Operating Instructions

for

Universal Plug-on Display

Signal Converter

Model: POD-



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The document may contain technical inaccuracies and typographical errors. The content will be revised on a regular basis. These changes will be implemented in later versions. The described products can be improved and changed at any time without prior notice.
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2. Note

2.1 General

Before unpacking and commissioning the device, the operating instructions and the “General Safety Instructions” document must be read and followed carefully. The general safety instructions, the operating instructions, the data sheet as well as approvals and further information can be downloaded via the QR code on the device or under the respective product on www.kobold.com.

Operating instructions, data sheet, approvals and further information via the QR code on the device or via www.kobold.com

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the device should be used only when the entire machine fulfils the EU machinery directive.

2.2 Validity and version of the operating instructions

Due to technical changes, the device documentation available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email (info.de@kobold.com) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form.

2.3 Hazard warnings

The following instructions are intended to ensure your personal safety and to prevent damage to the product described or connected devices. Safety instructions and warnings to prevent danger to the life and health of users or maintenance personnel, or to prevent damage to property, are highlighted in this documentation using the symbols defined here. *The symbols and terms used have the following meaning in the documentation itself:*

Symbol	Explanation	Symbol	Explanation
 Note	Is important information about the product, the handling of the product or the respective part of the documentation to which particular attention should be drawn.	 Caution	Means that minor personal injury or minor property damage may occur if proper precautions are not taken.

Symbol	Explanation	Symbol	Explanation
 Warning	Indicates that serious personal injury or substantial property damage may occur if proper precautions are not taken.	 Danger	Means that death can occur if proper precautions are not taken.
 Warning	Attention: Hot surface!	 Warning	Warning: Dangerous electrical voltage

2.4 Overview of the device functional scope

 Note	Depending on the installed device firmware, the electronics POD can have a different range of functions. The functional extensions can be found in the table below.

Function extension	Available from firmware version
Initial version with pulse input	REV230215
Version with frequency, voltage, and current input	REV260819

The installed software version is displayed below the manufacturer's logo in the form of REVxxxxxx for approx. 2 seconds after the device has been started.

3. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition.
Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:
The standard delivery includes:

- Universal plug-on evaluation electronics model: POD

4. Intended Use

Flawless operation of the device can only be guaranteed if all aspects in these operating instructions are adhered to.
The manufacturer assumes no responsibility for any damage resulting from improper use. The user assumes all responsibility for such usage.

Our products are designed exclusively for industrial use. Depending on the design, they can also measure potentially explosive, flammable, toxic and oxidizing substances.
The product should only be used for the media approved in the associated documentation. The resistance of the wetted parts should be checked before first use. The functional compatibility of the medium used with the product's measuring system should also be checked before first use.
The specified pressure and temperature range must always be observed.
The product must be permanently protected against corrosion caused by environmental influences. The general conditions listed on the nameplate, operating instructions and additional documentation must be permanently observed both when operating and storing the product. The information on the nameplate always takes precedence.
If the product documentation does not contain a separate specification of the environmental conditions, the values according to DIN EN 61010-1 must be observed. Otherwise, the following limitations prevail:

- Altitude: up to 2000 m
- Ambient temperature from 5 °C to 40 °C
- Pollution degree: 2

In addition to the above, the following applies to devices with a mains voltage supply:

- Fluctuations in the mains supply voltage up to 10 % of the nominal voltage;
- Overvoltage category II

4.1 Foreseeable misuse

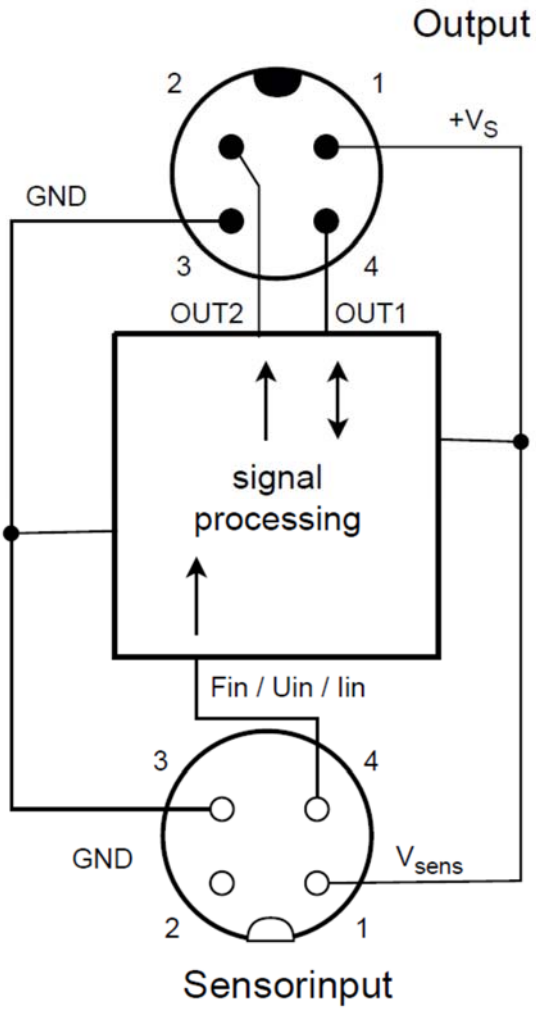
- The product must only be used in environments as defined in the documentation. In particular, only media compatible with the product's materials may be present in the environment.
- The product must not be subjected to mechanical loads (e.g., do not place or hang objects on the product, do not use it as a step or a grab handle, etc.).
- The product must not be structurally modified.
- Products with a wall-mounting option must only be installed on suitable surfaces and by qualified personnel.
- The product may only be enclosed in insulating devices if the permissible ambient temperature range is maintained as a result.

5. Functionality and use

The universal plug-on evaluation electronics POD- serves to upgrade or retrofit process sensors with pulse, frequency, current or voltage output and standardized sensor connector M12x1 and signal output at PIN4.
In this process, the electronics capture the incoming signal representing the sensor measurement, scale it, and display it on a color TFT screen.

Two individually configurable outputs are available for the available measured values: flow, volume, temperature, pressure, level, and force.
A simple dosing function with an external control input is also available.

The evaluation electronics can either be mounted directly on the M12x1 sensor connector or remotely via an extension sensor cable.
The orientation of the display can be individually adapted to the installation situation using software. The housing of the POD- can be rotated by 300° around the connector axis.



6. Mechanischer Anschluss

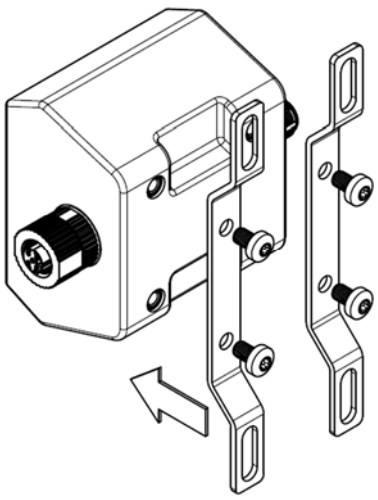
	WARNING Risk of injury due to vibration-related equipment failure
	Strong vibrations can lead to functional failure over time. The device must be protected against strong vibrations.

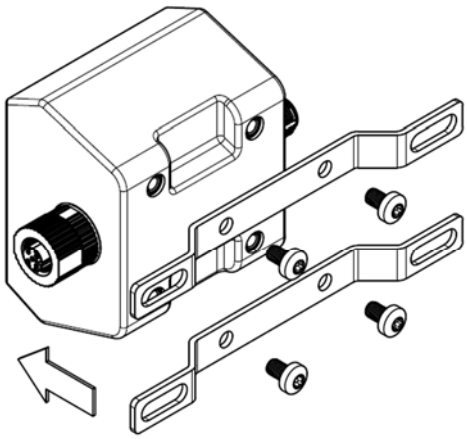
6.1 Mounting directly on the flow meter

The POD can be mounted directly onto a suitable measuring device—such as a flow meter—via the M12 connector.
To improve readability, the housing can be rotated by approximately 300° around the mounting axis.

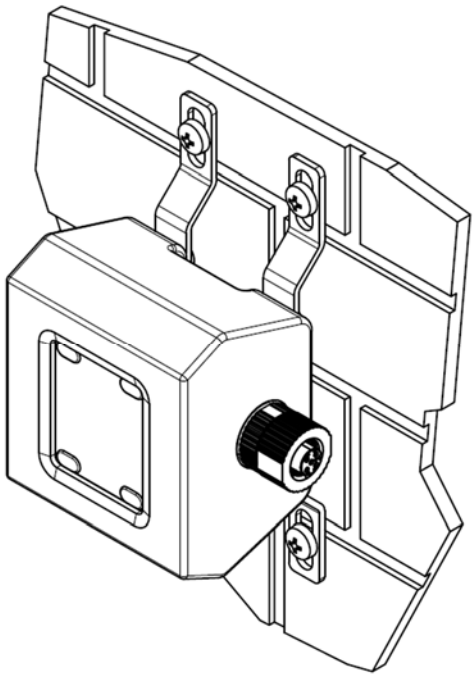
6.2 Wall-mounted installation (optionally available)

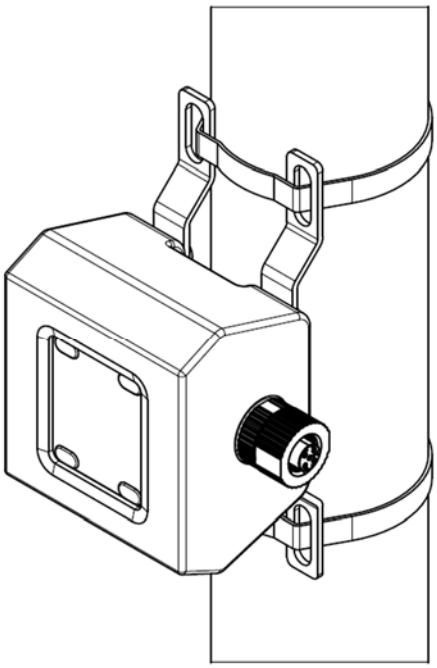
Pre-assembly of the mounting brackets (available as an option) on the underside of the housing. Depending on the installation situation, the brackets can be mounted either crosswise or lengthwise relative to the housing.





Mounting on a wall or pipe using the optional mounting set (screws, wall plugs, and clamps are not included)





7. Electrical Connection

	DANGER Risk of injury due to overcurrent in the event of a device fault.
	Overcurrent caused by device or installation faults can lead to fire. - An external overcurrent protection device must be installed in the supply circuit; the trip current should not exceed 1.5 times the device's maximum operating current. - Installation must be performed only by technically qualified personnel. - Allow the product to cool down before installation or removal. - Observe local occupational safety regulations and wear protective work clothing.

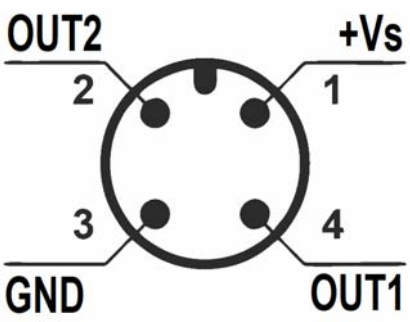
	DANGER Risk of injury from electric current
	Risk of malfunction or injury due to fire. The permissible operating voltage ranges must be strictly observed. Failure to do so may result in: - Malfunctions - Destruction of the device - Fire

7.1 Pin Assignment

7.1.1 External connection, output side

Connector: M12x1, 4-pin plug

Pin	Connection description
1	Supply 19 to 32VDC
2	Universal signal output 2
3	Supply GND
4	Universal signal output 1



7.1.2 External connection, input side (sensor)

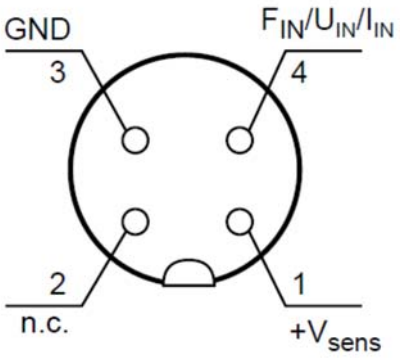
The maximum cable length between the sensor and the POD is 30 m. On the sensor side, the electronics are pin- and function-compatible with KOBOLD sensors featuring electronics options **-F3xx, -S30D, and L3x3**, among others.
Connector: M12x1, 4-pin socket

Pin	Connection description
1	Sensor supply = supply voltage +Vs on the output side
2	Not connected
3	Sensor GND = supply GND on the output side
4	Frequency/voltage/current input

The reference potential of the sensor must be identical to that of the POD's power connection.

The following limits apply:
Max. input current: 25 mA
Max. input voltage: 25 V

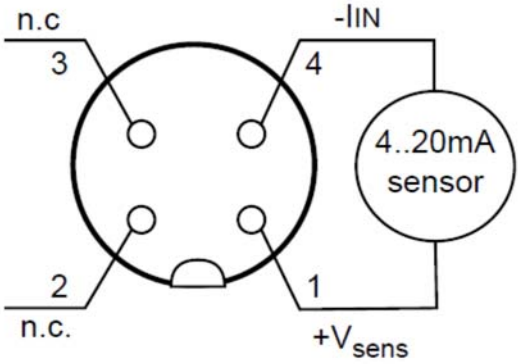
NOTE Note	If the input current on the sensor side exceeds 25 mA, the POD shuts down and attempts to restart once the input current drops below 25 mA again.



7.1.2.1 Three-wire version

For the output pin assignment, refer to the U-PACE electronics operating manual.

7.1.2.2 Two-wire version



8. Operation and menu structure

This operating manual covers only the specific operational differences of the POD. Refer to the U-PACE Electronics operating manual for all other controls.

Addition to the measurement variable table (Chapter 4.2 of the U-PACE manual) for the POD:
You can identify the connected sensor type on the display by the measurement variable symbol shown:

Sensor type	Measurement variable symbol	Availability	Description
Flow	Q	Always	Flow rate
Flow	AC	Only with connected frequency sensor	Totalizer
Flow	PT	Only with connected frequency sensor	Partial quantity counter
Temperature	T	Always	Temperature reading
Pressure	P	Always	Pressure reading
Level	L	Always	Level reading
Force	F	Always	Force reading

Expansion of the hotkey function (Section 5.3.5 of the U-PACE manual for POD):

Hotkey table:

Sensor type	Hotkey options	MIN/MAX / Reset	Value display / Reset
Frequency	Flow	Yes / Yes	Yes / No
	Partial quantity counter	Not available	Yes / Yes
	Totalizer	Not available	Yes / No
Current / Voltage	Flow rate	Yes / Yes	Yes / No
	Force	Yes / Yes	Yes / No
	Level	Yes / Yes	Yes / No
	Pressure	Yes / Yes	Yes / No
	Temperature	Yes / Yes	Yes / No

Expansion of the password function (Section 5.7):
The "Sensor" submenu is protected by a password lock once a password has been set in the "User Service" submenu. Thereafter, the sensor menu can only be accessed by entering the password, even if the device menu itself remains set to "unlocked" via the "Menu Lock" parameter in the User Service section.

Availability of the dosing function:
The dosing function is available only when the frequency input is active. It counts a dosing volume and can therefore only be used with flow sensors; other sensor types are unsuitable for dosing.

9. Device configuration

9.1 Definition of the sensor measuring range in the "Measurement" menu item

After selecting the "Measurement" menu item, the measurement value available based on the sensor settings is selected.

9.1.1 Unit

The unit displayed for the sensor-specific measured variable can be selected from various predefined standard units. It is also possible to define a custom "User" unit.

9.1.2 Measuring range

9.1.2.1 Measurement start

The measuring start parameter defines the start of the measuring range value of the measuring range. Measured values below the parameter value are set to "0", measured values above are displayed and processed in white.

9.1.2.2 End of measurement

The measurement end parameter defines the measurement range end value of the measurement range. Measured values below the parameter value are displayed and processed in white. Readings above are displayed in yellow up to the value of the parameter "Overflow" and continue to be processed normally.

9.1.3 Rounding

The display value can be calmed down with the "Rounding" parameter by reducing the display resolution. The parameter value defines the value to which the display value is rounded up or down.

Example:
Reading = **2.124**, rounding value = **0.2**
In this case, a display value results from rounding down to **2.00**.

9.1.3.1 Overflow

The "Overflow" parameter defines the limit as a percentage value of the "Measuring end" parameter from which the measured value is displayed in red.

Parameter table Measuring

Sublevel [Sensor measured variable]	Parameter level	Subparameter level	Input type	Description	Value range/ value list	Factory setting
Flow	Unit		List selection	Selection of the displayed unit for the flow rate measurement value	USER, L/m, mL/m, L/h, m^3/h, gals/m, gals/h, galk/m, galk/h, L/s mL/s	L/m
Temperature	Unit		List selection	Selection of the displayed unit for the temperature measurement value	USER °C °F	°C
Pressure	Unit		List selection	Selection of the displayed unit for the pressure measurement value	USER bar	bar
Level	Unit		List selection	Selection of the displayed unit for the level measurement value	USER m cm mm in	m
Power	Unit		List selection	Selection of the displayed unit of the force measurement value	USER N kN	kN
[Sensor measured variable]	Measuring range	Start of measurement	Value input	Sets the start of the measuring range	0 ≤ value ≤ 99999,99	0
		End of measurement	Value input	Sets the end of the measuring range	[Range Start] ≤ value ≤ 99999,99	100
		Rounding	Value input	Rounds the displayed value	0,0001 ≤ value ≤ 9,9999 [unit]	0,01
		Overflow	Value input	Specifies the percentage value of the measurement range end at which the "Overflow" status becomes active.	0 ≤ value ≤ 100 [%FS]	10

9.2 Configuring the sensor in the "Sensor" menu item

9.2.1 Selection of sensor type

The sensor type currently being actively processed by the POD is marked with a leading ">" on the display.
All other sensor types are configurable but are not currently being interpreted by the POD.
The sensor currently selected for configuration is highlighted in orange.
A sensor is activated for processing by the POD by setting the "Activation" option to "activated" in its corresponding submenu. As soon as a sensor type is activated via the "Activation" submenu option, the previously active sensor is automatically deactivated.
The following sensor types are available for selection:

S1: Frequency
The connected sensor must be a flow meter and supplies a frequency signal to the POD.
S2: Voltage
The connected sensor can measure quantities according to the "Unit Type" submenu and supplies a voltage signal of up to 25 V to the POD.
S3: Current
The connected sensor can measure quantities according to the "Unit Type" submenu and supplies a current signal of up to 25 mA to the POD.

9.2.2 Configuration of a sensor

9.2.2.1 Activation

To ensure the configured sensor is processed by the POD, it must be activated once.
Individual sensor types can be activated or deactivated in the "Activation" menu item.
The currently active sensor is indicated by a ">" in the sensor menu.

9.2.2.2 Defining the sensor type: Input type / Unit type

When a frequency sensor is selected, the "Input Type" menu item is available.
When a current/voltage sensor is selected, the "Unit Type" menu item is available.

9.2.2.2.1 Sensor type frequency

The "Input Type" parameter defines the physical input. The electronics engage the appropriate pull-up or pull-down resistors for the specific input type.

Input type	input circuit	Description
NPN	10 kOhm PullUp resistor	For sensors with output type NPN
PNP	10 kOhm PullDown resistor	For sensors with output type PNP
Reed	1 MOhm PullUp resistor	For reed sensors
Hall	10 kOhm PullUp resistor	For semiconductor Hall sensors with output type NPN
Active	high impedance	For active signals (e.g. PushPull)

9.2.2.2.2 Sensor Type: Current/Voltage

The "Unit Type" parameter determines the measured variable of the connected sensor.

Unit Type	Sensor unit	Description
Flow	L/m	A flow value is recorded
Temperature	°C	A temperature is recorded
Printing	bar	A pressure value is recorded
Level	m	A fill level is detected
Power	kN	A force value is recorded

9.2.2.3 Timeout – only available when the frequency sensor is selected

The "Timeout" parameter determines after which time the "pulse timeout" error should be issued without an incoming, complete signal period and the displayed measured value should be set to "0". If the parameter is set to "0", the function is deactivated and no error is returned.
The input also results in a minimum detectable input frequency of 0.1 Hz if the maximum possible timeout value of 10 s has been set.
The timeout should be set to the minimum possible value. This is calculated from the minimum frequency of the connected sensor:
$Timeout_{min}$ [s] = $1/F_{min}$ [Hz]
F_{min} [Hz] = 1/Timeout [s]

NOTE Note	The larger the timeout, the longer the response time for fault detection and zero signal at outputs and display. When using the dosing function, a large timeout value leads to very long run-on.

9.2.2.4 HW filter – only available with frequency sensor selected

With the parameter "HW filter" a simple low-pass filter with a cut-off frequency of approx. 3 kHz can be switched on. The hardware filter should be activated especially when using reed sensors in order to suppress the bouncing of the sensor signal if necessary.

9.2.2.5 Offset

The parameter "Offset" adds the offset entered here to the current measured value. The unit of the offset value results from the underlying sensor unit.

9.2.2.6 Scaling

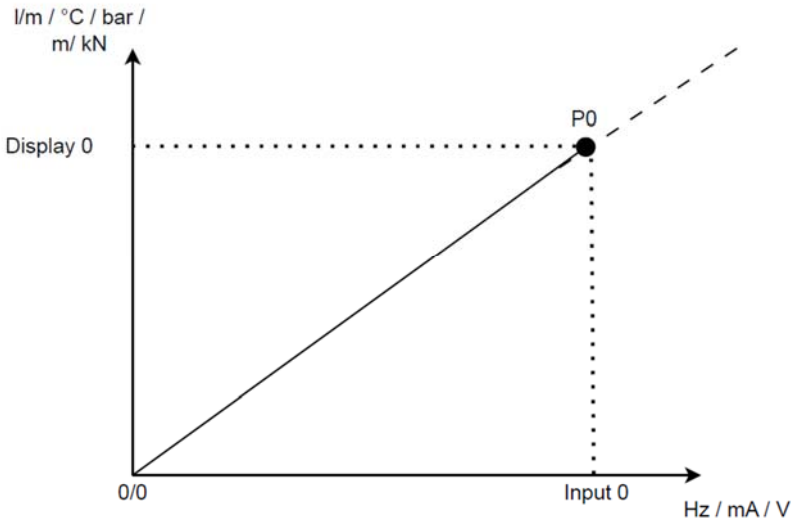
The scaling function replicates the characteristic curve of the sensor and determines the values for the measured value display, volume counter and outputs belonging to the input signal. If the input signal exceeds the linearisation point value of the maximum defined linearisation point P(max), the signal is calculated as an extension of the line from linearisation point P(max-1) to v linearisation point P(max).
The following parameters are available:

- Linearization: activates the input of multiple linearisation points to realize nonlinear sensor characteristics
  - activated: Menu item "Points" becomes visible in the upper menu
  - disabled: only the linearisation point "P0" is used for a linear sensor through the zero point
- Points: This menu item is only visible if the activation has taken place in the menu item "active". The number of linearisation points to be used can be set between 1... 10 points
- Px: adjustable linearisation point for defining the sensor characteristic curve
  - Display x: resulting measured value to be output on display and outputs of the POD at this linearisation points
  - Input x: applied input signal value = sensor output value of this linearisation points in Hz, mA or V

For the correct display of measured values in the display, the signal input must be scaled at at least one linearisation point.
By setting a single linearisation point, the sensor signal in the POD is interpreted as a linear measurement function with start point 0/0 and end point P0.

Example 1: Configuration as a linear sensor through the zero point.
e.g. 0... 500 Hz, 0... 10 V or 0... 20 mA sensor

1. Linearization selection: deselected
2. Setting the P0 point



If the connected sensor delivers a non-linear signal or if it is to be interpreted as a 4...20 mA or 2...10 V sensor, up to 9 additional linearisation points can be defined by activating the linearization.
The characteristic curve of the sensor is then approximated by a straight line section between the defined linearisation points.

NOTE Note	The zero point itself is always part of the scaling function and cannot be deleted or overwritten! The linearisation points must be unique and ascending!

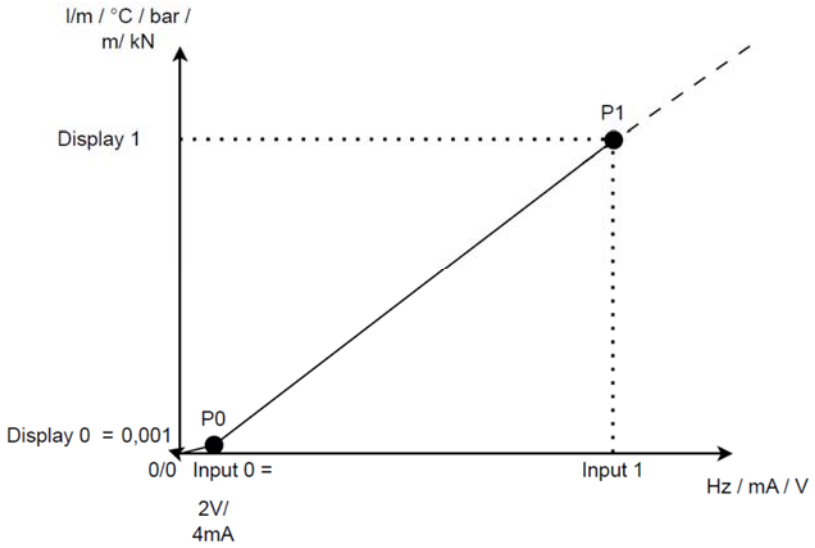
After entering the linearisation points, a consistency check is performed when exiting the menu. If the rules for uniqueness and ascending order of the vertices have been violated, the "sensor scale" error is set.

Example 2: Configuration as a linear 2... 10 V or 4... 20 mA sensor

1. Linearization selection: enabled
2. Selection "Points": 2
3. Setting points P0 and P1

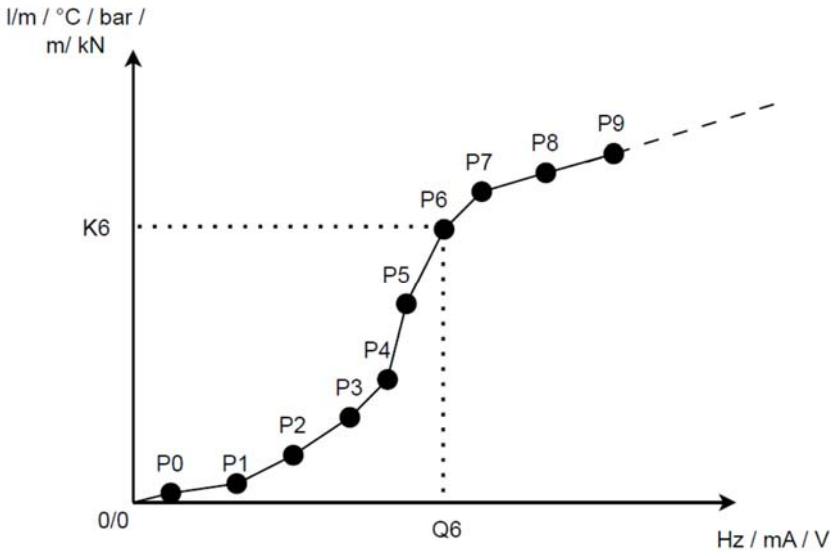
P0:
Display 0 = minimum possible value
Eingang 0 = 2 V/4 mA

P1:
Display 1 = end of measuring range
Eingang 1 = 10 V/20 mA

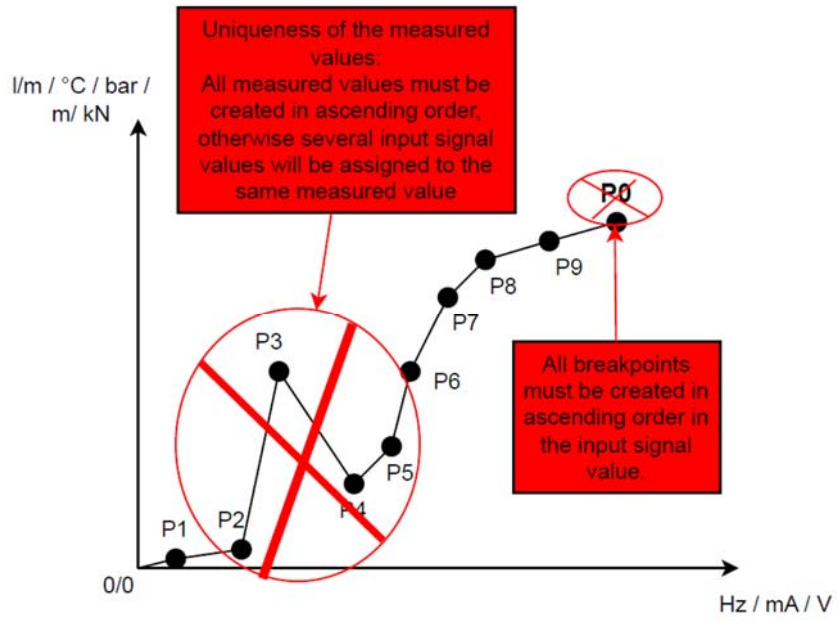


Example 3: Configuration as a non-linear sensor with 10 linearisation points:

1. Linearization selection: enabled
2. Selection "Points": 10
3. Setting points P0 and P9



Example 3: not possible configuration



The unit of measurement of the sensor is taken from the "Measurement" menu. The units available in the "Measurement" menu are in turn dependent on the "Unit Type" sensor setting. This means that the unit type of the active sensor must first be changed before the available measurement units are updated in the "Measurement" menu.

NOTE Note	The input of the sensor is limited to the scheme XXXX,XXX. To set the sensor, the unit must be selected accordingly in the measurement menu!

Special case: pulse output sensor with K-factor instead of frequency specification
When scaling a pulse sensor with a K-factor instead of frequency, the K-factor of the sensor must be calculated back to the underlying frequency!

Example 1: The active sensor category (flow, force...) is not changed – **the active sensor type is changed**

- Previously active sensor type: **S1**: Frequency: Flow meter
- Sensor type: **S3**: Current: Flow meter
- Current unit: L/min
- Desired unit: gals/h

When setting the scaling for the newly connected sensor, the unit l/min is used in the menu "S2: Current Scaling – Px – Display x". This results from the fact that a flow sensor with l/min unit was previously programmed. However, a sensor should now be operated in gals/h.

1. Sensor S3: Activate current
2. Exit the sensor menu (go back to the main menu)
3. Open the Measurement menu
4. Select "Flow"
5. Lineal einblenden
6. Select "gals/h"
7. go back to the main menu
8. Select the Sensor menu
9. Select "S3: Current – Scale – Px – Display x"
10. Now the sensor value for the connected flow meter can be set with current output can be entered in gals/h

Example 2: The active **sensor category (flow, force...) is changed** – the active sensor type is not changed

- Currently active sensor category: S2: Flow meter
- Sensor category: S2: Force gauge
- Current Unit: L/min
- Desired unit: kN

When setting the scale, the unit l/min is used in the menu "S2: Voltage -Scaling – Px – Display x". This is because a flow meter was previously programmed. However, a force meter in kN should now be entered.

1. Open the scaling menu of the active sensor "S2: Voltage" and select the "Unit Type" here
2. Select "Force" – now N is available as a unit in the "Scale-Px-Display x" menu. However, kN should be entered.
3. Go back to the main menu
4. Open the Measurement menu
5. Select "Unit"
6. Select "kN"
7. go back to the main menu
8. Select the Sensor menu
9. Select "S2: Voltage – Scale – Px – Display x"
10. Now the sensor value for the connected force sensor with voltage output can be entered in kN

Example 3: **The active sensor category (flow, force...) is changed – the active sensor type is changed**

- currently active sensor: S2: Flow meter
- now active sensor: S3: Force gauge
- Current Unit: L/min
- Desired unit: kN

When setting the scale, the unit l/min is used in the menu "S3: Current Scale – Px – Display x", although the parameter "Unit Type" has been set to force. In the menu "Measurement – Unit" no force unit can be selected. This is the case because the unit of the currently programmed, active sensor is always displayed here. Sensor S2 is currently still active. However, a force gauge in kN should now be entered as sensor S3.

1. Open the scaling menu of the sensor S3, open "Activation" and select "activated"
2. Open "Unit Type" and select "Force"
3. Go back to the main menu
4. Open the Measurement menu
5. Select "Unit"
6. Select "kN"
7. go back to the main menu
8. Select the Sensor menu
9. Select "S3: Current – Scale – Px – Display x"
10. Now the sensor value for the connected force sensor with current output can be entered in kN

9.2.2.7 Filter

The "Filter" parameter area allows additional filtering of the input signal. The settings correspond to those of the U-PACE measured value filter "Standard variant".
The parameterization is described in the additional instructions U-PACE electronics under 5.4.1.2 Filter function.

Parametertable Sensor

Parameter level	Menu item: "Sensor"	Sub-parameter level 2	Sub-parameter level 3	Description	Value Range / Value List	Factory Reset
Activation	List selection			Choice between simple straight line function and multi-point characteristic curve of the sensor	Enabled/ Disabled	Disabled
Input type	**ONLY frequency sensor**: list selection			Type of sensor	NPN, PNP, Reed, Hall, Active	Active
Timeout	**Frequency sensor ONLY**: value input			Waiting time without detected high edge until input signal = 0 is set	1 – 10 [s] in 1 s steps	1 s
HW-filter	**ONLY frequency sensor**: list selection			Activation of the hardware low-pass filter	Disabled/ Enabled	Disabled
Unit type	**Voltage/current sensor ONLY:** list selection			Type of sensor	Flow, temperature, pressure, level, power	Flow
Offset	Value input			Subtractive measurement correction value	0≤ Value ≤ 999,999	0
Scaling	Active	List selection		Activation of the multi-point characteristic curve	Disabled / Enabled	Enabled
	Points	Value input		Number of linearisation points	0 ≤ Value ≤ 9	2
	Px	Display x	Value input	Measured value at Px	0.001≤ Q(x-1) < value < Q(x+1) ≤ 9999,999	1
		Input x	Value input	Input signal value at Px	0.001≤ K(x-1) < value < K(x+1) ≤9999.999	1
Filter	Filter factor	See U-PACE electronics manual under 5.4.1.2				
	JD threshold					
	JD ConfFactor					
	0-ConfFactor					

9.3 Examples of configuring a sensor

Example 1:
A PNP frequency sensor with the following values should be connected:

- max. frequency 500 Hz
- Display in l/min
- Flow rate at F_{max} = 300 ml/min
- Flow rate at 0 hz = 0 ml/min
- It should be displayed exactly to the ml
- from 360 ml/min an overflow message should be issued
- Linear sensor characteristic curve
- no offset
- a hardware filter is to be activated
- After 5 seconds without a high cross, the display value should drop to "0"

The sensor is taught to the POD as follows:
Variant 1: **Setting in l/min**

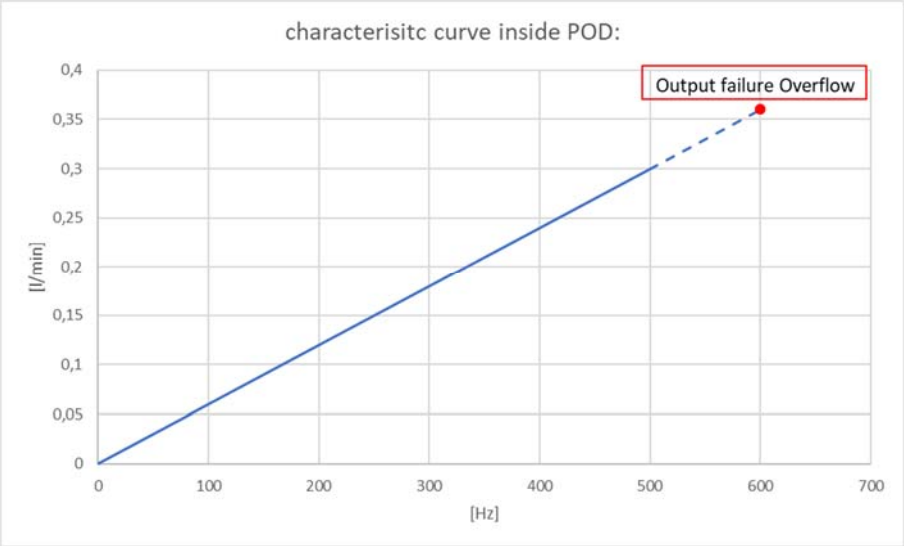
1. Configuring the Sensor
   a. Menu **"Sensor"-** select **"S1: Frequency"**
   b. **Input Type:** select **PNP**
   c. **Timeout:** enter **5**
   d. **HW filter:** enter **activated**
   e. **Offset:** enter **0**
   f. **Scaling:**
      i. **Active:** enter **disabled**
      ii. **P0:**
         1. **Display 0:** enter **0.3** (0.3 l/min = 300 ml/min)
         2. **Input 0:** enter **500**
   g. **Activation:** select **enabled** → in the "Sensor" menu, the frequency sensor is now marked as active: > S1: Frequency
2. Definition of the measuring range
   a. Menu **"Measurement" –** open **"Flow" – "Range"**
   b. **Measurement start =** enter **0.0**
   c. **End of measuring =** enter **0.3** (0.3 l/min = 300 ml/min)
   d. **Rounding =** enter **0.001** (0.001 ≙ 1 ml)
   e. **Overflow =** enter **20** (60 ml = 20% of 300 ml)

Variant 2: **Setting in ml/min**

1. Sensor Part Configuration
   a. Menu **"Sensor" –** select **"S1: Frequency"**
   b. **Activation:** select **activated** -> in the "Sensor" menu, the frequency sensor is now marked as active: >S1: frequency
2. Definition of the measuring range
   a. Menu **"Measurement" –** open **"Flow"-"Measurement range"**
   b. **Unit =** select **ml/m**
   c. **Measurement start =** enter **0,0**
   d. **Measurmenent end =** enter **300**

e. **Rounding =** enter **1**
f. **Overflow =** enter **20** (60 ml = 20% of 300 ml)

3. Final configuration of the sensor
   a. Menu **„Sensor“ –** select **„S1: Frequency“**
   b. **Input type:** select **PNP**
   c. **Timeout:** enter **5**
   d. **HW-Filter:** enter **aktivated**
   e. **Offset:** input **0**
   f. Scaling:
      i. **Active:** enter **disabled**
      ii. **P0:**
         1. **Display 0:** enter **300**
         2. **Input 0:** enter **500**



Example 2:
A current sensor 4...20 mA with the following values should be connected:

- Measured value temperature in °F
- Start of measurement: 32° F
- Measuring end: 300° F
- It should be displayed to an accuracy of 5°
- the temperature sensor is not linear. It has a curved gradient stored in the data sheet. This is to be approximated by a linearisation point at 150° F
- the temperature sensor does not sit directly in the medium and always shows 2° F too little
- an overflow message should be given immediately if the temperature exceeds the final value

The sensor is taught to the POD as follows:
Variant 1: **Setting display in °F and sensor in °C**

1. Configuring the Sensor
   a. **Menu "Sensor" -** select**"S3: Current"**
   b. **Unit Type:** select **Temperature**
   c. **Offset:** enter **-2** (sensor shows 2° F too little: measured value = X-(Offset) = X-(-2) = X+2 °F)
   d. **Scaling:**
      i. **Active:** enter **enabled**
      ii. **Points:** enter **3**
      iii. **P0:**
         1. **Display 0:** enter **0.001** (32° F = 0° C; 0.001 = smallest possible value above 0)
         2. **Input 0:** enter **4** (set the 4 mA point)
      iv. **P1:**
         3. **Display 1:** enter **65,556** (150°F = 65,556°C)
         4. **Input 1:** enter **15mA** (adjustment to nonlinear curve from sensor data sheet)
      v. **P2:**
         5. **Display 2: enter 148,889 (300°F = 148,889°C)**
         6. **Input 2: enter 20mA**
   e. **Activation:** select **enabled** → in the "Sensor" menu, the current sensor is now marked as active: > S3: Current
2. Definition of the measuring range
   a. Menu **"Measurement"-** open **"Temperature"-"Unit"**
   b. Select **°F**
   c. Open menu **"Measurement"-"Temperature"-"Measuring Range"**
   d. **Measurement start =** enter **32**
   e. **End of measurement** = enter **300**
   f. **Rounding =** enter **5**
   g. **Overflow =** enter **0**

Variant 2: **Setting display and sensor in °F**

1. Sensor part configuration
   a. "Sensor" menu – select "S3: Current"
   b. Activation: select activated -> in the "Sensor" menu, the current sensor is now marked as active: >S3: Current
2. Definition of the measuring range
   a. Open menu "Measurement" - "Temperature" - "Unit"
   b. Select F°
   c. Open menu “Measurement” – “Temperature” – “Measurement Range”
   d. Measurement start = enter 32
   e. End of measurement = enter 300
   f. Rounding = enter 5
   g. Overflow = 0
3. Configuring the sensor
   a. "Sensor" menu – select "S3: Current"
   b. Unit type: select Temperature
   c. Offset: Enter -2 (sensor shows 2°F too little: measured value = X-(offset) = X-(-2) = X+2°F)
   d. Scaling:
      i. **Active: enter enabled**
      ii. **Points: enter 3**
      iii. **P0:**

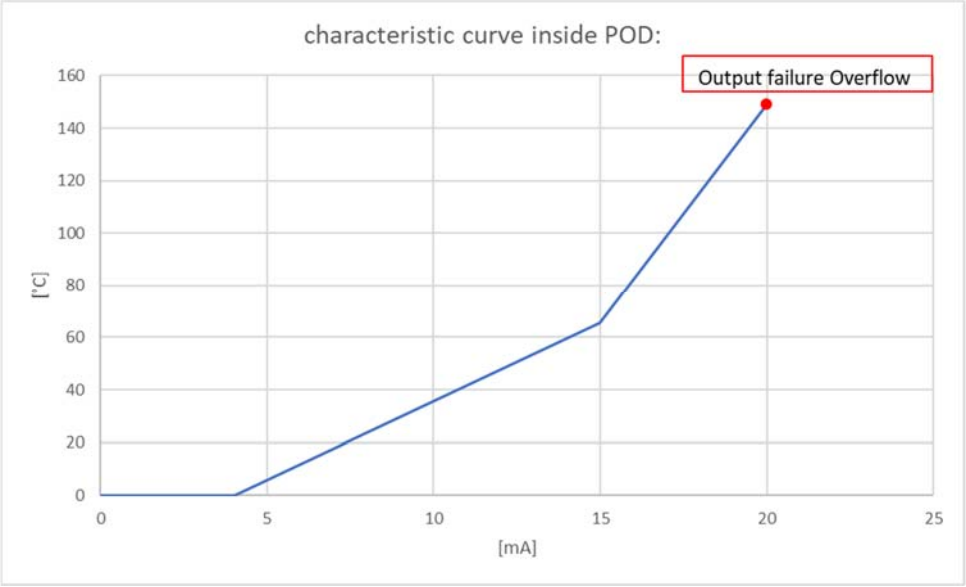
1. Display 0: enter 32
2. Input 0: 4 enter (setting the 4mA point)

      iv. **P1:**

1. Display 1: enter 150
2. Input 1: enter 15 mA (adjustment to nonlinear curve from sensor data sheet)

      v. **P2:**

   1. Display 2: enter 300
   2. Input 2: enter 20 mA



10. Device Status Table

The plug-on evaluation electronics POD can detect and display various device or application errors.
If there is a status or error message, the STATUS symbol in the display flashes alternately orange / red. To retrieve the status/error information, the status button must be pressed, then the status window that appears lists all the messages that have accumulated up to this point. By pressing the <<< button, the user confirms that he is aware of the displayed errors, the status memory is deleted and the status window is closed. If one of the displayed errors persists, this is reported again by flashing the status symbol.
The following status/error messages are generated:

Display text	Error type	Display color	Description	Troubleshooting
Pulse timeout	Note	White	The sensor type "frequency" is activated. No pulses were detected for the duration of the set timeout.	Timeout anpassen
Sensor overfl	Device error	Red	The maximum value of the active sensor type has been exceeded (current > 30mA; Voltage >25V; Frequency > 1000Hz)	Check the sensor for defects Check the suitability of the sensor
Sensor init	Device error	Red	Initialization of the active sensor type failed	Submission for repair
Sensor scale	Device error	Red	The scaling calculation of the active sensor type produces zero division	Checking all scale points

11. Technical Information

Operating instructions, data sheet, approvals and further information via the QR code on the device or via www.kobold.com

12. Order Codes

Operating instructions, data sheet, approvals and further information via the QR code on the device or via www.kobold.com

13. Dimensions

Operating instructions, data sheet, approvals and further information via the QR code on the device or via www.kobold.com

14. Disposal

See “General Safety Instructions” - via the QR code on the device or via www.kobold.com

15. IO-Link Process Data Structure

Byte	Data	Bitcount	Format	Factor	Range	Value	Description
0-3	Main Value	32	FloatT		-+/-1,4E-45… +/-3,4E+38	Depends on input type Chosen by user: Flow = l/m Temperature = °C Pressure = bar Level = meter Force = newton	
4-7	Volume	32	FloatT		+-1,4E-45… +/-3,4E+38	L	Is only applicable if sensor is a frequency/pulse input Otherwise will always read as 0
8-9	reserved	12	IntegerT		0/1		Reserved for future use
	reserved	1	BooleanT				Reserved for future use
	reserved	1	BooleanT				Reserved for future use
	Status Out 1	1	BooleanT				
	Status Out 2	1	BooleanT				

Main Value																											
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Byte 0								Byte 1								Byte 2								Byte 3							

Volume																											
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Byte 4								Byte 5								Byte 6								Byte 7							

reserved								reserved						
0	1	2	3	4	5	6	7	0	1	2	3	4	5	
Byte 8								Byte 9						

Status 1	Status 2
6	7
Byte: 9	Byte: 9

As long as a diagnostic status of type "Error" is active for the process value, the corresponding process values are invalid. Only if the diagnostic status is deactivated are the process values valid.

NOTE Note	The process data representation corresponds to the data structure on the device side. Please note: Siemens IO-Link Masters work with reversed high- and low-byte assignments if they are addressed byte-byte-byte!

16. EU Declaration of Conformance

We, KOBOLD Messring GmbH, Nordring 22-24, 65719 Hofheim, Germany, declare under our sole responsibility that the product:

Universal Plug-on Display Signal Converter **Model: POD-**

to which this declaration relates is in conformity with the following EU directives stated below:

2014/30/EU	**EMC Directive**
2011/65/EU	**RoHS** (category 9)
2015/863/EU	Delegated Directive (RoHS III)

Also, the following standards are fulfilled:

EN IEC 61326-1:2021 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

EN IEC 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

EN 60529:2014 Degrees of protection provided by enclosures (IP Code)

Hofheim, 08 Oct. 2026

H. Volz
General Manager

J. Burke
Compliance Manager