IO-Link

Pressure Transmitters

KERIOL250

Operating Instructions

English

PN-MAN-E-KERIOL250-24-1

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1 Quick set-up

Information about the IO-Link communication and set-up steps may be found here (“At a glance: IO-Link system description”):

https://io-link.com/share/Downloads/At-a-glance/IO-Link_System_Description_eng_2018.pdf

Connect the pressure transmitter to a suitable IO-Link-Master.

Install the device IODD. You may use the IO-Link-Master’s search function or download the IODD here: https://ioddfinder.io-link.com

Once the IODD is installed, the device is ready to use.

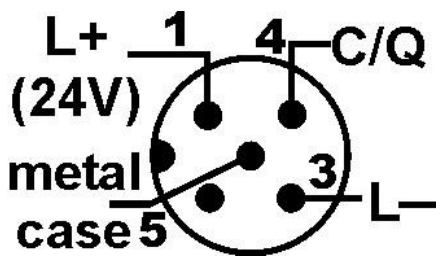
You may want to update the device location and/or TAG number before proceeding. Refer to chapter 2 for more detailed information.

Manual installation of PZM process connection (either pressure transmitter PZM or diaphragm MDM7887): To attain front-flush installation, slowly and with care push the PZM sensor until the axial stop of the process connection (adaptor or welding socket) is reached. Only then screw in and tighten the hexagon screw.

Once installed, you may want to execute the command “Auto-Nullen (Tarieren)“ (set bias - tara) to account for small pressure differences due to the spatial position of the device.

1.1 Electrical connection / port class A

Cable clamp connections inside the device head
M12 round plug connector pin configuration

	(from left to right) clamp 1 +24VDC clamp 2 GND (return) clamp 3 C/Q (command / query) clamp 4 not connected clamp 5 is connected to the device housing. Connect Pin 5 to ground potential if the device is not grounded by its installation (e.g. by a plastic tank).
	Pin 1 +24VDC Pin 2 not connected Pin 3 GND (return) Pin 4 C/Q (command / query) Pin 5 is connected to the device housing. Connect Pin 5 to ground potential if the device is not grounded by its installation (e.g. by a plastic tank).

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1.2 Easy exchange of devices

This device supports the IO-Link specification V1.1.

This specification allows for an intelligent exchange of devices, such that a specific device configuration is stored in the IO-Link master and downloaded onto an exchange device. No further action is required.

To be able to use this feature, the IO-Link master has to be configured to „Backup/Restore“. Refer e.g. to chapter 3.3 in the above mentioned „At a glance...“ - document.

1.3 Further information

IO-Link communication overview and first set-up steps

https://io-link.com/share/Downloads/At-a-glance/IO-Link_System_Description_eng_2018.pdf

IO-Link related downloads (IODD Checker, ...)

https://io-link.com/de/Download/Download.php

IODD-Finder

https://ioddfinder.io-link.com/

IO-Link master (arbitrary choice of vendors)

(TMG) https://www.tmgte.de/produkte/io-link/tmg-usb-io-link-master-v2-emc.html

(Pepperl+Fuchs) https://www.pepperl-fuchs.com/germany/de/classid_6436.htm

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Content

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2 IO-Link reference

Hengesbach vendor ID: 1508 (dec.), 0x05E4 (hex)

KERIOL250_-1/+10bar: Device ID 2008251, article ID KERIOL250_xxKNMx

2.1 Process data

sub-index	display	bit offset	type	bit length	range	unit
1	Pressure	40	integer	16	-32768..32767	mbar
2	Temperature	24	integer	16	-3276,8..3276,7	°C
3	Head temperature	8	integer	16	-3276,8..3276,7	°C
4	Excess pressure switchoff	0	boolean	1	0...1 / no...yes	n/a
5	Pressure < -5mbar	1	boolean	1	0...1 / no...yes	n/a
6	Pressure > 100%	2	boolean	1	0...1 / no...yes	n/a
7	Head temperature > 85°C	3	boolean	1	0...1 / no...yes	n/a
8	Service recommended	4	boolean	1	0...1 / no...yes	n/a

2.2 Parameters (rw)

Parameters may be both read or written by the user. They serve both information purposes as well as setting values & boundaries.

Identification	Application Specific Tag Funktionskennung (Function Tag)
Benutzereinstellungen, Druckeingang / User-specific setting, pressure input	Ortskennung (Location Tag) Signalglättung (signal smoothing) Auto-Null-Toleranz %FS / set bias tolerance %FS Wartungsintervall in Betriebsstunden (Druck > 5%) / maintenance after ... hours of operation (pressure > 5%)

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Typenschild / identification label	TAG-Nummer / Tag number Anlage / Plant Ort / Location Änderungsdatum (TTMMJJ) / date of change (ddmmyy)

2.3 Commands

Commands may be executed by the user.

Benutzereinstellungen, Druckeingang / User-specific setting, pressure input	Auto-Nullen (Tarieren) / set bias (tara)
Benutzereinstellungen zurücksetzen / bias value to zero	Auto-Null-Versatz (Tara) löschen / set bias to zero Auf Werkseinstellung zurücksetzen / restore Factory Settings
Typenschild / identification label	Tag, Anlage, Ort und Betriebs-Std. ins Archiv verschieben Move tag, plant, location and operation hours into the archive

2.4 Information

Information may be only read by the user.

Typenschild / identification label	Abschalt-Druck / switch-off pressure 0% des Beobachtungsbereichs / 0% of observation window 100% des Beobachtungsbereichs / 100% of observation window
Archive / archive	Tag, Anlage, Ort und Betriebs-Std. / tag, plant, location and operation hours
Produktkennung / product information	Geräte-ID / device-ID Produktname / product name Produkt-ID / product-ID Produkttext / product description Seriennummer / serial number Hardware-Revision / hardware revision

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Aktuelle AD-Werte / current AD values	Druck, Temperatur, Kopftemperatur, ADS1247 Chiptemperatur, MCU Spannung, MCU Chiptemperatur / pressure, temperature, transmitter temperature, ADS1247 chip temperature, MCU voltage, MCU chip temperature
Beobachtung / observation	Betriebsstunden / hours of operation Betriebsstunden seit letzter Verschiebung Daten ins Archiv / hours of operation after moving data to archive
Stunden über Grenze / hours of non-normal operation	Betriebsstunden seit Reset von „Beobachten“ / hours of operation after moving data to archive Druck ... vom Beobachtungsbereich / pressure ... of observation window Kopftemperatur / transmitter temperature < 60°C, 60-70°C, 70-80°, >80°C
Aktuelle und höchste Werte / current and maximum values	Maximum %FS Druck / pressure (%FS) Maximum Druck / pressure (mbar) Maximum Temperatur / temperature Maximale Kopftemperatur / maximum transmitter temperature
Diagnose / status	Error Count Device Status Detailed Device Status (1-8)

2.5 Error events

If the IODD is used in custom software, error events must be handled as such. It is not possible to read these conditions.

index	parameter	type	bit / chars
6200	Pressure is below 0% observation window	boolean	1
6201	Pressure is above 100% observation window	boolean	1
6202	Head temperature is above 85°C	boolean	1
6203	Excess pressure switch-off	boolean	1
6204	Service recommended	boolean	1
6205	User adjustment recommended (Auto-Zero)	boolean	1

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3 Device life cycle

3.1 Intended use

The pressure transmitters of the KERIOL250 series are designed for measuring the process pressure of aggressive and non-aggressive gases, vapors, and fluids.

Depending on the measurement cell of the device, the transmitter can be used for measuring both absolute and relative pressure.

Please read these operating instructions carefully before commissioning the devices. If you have questions, please contact the manufacturer.

The manufacturer cannot assume any liability for damage due to any other kind of use or the incorrect use of the devices. If in doubt, please contact the manufacturer.

	**The device is not approved for use in explosion-proof (ATEX, Ex) or safety-relevant (SIL) areas.**

The address of the manufacturer is:

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3.2 Assembly, commissioning and operation of the device

The device has been manufactured according to state-of-the-art technical knowledge and complies with all relevant guidelines for it to be safely operated.

The assembly, connection, commissioning, operation and service of the device should always be carried out by qualified personnel. Personnel who is carrying out the above tasks must have been authorised by the plant operator.

This document must be kept in a location where it is easily accessible for the relevant personnel. Please contact us for another copy if required or download another copy from the manufacturer's homepage.

3.3 Unpacking the device

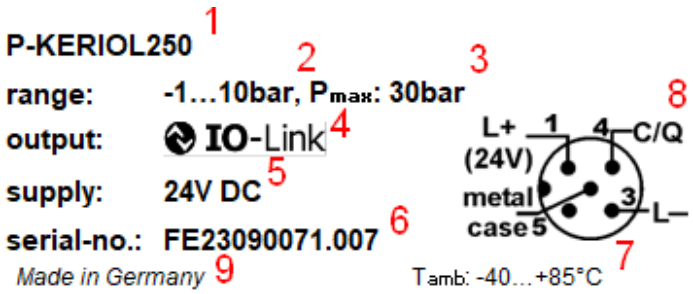
To avoid damage to the device, please observe the following notes before unpacking the device.

	**Carefully cut the packaging open as sharp objects may destroy parts of the device inside the packaging.**
	**Depending on the measuring cell, a cover protects the measurement membrane. Please only remove this cover immediately before installing the device.** **The measuring cell must under no circumstances be touched. Any damage to the membrane will result in the malfunction of the device.**
	**Please protect the contents of the shipment until its final installation and when all connections are checked for moisture-proof installation.**

Please check that the goods are of the correct type and complete, and that they`re undamaged.

If you detect any discrepancies, please contact the manufacturer immediately.

3.4 Device identification



1: Device designation
2: Measuring range
3: Overload protection
4: Output signal
5: Supply voltage
6: Serial number
7: Ambient temperature
8: Electrical connection
9: Manufacturing location

3.5 Assembly information

Please observe the following assembly notes. These notes are intended to ensure your own safety as well as ensuring the smooth, low-maintenance and reliable operation of the device.

	**You must make sure that any affected structures at the plant are depressurized and free of any medium before installing the device.**
	**You must make sure that personnel can safely work at the plant while the device is installed.** **Be aware of the danger of burns due to heat or cold and protect yourself against any contact with aggressive media.**

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	**Make sure that the potential equalization between device and plant is facilitated.** **In this respect, please also read the section regarding the electrical connections of the device.**
	**Do not remove the protective cover from the measuring cell during the assembly preparations.** **Only remove the cover shortly before installing the device. Make sure that you do not touch the membrane during the installation.**
	**The device manufacturer recommends that any device openings (e.g. ventilation) point downwards.** **Thus, any obstruction by e.g. highly viscose media will be avoided.**
	**The device should be installed in a low-vibration location and with some distance to larger machines and strong electrical fields.**
	**Make sure that the process connection to the plant fits tightly.** **Use a seal which is suited for your specific process and cleaning procedures, and pay special attention to its suitability for the process and cleaning temperatures.**
	**Tighten the device with the torque that is suitable for your process connection.** **If in doubt, please contact the manufacturer.**
	**If a reference cable is used, please observe a minimum bending radius of 120 mm.** **Protect the cable against the ingress of moisture by making sure that it ends inside a dry environment.**

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3.5.1 Diaphragm MDM7887 - process connection PZM with o-ring gasket EPDM

Cleaning notes

The process connection system PZM consists of a PZM process adaptor (e.g. PZM welding socket Z-PEM5FPZM) and a device with a process connection PZM (e.g. pressure transmitter type PZM or type MDM7887).

The process connection system PZM is cleanable via CIP and sterilizable via SIP. Cleaning and sterilization can thus be completed inline.

Please avoid any mechanical contact with the in-process parts as this may damage the pressure membrane.

Installation notes

The PZM process adaptor must be installed front-flush and without dead spaces, both in tanks as well as in pipes. If dead spaces cannot be avoided (as in t-pieces, extrusions) their length L should always be smaller than their diameter d, thus L < d. They must always be mounted to be self-draining. In tanks, the cleaning jet must be able to directly impinge and clean these spaces completely.

In storage, take care to avoid corrosion. Do not let stainless steel parts be exposed to inferior metals.

Avoid mechanical damages (scratches, dents) during installation of the PZM sensor into its respective process connection. Remove the protective cap just as the PZM sensor is to be inserted, not earlier. Act accordingly during PZM sensor removal.

Clean all sealing surfaces prior to inserting the PZM sensor to avoid leaks and contamination. The supplied o-ring may be greased (only use NSF-approved substances).

Restrict the greasing to small amounts to avoid problems with microorganism contaminations.

To attain front-flush installation, slowly and with care push the PZM sensor until the axial stop of the process connection (adaptor or welding socket) is reached. Only then screw in and tighten the hexagon screw.

Use PZM process adaptors together with the corresponding sealing according to the EHEDG position paper Easy cleanable Pipe couplings and Process connections, e.g. ASEPTO-STAR k-flex-sealing (process connection according to DIN 11851) or Tri-Clampseals (process connections according to DIN 32676 and ISO 2852).

Further installation instructions may be found in the EHEDG guideline Doc. 37 (Hygienic design and application of sensors).

Welding notes

The PZM welding adaptors are welded using the WIG procedure. To protect the seam root forming gas should be used.

Competent personnel must perform the preparations and the welding itself. The EHEDG guidelines Doc. 9 (Welding stainless steel to meet hygienic requirements) and Doc. 35 (Hygienic welding of stainless steel tubing in the food processing industry) may serve as further instructions.

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During welding, the PZM sensor must not be present in the adaptor. Use a welding dummy instead.

Avoid mechanical damages (scratches, dents) to any of the welding parts, and avoid corrosion (see “Installation notes” also).

To avoid welding distortion Hengesbach recommends:

- use a welding dummy or a comparable, state-of-the-art cooling procedure

- tack the adaptor to multiple, opposing points which are roughly the same distance apart

- weld opposing segments segmentally between the tack points

- after welding opposing segments allow all parts to cool down before proceeding

The welding seam must be cohesive and its surface must be flat, regular and free of welding defects. The first welding seam should be from the process product side (inside). As a rule, a post-treatment of the welding seam (e.g. polishing) is necessary to attain the required surface finish.

Before inserting the PZM sensor, all welded parts must be allowed to cool down completely.

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3.6 Electrical connection

	**The operating voltage of the device is 24 VDC. The device must under NO circumstances be operated with ANY other supply voltage.**

3.6.1 Connection cable gland

The cable gland may be used for cables with an outer diameter between 5mm and 9mm.

Use wires with a minimum cross section of 0,33mm² (AWG 22).

Without wire-end sleeve (only rigid wires)	0,33 to 1,5 mm² (AWG 22 to AWG 16)
With wire-end sleeve (flexible and rigid wires)	0,33 to 0,5 mm² (AWG 22 to AWG 20)

	(from left to right) clamp 1 +24VDC clamp 2 GND (return) clamp 3 C/Q (command / query) clamp 4 not connected clamp 5 is connected to the device housing. Connect Pin 5 to ground potential if the device is not grounded by its installation (e.g. by a plastic tank).

	**Earth yourself and the device before installing the connections to minimize unnecessary loads due to static electricity.**
	**When connecting, ensure that the connection lines are reliably fixed. The manufacturer recommends the use of wire-end sleeves.**
	**Use connection cables adhering to the IO-Link standard.**

3.6.2 Connection M12 round plug, 5pin

If the device is fitted with an M12 device plug (male), the following connection scheme applies:

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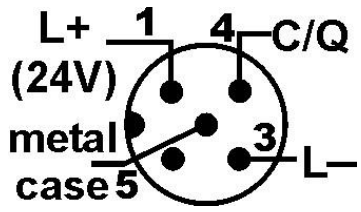	Pin 1 +24VDC Pin 2 not connected Pin 3 GND (return) Pin 4 C/Q (command / query) Pin 5 is connected to the device housing. Connect Pin 5 to ground potential if the device is not grounded by its installation (e.g. by a plastic tank).

3.7 Servicing and cleaning

The device does not contain parts that can be serviced by the user.

	**Any changes that are made to the inside of the device will automatically result in the loss of warranty.** **The manufacturer reserves the right to reject any repair request for such devices - this does not apply to the opening of the device lid for the purpose of wiring.**

We recommend that the following items be checked at least twice a year:

- process connection o-ring- or profile sealing (replace if necessary)
- tight connection of the braids to the screw terminals
- tight connection of the cable to the cable gland (if applicable)
- tight connection of the M12 plug (if applicable)
- tight connection of the device lid
- free pressure ventilation (reference cable: free ventilation tube)
- device head is free from any media and does not show coloring and/or corrosion

	**Observe the maximum permitted temperatures when cleaning.** **Sustained overtemperature can destroy both the electronics and attachments at the housing.**
	**The membrane of the measuring cell must not be directly impacted locally, such as by high-pressure cleaning equipment. This may result in the destruction of the membrane.** **Please continue to avoid any mechanical contact with the measuring cell.**

The housing of the device can be cleaned with all common cleaning agents and methods.

Please contact the manufacturer if you consider using special types of cleaning agents and processes.

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When using high-pressure equipment for cleaning, please make sure that you do not directly aim at the openings of the device, such as the pressure ventilation element.

3.8 Storage

Storage should be clean, dry, cool, and protected against vibration.

	**Do not let the devices stand upright on top of their measurement membrane.**
	**Do not let the stainless steel parts of the device come into contact with any other metallic material, especially black or raw steel. This carries the risk of severe corrosion.**

3.9 Disposal: Packaging material

A certain packaging effort is required to protect the device against damage during transport. Please recycle the packaging materials correctly or reuse them for packing other items.

3.10 Disposal: Obsolete devices

The devices consist of different materials, all of which need to be specifically disposed of. Therefore, please dispose of the devices via a suitable recycling specialist or return them to the manufacturer for the purpose of disposal.

	**The device is not subject to the WEEE directive 2002/96/EC and its associated laws and regulations. Therefore, obsolete devices are not designed for disposal in municipal recycling centers.**

4 Warranty & device returns

If a device seems to show malfunctions, please start by examining possible faults (see chapter 5). You may also contact the manufacturer to discuss further actions.

If you intend to return a defective device:

1. Include a completed RMA return procedure & decontamination formular. It is available for download at www.hengesbach.com, tab “downloads”.

2. Secure the measuring membrane against all forms of contact and use transport-proof outer packaging.

	**Devices which do not carry a completed decontamination formular may be rejected by the manufacturer.**

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	**Faults which are due to incorrect handling, incorrect installation or other improper handling of the product will not be regarded as warranty cases.**

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5 Faults and troubleshooting

In the event of a fault or malfunction, please check the following items to exclude possible error sources before beginning with the actual troubleshooting.

If your problem is not described here, contact the manufacturer to discuss further actions.

Fault	Possible causes	Check / correction
The device does not start OR	The IO-Link-Master is defective.	Replace IO-Link-Master
The device does not display values OR	The cable connecting the IO-Link master and the device is damaged.	Replace cable
The device fails to display values at some point.	A switch-off event has happened (e.g., the transmitter head temperature is too high	Return the device to a suitable ambient and measurement condition
The output signal does not react promptly to pressure changes.	The damping value is set to a very high integration time	Set the damping value down to the minimum required time