available only if the probe supports the oil library, refer to chapter 5.7 Oil library

*) The item does not appear if “Alerting” is set to “Off”; to display the item, first select a quantity to associate the alarm with.

Tab. 4 Menu structure

4 Probes

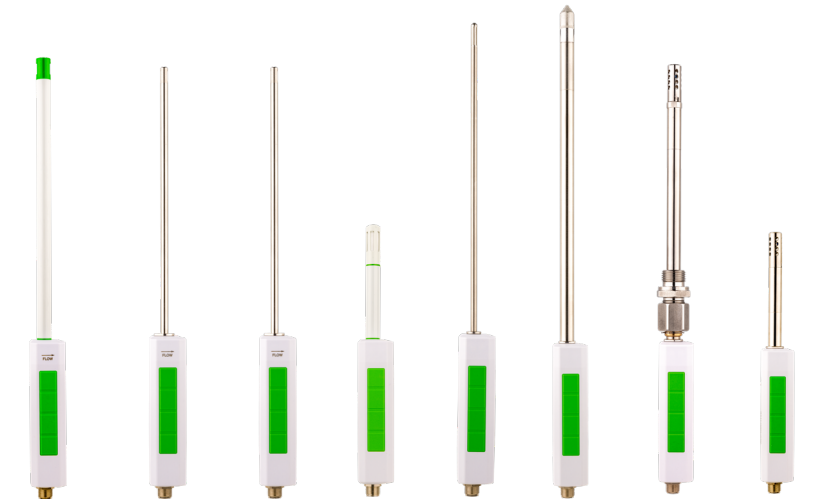
Information on a probe connected to the Omniport 40 can be found in the menu under "Port 1 / Port 2" section, depending on the connected port. The "Probe info" section displays the "Model", "Serial number" and "FW-version" (firmware version). A selection of "Measuring units", "Alarm settings", "Adjustment" and other features such as "Oil library" or "Cross-section" can be configured in the port settings.

4.1 Hand-Held-Probes

Before commissioning, connect the hand-held probe to the Omniport 40 using the M12 connection cable HA010813.

PLEASE NOTE

Connect the probe before starting the Omniport 40. Turn off the hand-held meter before switching between process and hand-held probes. Otherwise, automatic probe recognition may be impaired.



AVP201H AVP301H AVP401H HTP201H HTP401H HTP701H MOP301H MOP302H

- AVP201H - Air Velocity and Temperature Hand-Held Probe for HVAC Applications
- AVP301H - Air Velocity and Temperature Hand-Held Probe up to 20 m/s (4 000 ft/min)
- AVP401H - Air Velocity and Temperature Hand-Held Probe up to 2 m/s (400 ft/min)
- HTP201H - Humidity and Temperature Hand-Held Probe for HVAC Applications
- HTP401H - Humidity and Temperature Hand-Held Probe up to 100 °C (212 °F)
- HTP701H - Humidity and Temperature Hand-Held Probe up to 180 °C (356 °F)
- MOP301H - Moisture-In-Oil Immersion Hand-Held Probe up to 120 °C (248 °F)
- MOP302H - Short Moisture-In-Oil Hand-Held Probe up to 120 °C (248 °F)

Backwards Compatibility with Omniport 30 Hand-Held Probes

The Logprobes 16, 30, 31, 60, 61, 65 as well as Logprobe 36 (pressure-tight oil probe) and Logprobe 38 (short oil probe) can still be connected, but with limited functionality, regarding the display of information like serial number or name.

4.2 Process Probes

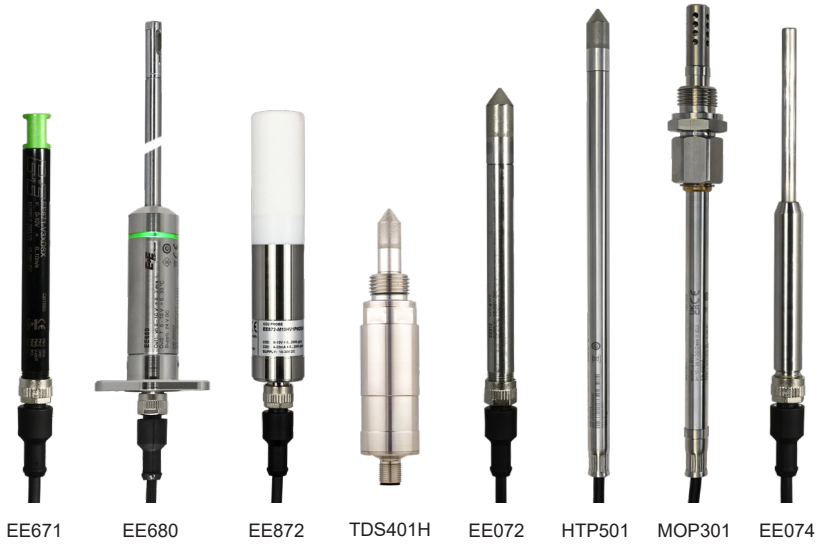
The process probes must be Modbus configured and can be connected to the Omniport 40 using the HA040908 cable.The probe naming must correspond to its original nomenclature; no extra Modbus configurations are needed.

PLEASE NOTE

Connect the probe before starting the Omniport 40. Turn off the hand-held meter before switching between process and hand-held probes. Otherwise, automatic probe recognition may be impaired.

PLEASE NOTE

The settings for Modbus RTU process probes are 9600, 8, parity even, 1.



Datasheets, user guides and other information on the process probes are available on the corresponding product web site as follows:

- EE671 - Air Velocity Probe: www.epluse.com/ee671.
- EE680 - Air Velocity and Temperature Probe for Laminar Flow: www.epluse.com/ee680.
- EE872 - Modular Probe for CO_2, Humidity, Temperature and Ambient Pressure: www.epluse.com/ee872.
- TDS401H - Dew Point Probe down to -60°C (-76 °F): refer to chapter 4.4 TDS401H
- EE072 - Humidity and Temperature Probe: www.epluse.com/ee072.
- HTP501 - Humidity and Temperature Probe up to 120 °C (248 °F): www.epluse.com/htp501.
- MOP301 - Digital Moisture in Oil Probe up to 120 °C (248°F): www.epluse.com/mop301.
- EE074 - Temperature Probe: www.epluse.com/ee074.

4.3 Measurands

The choice of measurands and measurement units depends on the probe connected to the Omniport 40. All available parameters are listed in Tab. 5 Measurand choice for hand-held probes and Tab. 6 Measurand choice for process probes.

Hand-Held Probes:

Probe	Possible Readings (Only One Unit can be Selected for Each Column)		
AVP201H	T [°C,°F]	v [m/s, ft/min]	V' [m^3/h]
AVP301H			
AVP401H			
HTP201H	T [°C,°F]	RH [%] Td [°C, °F] dv [g/m^3] r [g/kg, gr/lb]	
HTP401H			
HTP701H			
MOP301H	T [°C,°F]	x [ppm] aw	
MOP302H			

Tab. 5 Measurand choice for hand-held probes

Process Probes:

Probe	Main Measurand[1)]	Measurand 2	Further Information
EE872	CO_2 raw data [ppm] T [°C,°F, K] p [mbar, psi, hPa, Pa, kPa, bar, mmH_2O, mmHg, inHg, kgf/cm^2] RH [%]	CO_2 averaged [ppm] Td [°C, °F, K]	Refer to the manual: www.epluse.com/ee872
EE072	RH [%] T [°C,°F, K]	Uw [%] e [mbar, psi] Td [°C,°F, K] Tw [°C,°F, K] dv [g/m^3,gr/ft^3] r [g/kg, gr/lb] h [kJ/kg, ft lbf/lb, BTU/lb] Tf [°C,°F, K] Ti [°C,°F, K]	Refer to the manual: www.epluse.com/ee072
EE074	T [°C,°F, K]		Refer to the manual: www.epluse.com/ee074
EE671	v [m/s, ft/min] T [°C,°F, K]	V' [m^3/h, m^3/min, m^3/s, l/min, l/s, ft^3/min]	Refer to the manual: www.epluse.com/ee671
EE680	vn [m/s, ft/min] T [°C,°F, K]	V' [m^3/h, m^3/min, m^3/s, l/min, l/s, ft^3/min]	Refer to the manual: www.epluse.com/ee680
MOP301	x [ppm] aw T [°C,°F, K]	Saturation [%]	Refer to the manual: www.epluse.com/mop301
HTP501	RH [%] T [°C,°F, K]	Uw [%] e [mbar, psi] Td [°C,°F, K] Tw [°C,°F, K] dv [g/m^3,gr/ft^3] r [g/kg, gr/lb] h [kJ/kg, ft lbf/lb, BTU/lb] Tf [°C,°F, K] Ti [°C,°F, K]	Refer to the manual: www.epluse.com/htp501
TDS401H	Td [°C, °F, K] T [°C,°F, K] RH [%]	Tf [°C, °F] wv [ppm]	Refer to chapter 4.4 TDS401H

1) As specified in the order code

Tab. 6 Measurand choice for process probes

4.4 TDS401H

4.4.1 Intended Use

The TDS401H is a process probe for the dew point temperature (Td) measurement of compressed air and other noncorrosive and non-flammable gases at pressures. The sensor is suitable for line pressure up to 80 bar (1160 psi) and features a leak rate B according to EN 12266-1.

⚠ WARNING

Non-compliance with the product documentation may cause safety risks for people and the entire measurement installation.

The manufacturer cannot be held responsible for damages as a result of incorrect handling, installation and maintenance of the device.

- Do not use the TDS401H in explosive atmosphere or for measurement in aggressive gases.
- This device is not appropriate for safety, emergency stop or other critical applications where device malfunction or failure could cause injury to human beings.
- The device must not be manipulated with tools other than specifically described in this manual.

NOTICE

Failing to follow the instructions in this user manual may lead to measurement inaccuracy and device failures.

- The TDS401H must only be operated in accordance to the conditions described in this user manual and within the specification included in chapter 9 Technical Data.
- The installation, inspection and maintenance steps recommended by the manufacturer must be observed and carried out in the interests of the user's safety and the functionality of the equipment.
- Any unauthorised product modification leads to loss of all warranty claims. Modification must be accomplished only with an explicit permission of E+E Elektronik Ges.m.b.H.!

PLEASE NOTE

External power supply recommended for TDS401H. The power supply must not be interrupted during automatic calibration.

The device is designed for the operation with separated extra-low voltage (SELV).

4.4.2 Scope of Supply

- TDS401H Dew Point Sensor down to -60 °C Td (-76 °F), according to the ordering guide
- Inspection certificate according to DIN EN 10204-3.1

4.4.3 Product Description

General

The compact TDS401H dew point sensor with a measuring range down to -60 °C Td (-75 °F Td) and a robust stainless steel enclosure is ideal for compressed air systems, plastic dryers and industrial drying processes. The centrepiece of the TDS401H is the monolithic measuring cell type HMC200, which is manufactured in thin-film technology. Thanks to its outstanding long-term stability and resistance to condensation, the TDS401H requires minimal maintenance.
An integrated auto-calibration procedure enables a measurement accuracy of <2 °C Td (<3.6 °F Td).
The recommended calibration interval is 2 years.
The measured values for dew point, frost point or volume concentration are available.

PLEASE NOTE

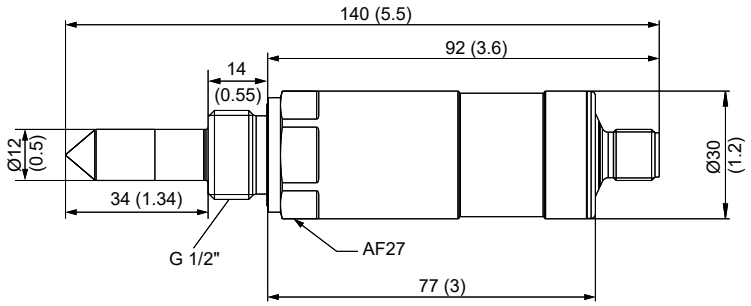
If working pressure differs from ambient pressure, set it in the PCS10 Product Configuration Software to get correct volume concentration Wv value.

Dimensions

Values in mm (inch)

ISO Thread

G 1/2"



4.4.4 Auto-Calibration

Dew point temperatures of -60 to -20 °C (-76 to -4 °F) at room temperature correspond to relative humidities from 0.08 to 5.37 %RH. To ensure accuracy at the lowest humidity, even the smallest drift effects in the humidity sensing element must be compensated.

A special auto-calibration method is used to compensate for the usual drift effects, resulting in highly accurate measurements even at the lowest dew point temperatures. Auto-calibration is performed every 30 minutes and takes approximately 3 minutes.

PLEASE NOTE

After a long periode of inactivity, the regular TDS401H auto-calibration procedure may take time to bring it back into the specification range. Therefore, an advanced auto-calibration mechanism takes place 5 minutes after power on and is performed up to 5 times during the first hour of operation. The auto-calibration behaviour depends on the probe configuration, which can be set using the PCS10 product configuration software. Refer to chapter 6 Setup and Configuration.

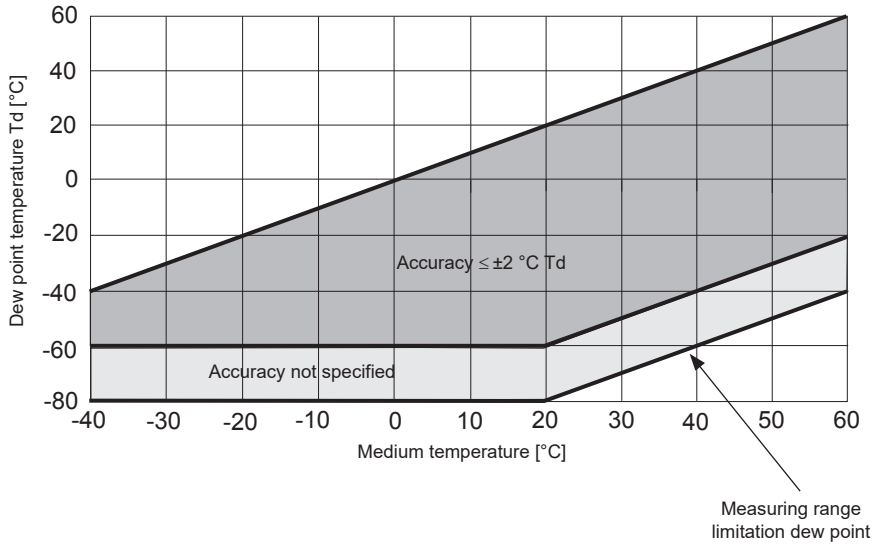
During auto-calibration, "Auto cal. running" is displayed instead of the measured value.

4.4.5 Measuring Range and Accuracy

The TDS401H has an accuracy of ±2 °C specified within the measuring range -60...+60 °C dew point.

Measuring Signal Limitation	
at medium temperature ≤20 °C	Td limitation = -80 °C
at medium temperature >20 °C	Td limitation = medium temperature -100 °C

e.g. at medium temperature 40 °C the measuring signal is limited at -60 °C dew point temperature.



Tab. 7 Dew point measuring range and specified accuracy

4.4.6 Mounting and Installation

Installation Location

The air or gas to measure shall be able to circulate freely around the sensing head of the TDS401H.

Temperature differences between the process air or gas and the installation location do not affect the dew point measurement. However, variations of the gas pressure have a strong impact on the dew point temperature. A pressure difference between the installation site and the process, the measurement can deviate from the dew point temperature by several tens of degrees.

The exact effect of pressure changes on the dew point can be simulated using the E+E humidity calculator. Further details can be found on our website www.epluse.com/omniport40.

Leakage should be avoided, as ingress of moisture from the environment will interfere with the measurement.

PLEASE NOTE

On delivery, the sensor is protected by a cap which keeps the dew point sensor dry. The cap shall only be removed right before installation.

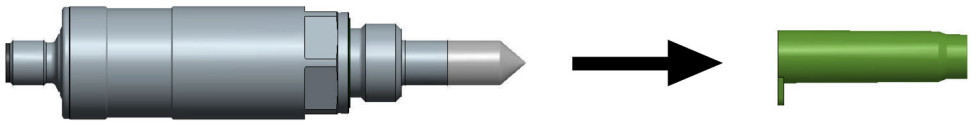


Fig. 3 Removal of the protection cap

Sensor Installation Directly into the Process

For direct installation in the pipeline, a shut-off valve should be installed on both sides of the TDS401H. This allows the sensor to be easily removed for maintenance and calibration.

PLEASE NOTE

A sealing ring with an NPT 1/2" thread is not permitted. Use a suitable PTFE (Polytetrafluoroethylene) sealing tape or sealant instead.

1. Insert the sensor into the process and tighten it by hand as far as possible.
2. If available, check the sealing ring for correct centring.
3. Tighten with a torque of 30 Nm.

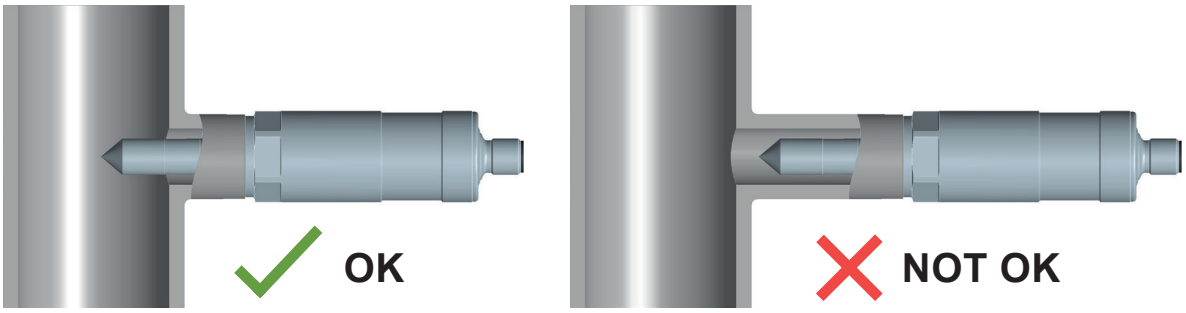


Fig. 4 Direct installation into the pipe

Sensor Installation in a Sampling System

Sampling is necessary when a direct installation of the sensor in the process is not possible or not desired. Reasons can be:

- The process temperature is too high.
- The sensor must be protected against contamination.
- The removal of the sensor must not interrupt the process.

PLEASE NOTE

To obtain a representative sample of the process gas and to avoid measurement errors, the following must be observed:

- Pressure differences between the process and the sampling chamber will cause significant measuring errors.
- The measurement of low dew point temperature is strongly affected by humidity diffusion from the environment because of leaks. Therefore, the sampling system shall be pressure-tight.
- All materials employed by the sampling systems shall be non-hygroscopic.
- The sampling line shall be as short as possible.
- The response time increases for gas flow <1 l/min (0.25 gpm).
- A too low gas flow can cause back-diffusion of humidity from the environment and affect the measurement.

The pipe material has a signigicant influence on the response time of the TDS401H and on the measurement accuracy at very low dew points. Fig. 5 illustrates how different tubing materials give off moisture over time when flushed with very dry gas after being exposed to ambient humidity.

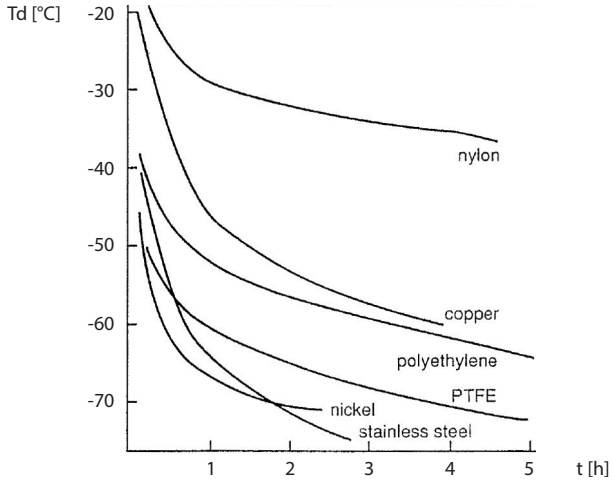


Fig. 5 Moisture given off by different tubing materials (© National Physical Laboratory)

4.4.7 Maintenance and Service

Filter Cap Exchange

In a dusty, polluted environment, it might be necessary to replace the filter cap occasionally. In most cases, visible contamination, dirt deposits or long response time indicate a clogged filter. A clogged filter cap shall be replaced with a new one (order code HA010103).

Filter Cap Replacement Procedure:

1. Carefully unscrew the filter cap counter-clockwise to avoid damaging the sensing element.
2. Handling the filter can clog the pores. Wear gloves when screwing on the new filter.

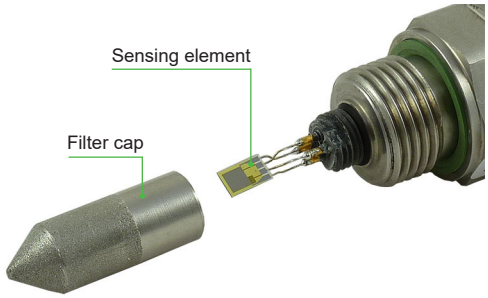


Fig. 6 TDS401H filter and sensor

Cleaning the Sensing Element

- For cleaning instructions please refer to www.epluse.com.

NOTICE

- Never touch the sensing element
- Any attempt to clean the sensing element mechanically such as rubbing or brushing will certainly lead to its irreversible damage.

4.5 Calibration and Adjustment

All supported probes can be calibrated / adjusted directly with the Omniport 40.

The process probes can be calibrated / adjusted using the PCS10. For this purpose, the process probes need to be connected to a PC via a Modbus configuration adapter or via the Omniport 40.

Definitions

- **Calibration** documents the accuracy of a measurement device. The device under test (specimen) is compared with the reference and the deviations are documented in a calibration certificate. During the calibration, the specimen is not changed or improved in any way.
- **Adjustment** improves the measurement accuracy of a device. The specimen is compared with the reference and brought in line with it. An adjustment can be followed by a calibration which documents the accuracy of the adjusted specimen.

Humidity Calibration and Adjustment

Depending on the application and the requirements of certain industries, there might arise the need for periodical humidity calibration (comparison with a reference) or adjustment (bringing the device in line with a reference).

Calibration and Adjustment at E+E Elektronik

Calibration and / or adjustment can be performed in the E+E Elektronik calibration laboratory. For information on the E+E capabilities in ISO or accredited calibration please refer to www.eplusecal.com.

Calibration and Adjustment by the User

Depending on the level of accuracy required, the humidity reference can be:

- Humidity Calibrator (e.g. Humor 20), please refer to www.epluse.com/humor20.
- Humidity Calibration Kit (e.g. E+E Humidity Standards), please refer to www.epluse.com.
- Or with the Omniport 40, which is described in the following chapters.

4.5.1 Adjustment of Hand-Held Probes

Connect the probe to the Omniport 40 and select in "Menu > Port x > Adjustment" the measurand to be adjusted.

Depending on the probe, various settings can be performed by the user (see table below). Use the function buttons (< >) to select the different digits. To change a digit, use the "up/down arrow" buttons. When finished, press "OK" to confirm the value. When adjustment (correction) is completed, "cor" is displayed in the status bar of the hand-held meter. The following ranges must be observed for the adjustment.

	Temperature	Humidity		
Hand-held probe	**Offset**	**1-point**	**2-point Low**	**2-point High**
HTP201H	-20…+70 °C	30...95 %	0...40 %	60...95 %
HTP401H	-40...+100 °C	30...95 %	0...40 %	60...95 %
HTP701H	-40...+180 °C	30...95 %	0...40 %	60...95 %

	Temperature	Air velocity		
Hand-held probe	**Offset**	**Gain / Offset**		
AVP201H	-20…+50 °C		0…8 m/s	10…20 m/s
AVP301H	-20…+70 °C		0…8 m/s	10…20 m/s
AVP401H	-20…+70 °C		0…0.8 m/s	1…2 m/s

	Temperature	Water activity		
Hand-held probe	**Offset**	**1-point**	**2-point Low**	**2-point High**
MOP301H	-40…120 °C	0.30…0.95	0…0.40	0.60...0.95
MOP302H	-40…120 °C	0.30…0.95	0…0.40	0.60...0.95

Tab. 8 Ranges for the adjustment of hand-held probes

PLEASE NOTE

The water content cannot be adjusted.

PLEASE NOTE

In order to obtain results comparable to the E+E factory setting, the following must be observed when measuring the air velocity:

- The adjustment should be done in a wind tunnel with homogeneous, low turbulent flow profile.
- Insert the probe 10 cm (4") deep into the flow channel.
- The fixtures should be mounted outside the flow channel and should not rise into the air stream.

4.5.2 Adjustment of Process Probes

Process probes can be adjusted either via Omniport 40 (refer to Fig. 10 Gain adjustment, Fig. 7 Offset) or via PCS10 (refer to the manual of the respective process probe).

Adjustment via Omniport 40

Connect the probe to the Omniport 40 and select in "MENU > Port x > Adjustment" the measurand to be adjusted. Use the function buttons (< >) to select the different digits. To change a digit, use the "down / up arrow" buttons. When finished, press "OK" to confirm the value. When any corrections have been made, "cor" is displayed in the status bar of the hand-held meter.

Adjustment via PCS10

Connect the probe to a PC with the Modbus configuration adapter (HA011018) or directly via Omniport 40 (use the HA040908 connection cable and USB-C).

4.5.3 TDS401H

For the adjustment of TDS401H the difference between the ambient temperature and the reference dew point temperature must be >60 °C (>140 °F).

Example:

Ambient temperature = 20 °C (68 °F)
The reference dew point temperature must be below -40 °C (-40 °F).

4.5.4 Possible Adjustments

The hand-held probes can be adjusted with the push buttons (see figures below).

Offset

When correcting the measurement offset, the characteristics moves parallel to itself by the offset value. The offset correction is suitable for optimum performance within a narrow measurement range of interest. Choose the reference value in the middle of the range of main interest.

Allow sufficient time for probe stabilisation in the reference environment.
Recommended minimum stabilisation time for each adjustment point, valid for adjustment against an appropriate, stable reference:

- Temperature: 30 min
- Relative humidity and all other humidity related measurands: 30 min
- CO_2: 15 min
- Air velocity, flow: 2 min
- Pressure: no stabilisation time required

Adjustment of probes which feature pressure compensation and/or sensing element heating and/or probe heating:

For best accuracy of the adjustment procedure, the pressure compensation must be enabled, and the heating mode must correspond to the factory setup.

Offset = Reference value - Measured value

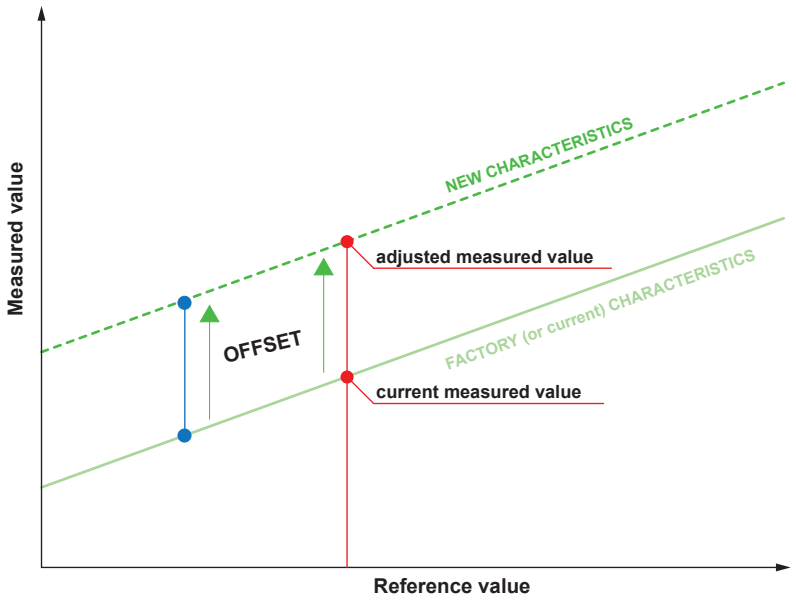


Fig. 7 Offset

PLEASE NOTE

Enter the offset temperature difference of the process probes in Kelvin ("MENU > Port x > Adjustment > Temperature > Offset").

1-Point

The 1-point adjustment describes the rotation around the zero point.
Enter the deviation at the current point, all other values will change according to the defined characteristics.

Deviation = Reference value - Measured value

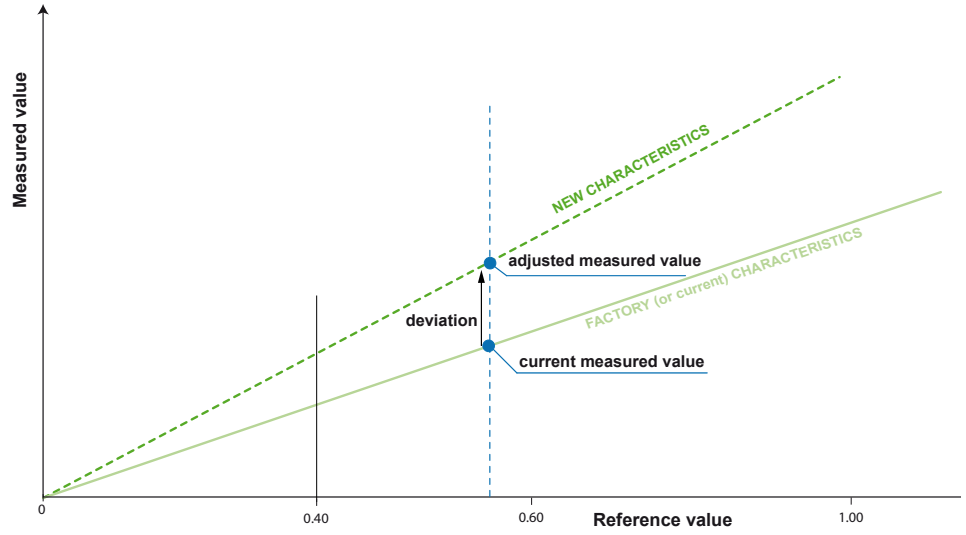


Fig. 8 1-point adjustment

2-Point

A two-point adjustment is intended for best accuracy over the entire measuring range (or over a wide range of interest).

The two-point adjustment requires two reference values, which should ideally be around 30% and 75% of the range.

For optimal adjustment results:

- The first adjustment point shall be in the lower half of the output scale,
- Allow sufficient time for probe stabilisation in reference environment.

Recommended minimum stabilisation time for each adjustment point, valid for adjustment against an appropriate, stable reference:

- Temperature: 30 min
- Relative humidity and all other humidity related measurands: 30 min
- CO_2: 15 min
- Air velocity, flow: 2 min
- Pressure: no stabilisation time required

Adjustment of probes which feature pressure compensation and/or sensing element heating and/or probe heating:

For best accuracy of the adjustment procedure, the pressure compensation must be enabled, and the heating mode must correspond to the factory setup.

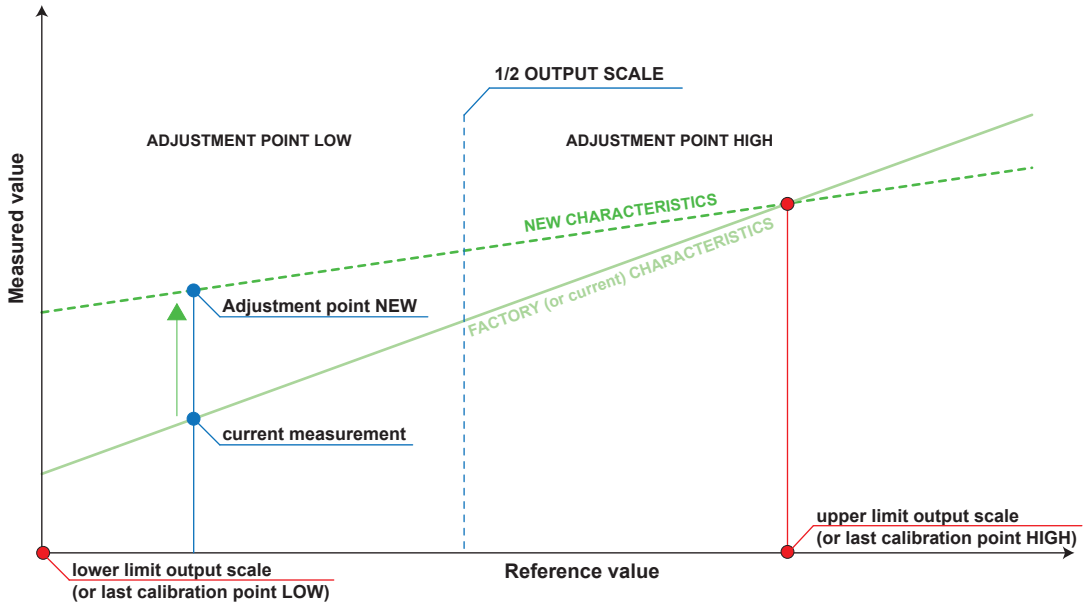


Fig. 9 2-point adjustment

Gain

Calculate the gain as follows:

Gain = (Upper reference value - Lower reference value) / (Upper measured value - Lower measured value)

Then enter the gain for the adjustment ("MENU > Port x > Adjustment > Temperature > Gain").

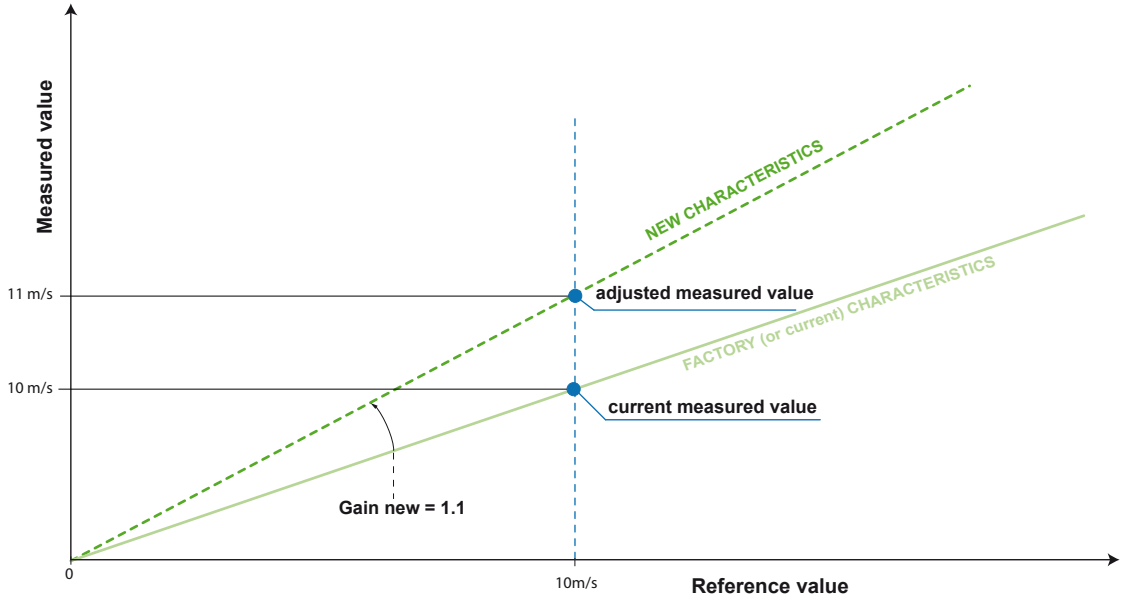


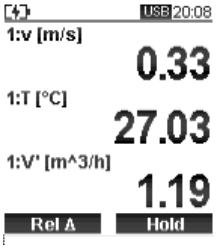
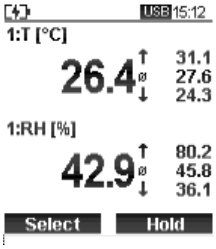
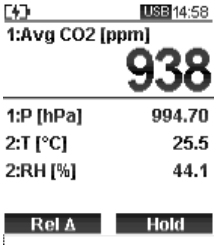
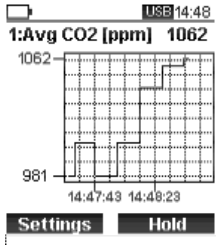
Fig. 10 Gain adjustment

5 Functions

5.1 Measurement Mode

The measurement mode is the default setting when the Omniport 40 is first powered on and subsequently used. The device offers a variety of viewing options, including 2-line, 3- line, min. / avg. / max., main view and diagram. Change the views by pressing the "←" button. To change the displayed measurands, change the "Measures list" in the "MENU", as outlined in chapter 5.2 Measures List.

Various views, with exemplary probes and measurands

2-line (aw, x)	3-line (v, T, V')	Statistics (T, RH)	Overview (CO_2, p, T, rH)	Diagram (CO_2)
MOPxxxH	AVPxxxH	HTPxxxH	1: EE872 2: HTP201H	EE872
				

Tab. 9 All views are available for all probes.

5.1.1 REL Δ Function

To view the relative deviation from the actual value, use the relative function.

Press "REL Δ" and select the desired measurand. Subsequently, press "Δ on" to set the value to zero. The "Δ" symbol appears. To exit the menu press the "right function" button. While the "Δ" symbol is displayed, the deviation from the previous value will be calculated. To disable this function, press "REL Δ" and "Δ off". The delta sign will disappear and the actual reading will be displayed.

5.1.2 Hold Function

The "Hold" function, which can be activated / deactivated by pressing the "right function" button, freezes the current measurement values on the display. The function is activated when the "hld" symbol appears in the status bar of the display.

5.1.3 Clear the Statistical Overview

In the "Min./Avg./Max." view, the data from the most recent measurements is evaluated. To begin a new series of measurements, click the "Select" button on the left and choose the appropriate measurand. To reset the numbers to zero, press the "Clear" button.

5.1.4 Diagram View

In diagram mode, press "Settings" to set the displayed "Channel select" and "Chart interval". In the "CHANNEL SELECT" menu the measurands can be selected using the "up" and "down" buttons. In the "CHART INTERVAL" menu, select the desired interval between one second and ten minutes.

5.1.5 Favourite

To optimise the navigation experience, frequently used menu items can be added to a list of favourite functions, ensuring quick and easy access without the need to navigate through the menu structure. To add a menu item to the list of favorite functions, select it from the "MENU" and press the "F" button. Functions added to the favourites list are marked with a "☆" symbol. To access the list of preferred functions, press the "F" button on the measurement screen.

To execute a favorite function, select it using the "down/up arrow" buttons, then press "OK" to confirm.The list of favorite functions can be edited by pressing the "right function" button ("Edit"). The "left function" button ("Clear all") deletes the entire list.

To change the position of a function, select it using the "down/up arrow" buttons, press the "right function" button (Move), move the quantity with the "down/up arrow" buttons, and press the "right function" button ("Stop"). Press the "←" button to exit the function list editing mode.

To delete a single item from the list of favorite functions, select it in the "MENU" and press the "F" button: the symbol disappears.

5.2 Measures List

The measures list can be viewed in the settings. To access the settings, press the "≡" button. The measures list provides a comprehensive overview of all measurands that can be displayed and stored in the internal memory.

The available measurands for each port are displayed in the "MEASURES LIST". (refer to Tab. 5 Measurand choice for hand-held probes and to Tab. 6 Measurand choice for process probes).

The order of the measurands can be changed by pressing the "Move" function button. To deselect a measurand, navigate with the arrow button and press the "Unselect" function button. The number in front of the measurand indicates the connection port.

To select an alternative measurement type, navigate to the "MENU > Port x > Measuring units" section and modify the measurement units as required.

5.3 Data Logging

The data logging function records the measured values with the date and time of each sample in the device's memory, providing a comprehensive record of the data collected. The data is stored in a .csv file, with the following information included: serial number, port number, time and date stamp, and the measured value. The logging process is carried out automatically in accordance to the specified interval.

To use the data logging function, set the "USB mode" to "COM interface", otherwise a message will be displayed. The data logging function only records the variables activated in the measures list (that measurands that are displayed in measurement mode). Prior to commencing the recording process, it is essential to ensure that all relevant variables have been activated. To activate the measurement variables, refer to table 5 and 6 in chapter 4.3 Measurands. To change the unit, navigate to "MENU > Port x > Measurement units".

To start data logging, select the "Start data log" option located within the "MENU > Recording" section.

Selecting "Start data log" will exit the menu automatically. All measurement views are available, but settings cannot be changed.

The activation of recording is highlighted by the presence of the "rec" symbol in the status bar of the display. During the logging process, the status LED will flash green briefly every five seconds.

Press the left function button to terminate the current logging (stop function appears at the bottom left of the display). The automatic switch-off of the device is deactivated during the logging process.

No additional software is required to transfer the logged data to a PC. Switch the setting from USB mode "COM Interface" to "Mass storage" and transfer the .csv file directly to the PC. The Omniport 40 is recognised as a separate USB drive. When the drive is opened, the logged data will be visible.

At the end of the .csv file, "End of log session" indicates a successful completed logging session. If "End of log session" is missing, the logging process failed. Last values may be missing. This can happen when logging is in progress and the Omniport 40 switches off due to low battery power or power being removed. Please ensure to end each logging session using the stop button.

PLEASE NOTE

The .csv file must be imported correctly, especially in the latest Microsoft Excel version and depending on the local settings of the PC. Otherwise the data will be displayed in an inappropriate style. Follow the instructions at support.microsoft.com for importing and converting txt/.csv files or follow this short instruction:

- Open Microsoft Excel and import the .csv file using the import function (do not open the file with Microsoft Excel by double-clicking in Explorer).
- Do not change any settings and leave the separator set to "semicolon".
- Click on Load. The data is now sorted in Microsoft Excel.
- Search for "." and replace it with ",". The figures can now be displayed in a chart.

All changes must be saved as an Microsoft Excel worksheet.

5.4 Data Collecting

The data collecting function is an advanced data logging mode to facilitate recurring measurements in predefined locations.

The measured values are stored easily with a simple click in a predefined location in the record file. The customized names of measuring locations can be assigned with PCS10.

Connect the Omniport 40 to the PCS10, start the PCS10 (refer to chapter 6.1 PCS10 Product Configuration Software), select "Data collecting", enter the customized location name, press Sync to save it on the Omniport 40. Up to 20 location names can be saved. Default name: Location 1...20.

In the Omniport 40, with a probe connected, the "Data collecting mode" function, accessible via the "MENU > Recording" option, enables the selection of alternative data-collecting modes, as detailed below.

Mode Standard	Mode Multiselect	Mode On hold
In "MENU > Recording > Data collecting" the available locations are displayed. To select a location, use the down and up arrows, then click the "OK" button: the measured values are stored in the selected location. A single symbol "✓" indicates the last saved location.	By activating this mode, the measured values can be saved in different locations, with the storage location being visually displayed: the symbol "✓" is displayed for each location where the values are stored. With down and up arrows, select your location and then click on the"OK" button: the measured values are stored in the selected location. With the left function button "Clear", all status (indicated with "✓") are deleted. The recorded values are not deleted from the record file.	By activating this mode, using the "Hold function" (see Chapter 5.1.2), the on-hold values can be stored in a predefined location. In the main display view, the "right function" button indicates "hold / rec". To access the menu "Data collecting", press this button: select the desired location and save the values with the "OK" button. During the recording process, the symbol "hld / rec" is displayed in the status bar of the display.

PLEASE NOTE

In all modes (Standard, Multiselect, On hold) the previously recorded data for the location are not overwritten: the record of the selected location contains multiple data.

All data recorded by the function "Data collecting" are stored in a file called DataCollecting.json, which contains: location name, measured values, serial number of the probe, measurand, time and date stamp.

To export the data from the .json file to .csv file follow the steps below:

- Set the "USB Mode" in the Omniport 40 to "Mass Storage".
- Connect the Omniport 40 to the PC using the USB-C cable.
- Copy the .json file from the Omniport 40 to the PC.
- Change the "USB Mode" of the Omniport 40 to "COM Port".
- Run PCS10 (refer to chapter 6.1 PCS10 Product Configuration Software)
- Open the menu "Data collecting" and import the DataCollecting.json file from the PC using the "Import collected data" button.
- Select the data to be exported with the filters "location, sensor and measurand".
- With the Export to .csv button, the data will be saved on the PC in .csv format.

5.5 Alarm Settings

The "Alarm settings" can be set in the "Menu > Port x". The alarm may be activated or deactivated for each probe, with the following settings available:

Settings	Description
≡ Alerting	Selection of the measurand with which to associate the alarm
≡ Min.alarm	Lower alarm threshold (alarm if measure < threshold)
≡ Max.alarm	Upper alarm threshold (alarm if measure > threshold)
≡ Hysteresis	Thresholds hysteresis

The alarm can be acoustic, optical or both, simultaneously. The optical alarm is a flashing display while the acoustic alarm is a signal tone. Each measured variable can have its own alarm threshold value, with the option of saving a hysteresis.

5.6 PIN Configuration

For security purposes, a PIN can be set in the menu using a user-defined 4-digit PIN code.

PLEASE NOTE

Do not power off the Omniport 40 unexpectedly during PIN entry (e.g. by removing the batteries), otherwise the PIN will not be saved. Each menu option must be confirmed with 'OK'.

After restarting the device, only the measurement mode is enabled. Access to the menu is only permitted once the correct PIN has been entered.

In the case of a forgotten PIN, the device can be returned to the manufacturer for deactivation. Alternatively, it can be reset using the master PIN supplied with the Omniport 40.

PLEASE NOTE

There is no way for the user to reset or change a PIN that has been activated!

Enter your PIN code in the field provided

The factory default settings are "0" for the PIN code and "No" for "Activate PIN code".

Upon changing a PIN via the "Set PIN" function, the "Activate PIN code" option will be automatically reset to "No". This is to ensure that the user verifies the new PIN. Once the menu has been exited or a period of two minutes of inactivity has been reached, the menu will be locked. This is indicated by the "lck" symbol in the status bar.

PLEASE NOTE

The "lck" position is shared with "cor" when any correction is active. Consequently, "lck" will never be displayed.

For security purposes, the PCS10 is also locked by the same PIN. Unlocking the menu does not unlock the PCS10 and unlocking the PCS10 does not unlock the menu! Following a period of approximately two minutes without user interaction via the keypad or user interface, the menu and the PCS10 will be locked again.

PLEASE NOTE

To enhance security, certain menu items cannot be added to the "Favourites menu". The menu items are: "Factory reset", "Activate PIN code" and "Set pin". A help screen will appear when the user attempts to add these items to the "Favourites menu".

Procedure to Activate a PIN Lock

Step 1	Step 2	Step 3
		
Set a PIN code via "MENU > Settings > PIN configuration > Set PIN".	A message will appear on the screen indicating that the PIN code needs to be activated. Click the left soft button to exit and deactivate the help function.	To activate the PIN code, navigate to "MENU > Settings > PIN configuration > Activate PIN code".

Step 4	Step 5	Step 6
		
Verify the selected PIN to activate PIN lock.	If the PIN is entered correctly, "Activate PIN code" is set to "Yes" and "lck" is displayed in the status bar.	The PIN must be entered to access the menu.

5.7 Oil library

The oil parameter and the name of the oil in the oil library can be configured with the PCS10. To achieve this, connect the device to the PC and open PCS10 (refer to chapter 6 Setup and Configuration). Configure the oil parameters or import an oil library that has been previously created for E+E moisture in oil sensors such as EE360 or MOP301.

If a moisture in oil probe is connected, find the configured oil library at "MENU > Port x > Oil library". Press the left "Info" button to view the saved oil parameters. If another oil parameter is required, select the used oil and the parameter will be saved in the hand-held probe.

NOTICE

The actual oil is saved within the hand-held probe. If the Omniport 40 cannot identify the oil, it will be displayed in the oil library as "Unknown oil".

- Enter A-Parameter (-1999.9...100.0)
- Enter B-Parameter (0.00...20.00)
- A maximum of 20 oil parameter sets are possible

PLEASE NOTE

The A and B factory settings of the probes MOP301H and MOP302H for mineral transformer oil are
A-Parameter: -1663.3
B-Parameter: 7.37

5.8 Cross-Section

For volume flow probes, the cross-section of the canal or pipe can be entered in cm^2 to calculate V'. (MENU > Port x > Cross section).

5.9 Pressure

Hand-held probes, such as AVP201H, AVP301H, AVP401H, HTP201H, HTP401H and HTP701H require the input of the pressure value for calculating the mixing ratio. As soon as the probe is connected, the pressure can be set via the "MENU > Port x > Adjustment > Pressure.

Some of the process probes use a factory-set pressure value, stored within the probe itself. The pressure can be changed in one of the following two ways: via PCS10 or via Modbus configuration of the register.

6 Setup and Configuration

The Omniport 40 is ready to use. Extended functionality as well as configuration of the process probes are possible with PCS10. Connect the Omniport 40 to the PC using a USB-C cable. The Omniport 40 will be recognised automatically by the PC.

Download logged data to the PC, use the USB mode "Mass storage". The logged data can be deleted via PC.

Data collection and oil library settings can be performed with PCS10. For this the Omniport 40 shall be in the "USB mode / COM interface".

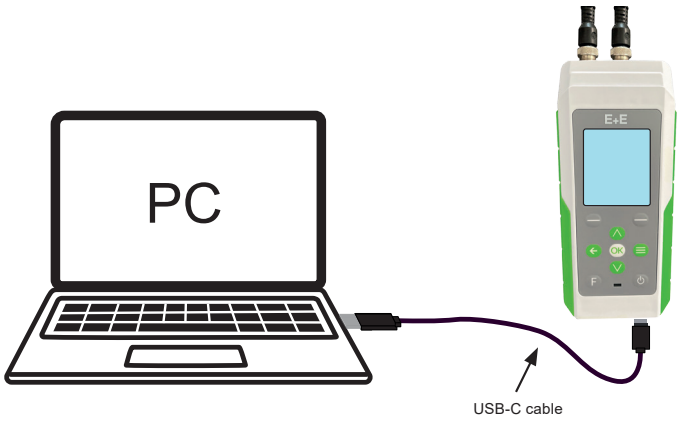


Fig. 11 Omniport 40 connected to a PC

PLEASE NOTE

To perform a firmware update, connect the Omniport 40 to the PC. For further information see chapter 6.3 PCS10 Product Configuration Software below.

6.1 PCS10 Product Configuration Software

Use the software to change the settings and proceed as follows:

1. Download the PCS10 Product Configuration Software from www.epluse.com/pcs10 and install it on a PC.
2. Connect the Omniport 40 to the PC using the USB-C cable.
3. Start the PCS10 software.
4. Follow the instructions on the PCS10 opening page to scan the ports and to identify the connected device.
5. Click on the desired setup mode from the main PCS10 menu on the left. Follow the PCS10 online instructions that are displayed when clicking the "Tutorial" button.
6. Upload changes to the sensor by pressing the "Sync" button.

6.2 PCS10 for Process Probes

It is possible to configure the process probes directly via Omniport 40 and a USB-C cable with PCS10. To achieve this, the USB mode shall be set to "COM Interface".

6.3 Firmware Update

To perform a firmware update, connect the Omniport 40 to the PC (The system requirements are MS Windows 10 or 11). Establish a connection to the PCS10 to check if an update is available.

1. If a firmware update is available, download the ProXupdate tool for the first time available at www.epluse.com/omniport40.
2. Start the software.
3. Click on 'Synchronise' - A pop-up window appears with the message "With synchronisation you can check if there are updates available" - Click on Yes.
4. Connect the Omniport 40 to the PC.
5. Switch on the Omniport 40. The currently loaded firmware will appear on the screen.
6. Click on 'Connect' in the ProXupdate software. Check whether the Omniport 40 is up to date.
7. A pop-up window appears showing the current firmware version (e.g.V1.3.2.0), the available version (e.g. V1.4.0.0) and the question "Do you want to continue with the update?"
8. Click 'Yes'. Pop-up "WAIT!" appears. Another pop-up with the message "To complete the upload follow these steps" appears.
9. Press 'ON-Off' button on the Omniport 40. The display stays of: only a USB connection is established in this state.
10. Click the 'CONTINUE' button and wait for the update to complete.
11. The newly loaded firmware appears on the Omniport 40 display.
12. Then click on Exit to close the ProXupdate software.

PLEASE NOTE

For further information about the firmware update, click 'Help' in the ProXupdate software.

13. Restart the Omniport 40 after firmware update.

7 Maintenance and Service

7.1 Storage

It is advisable to remove the batteries if the hand-held meter is stored for a long time.

CAUTION

Caution indicates hazards for persons. If the safety instruction marked in this way is not followed, minor or moderate injuries may occur.

Do not store the product where:

- Humidity is high.
- The product is exposed to direct sunlight.
- The product is exposed to a source of high temperature.
- There are strong vibrations.
- There is vapor, salt and/or corrosive gas.

PLEASE NOTE

The Omniport 40, the probes and the accessories must be stored in the original carrying case. On delivery, the sensor is protected by a cap which keeps the sensing element dry. The cap shall only be removed straight before installation.

This prevents:

- mechanical damage
- contamination of the probes
- probe drift

This ensures the optimum performance of the Omniport 40 and probes in the long term.

7.2 Cleaning

Do not use cleaning agents that are aggressive or incompatible with the materials indicated in the technical specifications. For cleaning, use a soft dry cloth or slightly dampened with clean water.

The hand-held meter has limited resistance to n-heptane, oil and isopropanol. Use small amounts of cleaning fluid for a longer lifetime of the device.

7.3 Self Diagnosis and Error Messages

7.3.1 Error Messages on the Display

Error	Description	Recommended action
Wrong USB mode		Change the USB mode. A "COM interface" is required for data logging and data collection
Already in use	The Omniport 40 is connected to the PCS10 and the communication between PCS10 and Omniport 40 is running	Finish the configuration with PCS10 and disconnect the Omniport 40
Timeout	The probe does not respond within the expected time	Leave the probe for a while to establish communication. If the error persists, check the cable or disconnect and reconnect the probe
No sensor	No probe was recognised (not connected or unknown)	Check whether the probe is supported by Omniport 40. Then connect a hand-held compatible probe and restart the Omniport 40. Check that the correct cable is used (in accordance with the ordering guide)
S/N error	Connection error	Check the connection plugs and tighten the threads.The error may occur if the thread is not properly tight
Parameter error	The probe responds, but the response is not correct (incorrect CRC or similar)	Check the probe configuration
Auto cal running	TDS401H auto calibration in process	Await the end of the automatic calibration, refer to chapter 4.4.4 Auto-Calibration
Error	Deviation is not accepted in the adjustment range	Check the deviation and the limits for adjustment (refer to Tab. 8 Ranges for the adjustment of hand-held probes).
123.4 appears instead of the measured values, directly after starting	An error occurred while loading the data	Restart the device
Com Err	The probe does not communicate	Check the connection, reconnect the probe and restart the device

PLEASE NOTE

If the Omniport 40 does not respond to any commands, remove the batteries, wait briefly and then reinsert them.

7.4 Repairs

PLEASE NOTE

Repairs may only be carried out by the manufacturer. The attempt of unauthorised repair excludes any warranty claims.

8 Accessories

For further information please refer to the Accessories datasheet.

Description	Code
Carrying Case for Omniport 40, hand-held probes, process probes and accessories	**HA040909**
Membrane filter cap, polycarbonate body, black **Metal grid filter cap, polycarbonate body, black** **Stainless steel sintered filter cap for plastic probes** **Stainless steel sintered filter cap for metal probes**	**HA010118** **HA010119** **HA010103** **HA010117**
Connection cable for hand-held probe, unshielded, 5 poles, M12x1 plug ↔ socket 2 m (6.6 ft)	**HA010813**
Omniport 40 connection cable for process probes 1 m (3.28 ft)	**HA040908**
Humidity standards / Calibration device	**Refer to data sheet** Humidity Calibration Kit
Configuration software	**PCS10 Product Configuration Software** Free download from www.epluse.com/pcs10
Ball valve G 1/2" ISO	**HA050101**[1)]
Ball valve 1/2" NPT	**HA050104**[1)]

1) Suitable for MOP301H - Moisture-in-oil immersion hand-held probe up to 120 °C (248 °F).

9 Technical Data

9.1 Hand-Held Meter

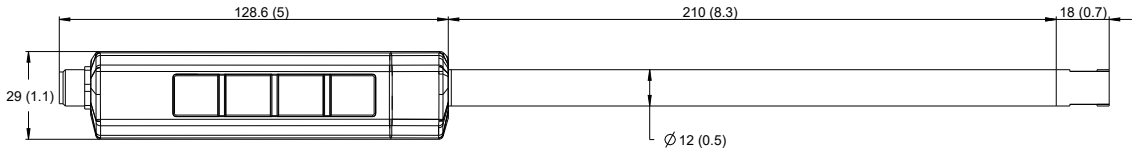
Power supply	4x AA rechargeable NiMH batteries (included in the scope of supply)
Optional power supply	External 5 V DC via USB C (Power supply unit or PC-USB connection)
Power consumption, typ.	10 mA (excluding probes)
Battery runtime, typ.	>100 h continuous operation (fully charged, backlight switched off, hand-held probe). The battery runtime depends on the number and type of connected sensors.
Automatic switch-off	Configurable Automatically deactivated when an external power supply is connected
Connections	2x 5-pin M12 connection
PC connection	USB-C
Internal memory	Up to 1 million measuring points. A time and date stamp is assigned to each measuring point.
Type of logging	Automatic with manual start / stop
Logging interval	1, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 20, 30 min / 1 hour
Sensor query	2 measurements/s
Real-time clock	Max. deviation 1 min / month at 25 °C (77 °F)
Display	140 x 160 dot-matrix LCD with backlight / visible area 42 x 50 mm (1.65 x 1.97") Choice of display layouts: ▪ Large-digit single values ▪ Multi-line ▪ Statistical information (min. / avg. / max.) ▪ Diagram view
User interface	Selectable in the menu (de, en, it, fr, es)
Dimensions	170 x 78 x 38 mm (6.69 x 3.07 x 1.50")
Weight	Approx. 370 g (approx. 13.05 oz)
Operating and storage conditions **Operation** **Storage**	 -5...+50 °C (+23...+122 °F), 0...85 %RH non-condensing -25...+65 °C (-12...+149 °F) (without rechargeable battery)
Enclosure **Material** **Protection rating**	ABS (acrylonitrile butadiene styrene) TPE side protection (thermoplastic elastomers) Polyester front panel IP67 (except for the probe connection)
Impact test	IK04 according to EN 60068-2-75
Drop test, 1m @ ±25 °C (3.28 ft @ ±45 °F)	EN 61010-1
Electromagnetic compatibility	EN IEC 61326-1:2021
Conformity	CE UKCA
Configuration software	PCS10 Product Configuration Software and USB-C connection cable Free download from www.epluse.com/pcs10

9.2 Hand-Held Probes

9.2.1 AVP201H - Air Velocity and Temperature Hand-Held Probe for HVAC Applications

Dimensions

Values in mm (inch)

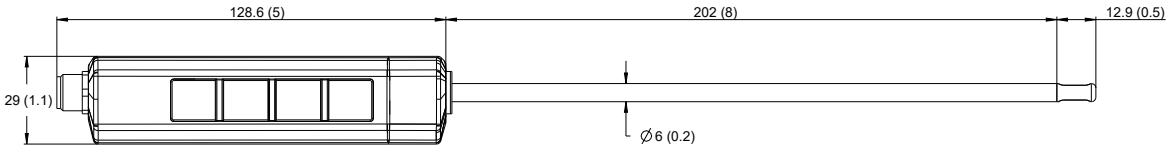


Measuring range	0.4...20 m/s (80...4000 ft/min) 0...+50 °C (+32...+122 °F)	
v accuracy	±(0.2 m/s (40 ft/min) + 3 % of mv)	mv = measured value
T accuracy	±1 °C (±1.8 °F) (0...+50 °C (+32...+122 °F))	
v response time τ_{90}	≤1.5 s	
Temperature range (Probe handle) **Operation** **Storage**	 0...+50 °C (+32...+122 °F) -20...+60 °C (-4...+140 °F)	
Probe handle **Enclosure material** **Side protection material** **Protection rating**	ABS (Acrylnitril-Butadien-Styrol) TPU (Thermoplastisches Polyurethan) IP40	
Probe **Material**	PC (Polycarbonate)	
Electromagnetic compatibility	EN 61326-1:2013	EN 61326-2-3:2013
Conformity	CE UKCA	

9.2.2 AVP301H - Air Velocity and Temperature Hand-Held Probe up to 20 m/s (4 000 ft/min)

Dimensions

Values in mm (inch)

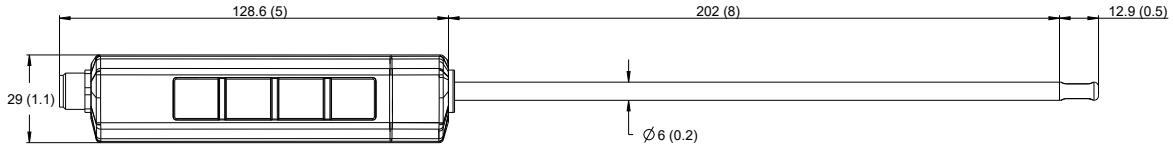


Measuring range	0.4...20 m/s (80...4 000 ft/min) -20...+70 °C (-4...+158 °F)	
v accuracy @ 20 °C (68 °F) and 1 013 hPa (14.7 psi), 45 %RH	± (0.2 m/s (40 ft/min) + 2 % of mv)	mv = measured value
T accuracy	±0.7 °C (±1.26 °F), v > 0.5 m/s, 0...+50 °C (+32...+122 °F)	
v response time τ_{90}	≤1.5 s	
Temperature range (Probe handle) **Operation** **Storage**	 0...+50 °C (+32...+122 °F) -20...+60 °C (-4...+140 °F)	
Probe handle **Enclosure material** **Side protection material** **Protection rating**	 ABS (Acrylonitrile butadiene styrene) TPU (Thermoplastic polyurethane) IP40	
Probe **Material**	 Stainless steel 1.4404	
Electromagnetic compatibility	EN 61326-1:2013	EN 61326-2-3:2013
Conformity	CE UKCA	

9.2.3 AVP401H - Air Velocity and Temperature Hand-Held Probe up to 2 m/s (400 ft/min)

Dimensions

Values in mm (inch)



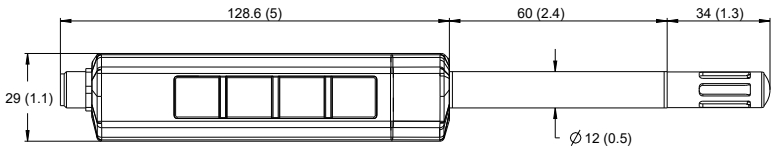
Technical Data

Measuring range		0.12...2 m/s (24...400 ft/min) -20...+70 °C (-4...+158 °F)
v accuracy @ 20 °C (68 °F) and 1 013 hPa (14.7 psi), 45 %RH		± (0.04 m/s (8 ft/min) + 1 % of mv) mv = measured value
T accuracy		±1.2 °C (±2.16 °F), v = 0.2...0.5 m/s, 0...+50 °C (+32...+122 °F)
v response time τ_{90}		≤1.5 s
Temperature range (Probe handle)		
	Operation	0...+50 °C (+32...+122 °F)
	Storage	-20...+60 °C (-4...+140 °F)
Probe handle	**Enclosure material**	ABS (Acrylonitrile butadiene styrene)
	Side protection material	TPU (Thermoplastic polyurethane)
	Protection rating	IP40
Probe	**Material**	Stainless steel 1.4404
Electromagnetic compatibility		EN 61326-1:2013 EN 61326-2-3:2013
Conformity		CE UKCA

9.2.4 HTP201H - Humidity and Temperature Hand-Held Probe for HVAC Applications

Dimensions

Values in mm (inch)



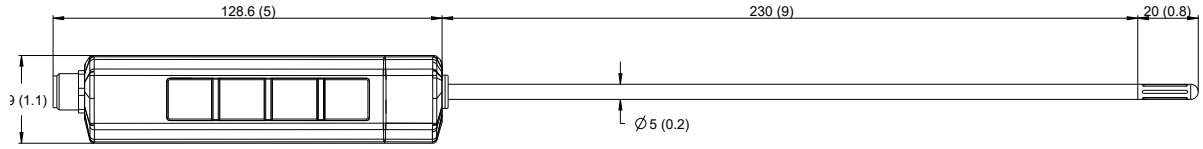
Technical Data

Measuring range	0...100 %RH -20...+70 °C (-4...+158 °F)
RH-accuracy **0...90 %RH** @ 20 °C (68 °F) **90...100 %RH**	±2 %RH ±3 %RH
T-accuracy **@ 20 °C (68 °F)** **-20...+70 °C (-4...+158 °F) max.**	±0.2 °C (±0.36 °F) ±0.5 °C (±0.9 °F)
RH response time τ_{90}	≤7 s
RH temperature dependency, typ. **Probe** **Electronics**	±0.03 %RH/°C (0.0054 %RH/°F) ±0.05 %RH/°C (0.09 %RH/°F)
T dependency, typ. **Electronics**	±0.005 °C/°C (±0.005 °F/°F)
Temperature range (Probe handle) **Operation** **Storage**	 0...+50 °C (+32...+122 °F) -20...+60 °C (-4...+140 °F)
Probe handle **Enclosure material** **Side protection material** **Protection rating**	ABS (Acrylonitrile butadiene styrene) TPU (Thermoplastic polyurethane) IP40
Probe **Material**	PC (Polycarbonate)
Electromagnetic compatibility	EN 61326-1:2013 EN 61326-2-3:2013
Conformity	CE UKCA

9.2.5 HTP401H - Humidity and Temperature Hand-Held Probe up to 100 °C (212 ° F)

Dimensions

Values in mm (inch)



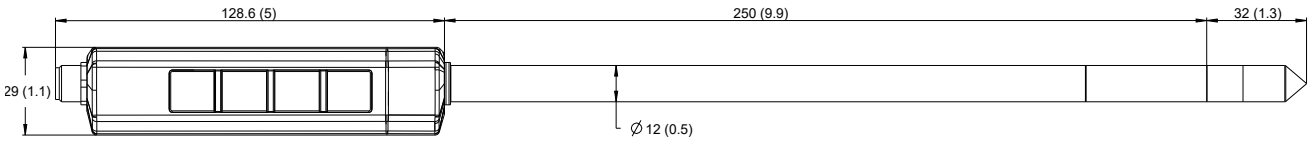
Technical Data

Measuring range		0...100 %RH -40...+100 °C (-40...+212 °F)
RH accuracy @ 20 °C (68 °F)	**0...90 %RH** **90...100 %RH**	±2 %RH ±3 %RH
T accuracy	**@ 20 °C (68 °F)** **-40...+100 °C max.**	±0.2 °C (±0.36 °F) ±0.6 °C (±1.08 °F)
RH response time τ_{90}		≤15 s
RH temperature dependency, typ.	**Probe** **Electronics**	±0.03 %RH/°C (±0.0054 %RH/°F) ±0.05 %RH/°C (±0.09 %RH/°F)
T dependency, typ.	**Electronics**	±0.005 °C/°C (±0.005 °F/°F)
Temperature range (Probe handle)		
	Operation **Storage**	0...+50 °C (+32...+122 °F) -20...+60 °C (-4...+140 °F)
Probe handle	**Enclosure material** **Side protection material** **Protection rating**	ABS (Acrylonitrile butadiene styrene) TPU (Thermoplastic polyurethane) IP40
Probe	**Material**	Stainless steel 1.4301, 1.4305
Electromagnetic compatibility		EN 61326-1:2013 EN 61326-2-3:2013
Conformity		CE UKCA

9.2.6 HTP701H - Humidity and Temperature Hand-Held Probe up to 180 °C (356 °F)

Dimensions

Values in mm (inch)



Technical Data

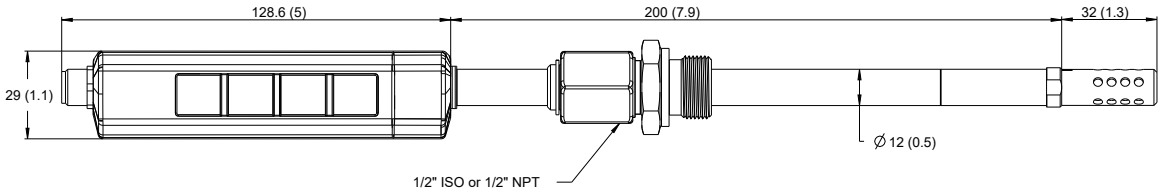
Measuring range	0...100 %RH -40...+180 °C (-40...+356 °F)
RH accuracy **0...90 %RH** @ 20 °C (68 °F) **90...100 %RH**	±2 %RH ±3 %RH
T accuracy **@ 20 °C (68 °F)** **-40...+180 °C (-40...+356 °F) max.**	±0.2 °C (±0.36 °F) ±0.6 °C (±1.08 °F)
RH response time τ_{90}	≤30 s
RH temperature dependency, typ. **Probe** **Electronics**	±0.03 %RH/°C (±0.0054 %RH/°F) ±0.05 %RH/°C (±0.09 %RH/°F)
T dependency, typ. **Electronics**	±0.005 °C/°C (±0.005 °F/°F)
Temperature range (Probe handle) **Operation** **Storage**	 0...+50 °C (+32...+122 °F) -20...+60 °C (-4...+140 °F)
Probe handle **Enclosure material** **Side protection material** **Protection rating**	ABS (Acrylonitrile butadiene styrene) TPU (Thermoplastic polyurethane) IP40
Probe **Material**	Stainless steel 1.4404
Electromagnetic compatibility	EN 61326-1:2013 EN 61326-2-3:2013
Conformity	CE UKCA

9.2.7 MOP301H - Moisture-in-Oil Immersion Hand-Held Probe up to 120 °C (248 °F)

(with ISO or NPT-slide fitting)

Dimensions

Values in mm (inch)



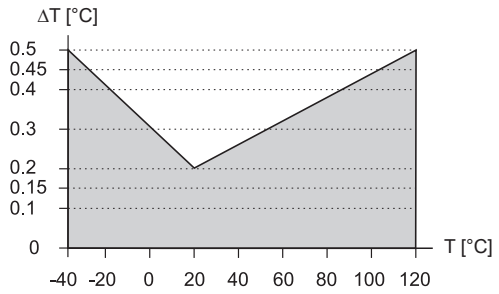
Technical Data

Water activity (aw) / water content (x)

Measuring range	**max.**	0...1 aw 0...100 000 ppm; actual range depends on the oil type, for non-mineral transformer oil, specific solubility parameters are needed (ppm output is valid in the range 0...+100 °C (+32...+212 °F))
Accuracy[1] (without hysteresis) @ 20 °C (68 °F)	**(0...0.9 aw)** **(0.9...1 aw)**	 ±0.02 aw ±0.03 aw
Aw dependency, typ.	**Probe** **Electronics**	<±0.0003 [-]/°C (<±0.00017 [-]/°F) <±0.0005 [-]/°C (<±0.00028 [-]/°F)
Response time t_{90}, typ. @ 20 °C (68 °F) in still oil		10 min.
Resolution		0.001 aw

1) Traceable to international standards, administrated by NIST, PTB, BEV...
The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times 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).

Temperature (T)

Measuring range		-40...+120 °C (-40...+248 °F)
Accuracy[1]		
T dependency, typ.	**Electronics**	<±0.005 °C/°C (<±0.005 °F/°F)
Resolution		0.1 °C

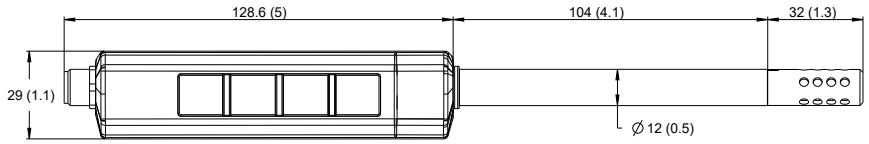
1) Traceable to international standards, administrated by NIST, PTB, BEV,...
The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation).
The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement).

Temperature range (Probe handle)		
	Operation	0...+50 °C (+32...+122 °F)
	Storage	-20...+60 °C (-4...+140 °F)
Pressure rating		0.01...20 bar (0.15...290 psi)
Probe handle	**Enclosure Material**	ABS (Acrylonitrile butadiene styrene)
	Side protection material	TPU (Thermoplastic polyurethane)
	Protection rating	IP40
Probe	**Material**	Stainless steel 1.4404

9.2.8 MOP302H - Short Moisture-in-Oil Hand-Held Probe up to 120 °C (248 °F)

Dimensions

Values in mm (inch)



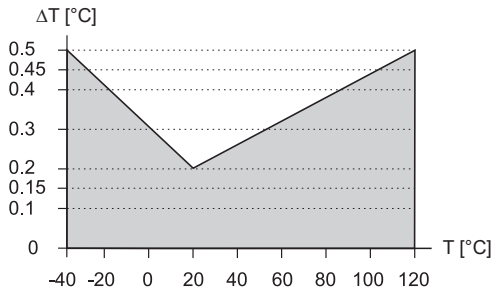
Technical Data

Water activity (aw) / water content (x)

Measuring range	**max.**	0...1 aw 0...100 000 ppm; actual range depends on the oil type, for non-mineral transformer oil, specific solubility parameters are needed (ppm output is valid in the range 0...+100 °C (+32...+212 °F))
Accuracy[1] (without hysteresis) @ 20 °C (68 °F)	**(0...0.9 aw)** **(0.9...1 aw)**	 ±0.02 aw ±0.03 aw
Aw temperature dependency, typ.	**Probe** **Electronics**	<±0.0003 [-]/°C (<±0.00017 [-]/°F) <±0.0005 [-]/°C (<±0.00028 [-]/°F)
Response time t_{90}, typ. @ 20 °C (68 °F) in still oil		10 min.
Resolution		0.001 aw

1) Traceable to international standards, administrated by NIST, PTB, BEV...
The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times 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).

Temperature (T)

Measuring range		-40...+120 °C (-40...+248 °F)
Accuracy[1]		
T dependency, typ.	**Electronics**	<±0.005 °C/°C (<±0.005 °F/°F)
Resolution		0.1 °C (32.18 °F)

1) Traceable to international standards, administrated by NIST, PTB, BEV,...
The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times 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).

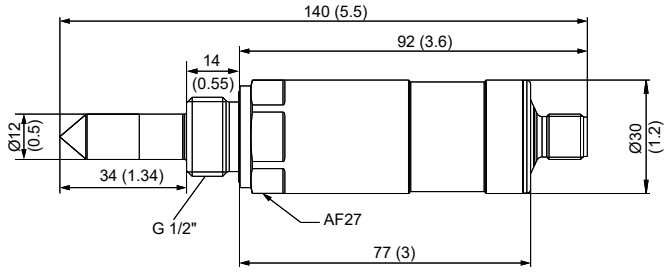
Temperature range (Probe handle)	**Operation** **Storage**	0...+50 °C (+32...+122 °F) -20...+60 °C (-4...+140 °F)
Probe handle	**Enclosure Material** **Side protection material** **Protection rating**	ABS (Acrylonitrile butadiene styrene) TPU (Thermoplastic polyurethane) IP40
Probe	**Material**	Stainless steel 1.4404

9.3 Process Probe

9.3.1 TDS401H - Dew Point Sensor down to -60°C (-76 °F)

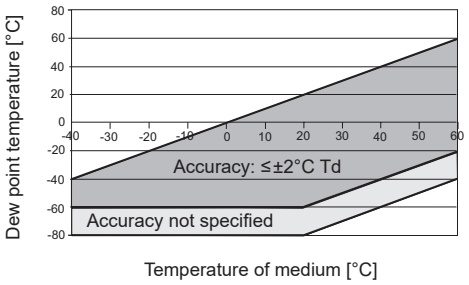
Dimensions

Values in mm (inch)



Technical Data

Dew Point Temperature (Td)

Measuring range	-60...+60 °C Td (-76...+140 °F Td)
Accuracy[1)]	
Response time t_{90}[2)]	< 5 min for step -5 °C Td (+23 °F Td) → -50 °C Td (-58 °F Td) < 20 s for step -50 °C Td (-58 °F Td) → -5 °C Td (-23 °F Td)

1) Traceable to international standards, administrated by NIST, PTB, BEV,...
The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times 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).
2) For the response time after each power-on of the sensor, refer to chapter TDS401H.

Volume Concentration (Wv)

Measuring range @ 1 013 mbar (14.7 psi)	20...200 000 ppm
Accuracy @ 20 °C (68 °F) and 1 013 mbar (14.7 psi)	±(5 ppm + 9 % from measured value)

Power supply class III ⧫ USA & Canada: Class 2 supply necessary	18 - 28 V DC
Current consumption @ 24 V DC	<20 mA + load current during normal measurement 100 mA + load current during auto-calibration
Electrical connection	M12x1, 4 poles, stainless steel 1.4404, Omniport 40 connection cable for process probes (HA040908) required
Filter	Stainless steel sintered
Pressure working range	0...80 bar (0...1 160 psi)
Humidity working range	0...100 %RH
Temperature working range	-40...+70 °C (-40...+158 °F)
Storage conditions	-40...+60 °C (-40...+140 °F) 0...95 %RH, non-condensing
Enclosure **Material** **Protection rating**	Stainless steel 1.4404 (AISI 316L) IP65 / NEMA 4X
Electromagnetic compatibility	EN 61326-1 EN 61326-2-3 Industrial environment FCC Part15 Class B ICES-003 Class B
Conformity	CE UKCA
Configuration and adjustment	PCS10 Product Configuration Software (free download from www.epluse.com/pcs10) and Modbus configuration adapter (HA011018) or via Omniport 40
Inspection certificate	According to DIN EN 10204-3.1

9.3.2 Other Process Probes

For the technical data of all other process probes, refer to the respective datasheet. The links can be found in chapter 4.2 Process Probes.

10 Conformity

10.1 Declarations of Conformity

E+E Elektronik Ges.m.b.H. hereby declares that the product complies with the respective regulations listed below:

CE European directives and standards.

and

UKCA UK statutory instruments and designated standards.

Please refer to the product page at www.epluse.com/omniport40 for the Declarations of Conformity.

10.2 Electromagnetic Compatibility

EMC for basic environment.
The sensor is a group 1 device and corresponds to class B.

10.3 FCC Part 15 Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the installation manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

10.4 ICES-003 Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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