CETONI

CE EXTERNAL PRESSURE SENSOR

Hardware Manual

ORIGINAL INSTRUCTIONS 1.01 – JULY 2019

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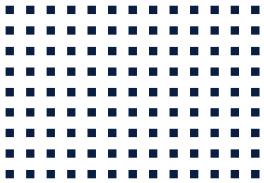


1 Overviews & Directories

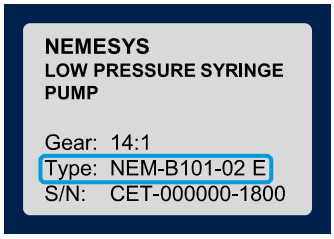
1.1 Table of Contents

1.2 Revision History

REV	DATE	CHANGE	VALID FOR
1.00	28.05.2019	Creation of the manual	Type: NEM-B070-01 A Type: NEM-B070-02 A
1.01	11.07.2019	Connection diagram for QmixIO-B added	Type: NEM-B070-01 A Type: NEM-B070-02 A

IMPORTANT. In its current revision, this manual applies only to the product types listed in the last line. Should you require a manual from a previous revision, please do not hesitate to contact us. Please let us know your device type and email address and we will send you the appropriate manual as a pdf file.

The type of your product can be found on the label behind "Type:", according to the marked number in the following example:



2 Introduction

2.1 Preface

Thank you for purchasing a product from CETONI. With this user manual we would like to support you as well as possible when handling the device. If you have any questions or suggestions, please do not hesitate to contact us.

2.2 Symbols and Keywords Used

The following symbols are used throughout this manual to help you navigate through this document:

HINT. Indicates application tips and useful hints to facilitate operation.

IMPORTANT. Indicates important information and other particularly useful information that does not describe dangerous or harmful situations.

ATTENTION. Indicates a potentially harmful situation. If it is not avoided, the product or something in its environment may be damaged.

CAUTION. Indicates a potentially dangerous situation. If it is not avoided, slight or minor injuries and property damage may result.

2.3 Norms and directives

CETONI GmbH declares under its sole responsibility, that the external pressure sensor complies with the health and safety requirements of the relevant European directives.

2.4 Application Purpose

2.4.1 General Description of the Device

The external pressure sensor is a small, chemically resistant pressure sensor with low dead volume for connection to the I/O interface of other CETONI devices.

2.4.2 Intended Use

The external pressure sensor is intended to be used to monitor the pressure in a fluidic system, driven by neMESYS syringe pumps, or to build a pressure regulation.

Application usually takes place in laboratory.

2.4.3 Reasonably Foreseeable Faulty Application

A use for applications distinct from the intended purpose can lead to dangerous situations and is to be omitted.

CAUTION. The unit must not be used as a medical device or for medical purposes.

2.4.4 Safety measures

The safety of the user and a failure-free operation of the devices are assured only if original parts are used. Only original accessories may be used. Warranty claims will not be accepted for damage due to the use of alien accessories or expendables.

The devices have been developed and constructed in such a way as to largely rule out hazards due to its intended use. Nevertheless, you must observe the following security measures in order to exclude any remaining hazards.

- CETONI GmbH points out the responsibilities of the operator for the operation of the devices. The laws and regulations of the place of installation must be observed while operating the devices! To ensure a safe work routine, operators and users must assume responsibility for adhering to regulations.
- The devices must not be used as a medical device or for medical purposes.
- The neMESYS Pressure Sensor is designed and approved to work in fluidic systems that do not exceed a maximum volume of 1 liter and a maximum pressure of 200 bar. CETONI GmbH is not liable for consequences that may arise if the user expands the system by peripheral devices, such that one of the values or both values are exceeded.

  It is explicitly stated to observe the validity of the Pressure Equipment Directive 2014/68/EU, wherein Article 4 “Technical requirements“ has to be paid particular attention.

  It is the user's responsibility to become familiar with the mentioned Pressure Equipment Directive and to comply with the prevailing requirements.
- Before operating the unit, the user must at all times ensure the operational reliability and the adequate and orderly condition of the unit.
- The user must be familiar with the operation of the device and the software.
- The device as well as cables and pipes must be checked for damage before operation. Damaged pipes, cables and plug devices must be replaced immediately.
- Cables and pipes must be laid in a way that avoids any risk of stumbling.
- It is not allowed to use the device in an explosive atmosphere or with potentially explosive substances.
- Wear protective glasses if you are working with corrosive, hot or otherwise dangerous substances during assembly work on the device.
- Transportation, storage or operation of the device below 0°C with water in the fluid passages may cause damage to the device.

2.4.5 Measures for Safe Operation

2.4.5.1 ELECTROMAGNETIC EMISSIONS

The neMESYS Pressure Sensor is intended to be operated with a neMESYS System which is connected directly to the public power supply network that supplies buildings used for domestic purposes.

2.4.5.2 ELECTROSTATIC DISCHARGE

Floors should be made of wood, concrete, or ceramic tiles. If the flooring is made of a synthetic material, the relative humidity must be at least 30%.

2.4.5.3 ELECTRIC DISTURBANCES

The quality of the supply voltage should be to the standard of a typical business or hospital environment.

2.4.5.4 MAGNETIC DISTURBANCES

Do not place power connector cables, even of other appliances, in close proximity of the devices and their cables. Mobile communication devices may not be used in closer proximity of the devices or their cables than the recommended safety distance!

2.5 Warranty and Liability

The devices left our company in perfect condition. Only the manufacturer is permitted to open the devices. All warranty and liability entitlements, particularly damage entitlements due to personal injuries, are void if the devices are opened by an unauthorised person.

The duration of the warranty is 1 year of technical equipment (expect wear parts) from the day of delivery. It is not extended or renewed due to work carried out under warranty.

CETONI GmbH considers itself responsible for the devices with regard to safety, reliability and function only if assembly, new settings, changes, extensions and repairs are carried out by CETONI GmbH or an authorised centre, and if the devices have been used in accordance with the instruction manual.

The product conforms to the basic safety regulation standards. Industrial property rights are reserved on the circuits, methods, names, software programs, and units.

2.6 Scope of Delivery

The following items should be included:

EXTERNAL PRESSURE SENSOR

- Pressure range, connections and materials according to order

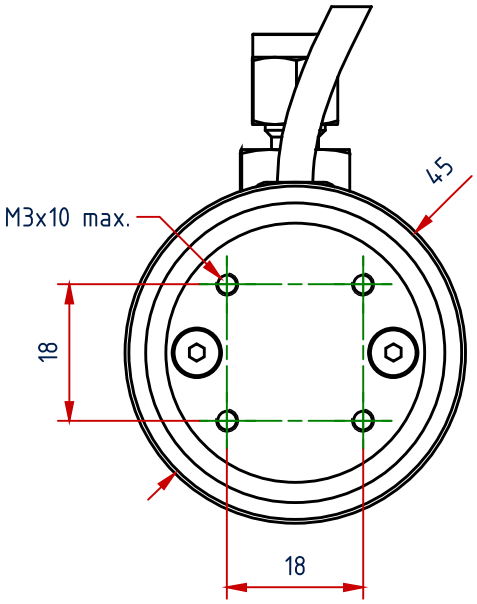
3 Technical Data

3.1 Environment

OPERATING TEMPERATURE	0°C to 50°C
STORAGE TEMPERATURE	-20°C to 75°C
AIR HUMIDITY OPERATION AND STORAGE	20% to 90%, non-condensing

ATTENTION. Indicates a potentially harmful situation. If it is not avoided, the product or something in its environment may be damaged.

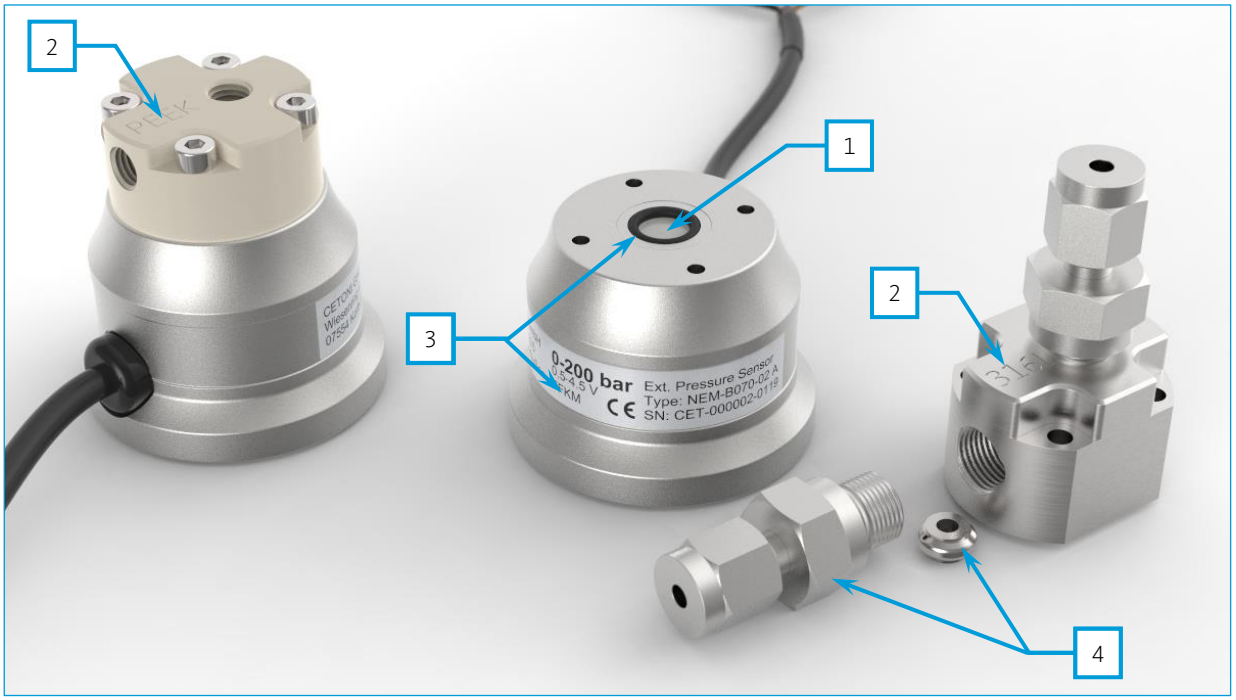
3.2 Interfaces

HIROSE CABLE PLUG 12p round	for connection to neMESYS I/O-interface
JST CABLE SOCKET 12p flat	for connection to neMESYS OEM I/O-interface
FREE LEADS WITH FERRULES	for connection to Qmix I/O-B module
MOUNTING OPTIONS	

3.3 Wetted Materials

The following picture shows the components that have media contact during operation.

1. The pressure sensor consists of Al_2O_3 (aluminum oxide ceramics)
2. The material of the upper part of the housing is engraved on its upper side.
3. The material of the seal is indicated on the type plate.
4. The material of the fittings and sealing discs for the 100 and 200 bar versions is according to your order and in most cases corresponds to the material of the upper part of the housing.



ATTENTION. Before using the neMESYS Pressure Sensor, please check the chemical resistance of the wetted materials against the dosing liquid.

4 Transport and Storage

It is recommended to use the original packaging for any returns as this ensures optimal protection of the equipment during transport. If this is no longer available, please ensure that the equipment is safely stored within a stable box. Please also take care of enough cushion material to protect the equipment for mechanical shocks.

For storage, observe the information given in the "Technical data" chapter.

5 Operation

5.1 Pressure Range/Configuration

The pressure sensor must be configured in the software before use. The procedure is described in the software manual. During configuration, you must specify the pressure range and output signal. These values can be found on the type plate.

IMPORTANT. In operation, the pressure rating of the sensor must not be exceeded permanently. However, the sensor is capable of withstanding an overload pressure corresponding to twice the nominal pressure for a maximum of one second in the event of a fault.

5.2 Electrical Connection

IMPORTANT. Please read and observe the respective section of the associated software manual before connecting the device.

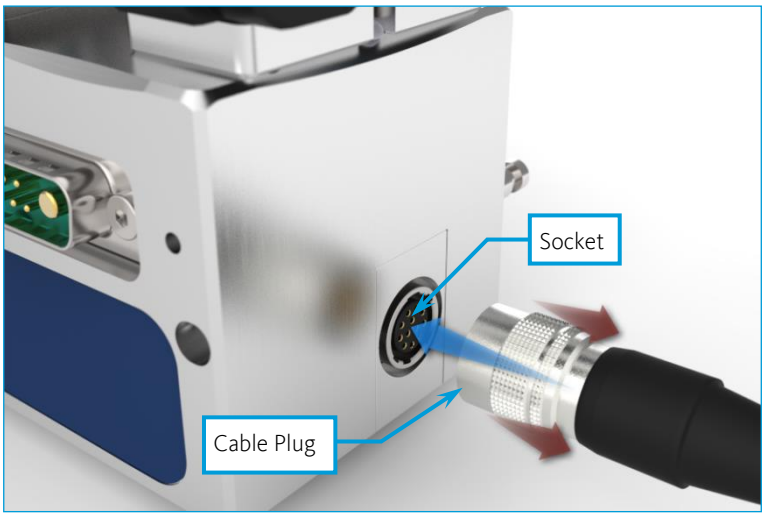
CAUTION. Danger of stumbling due to connecting cables! Place cables and tubing in such way as to avoid any danger of stumbling!

5.2.1 Connection to neMESYS I/O-interface

The pressure sensor with the 12-pin Hirose cable plug can be connected to all neMESYS devices that are fitted with the corresponding 12-pin Hirose socket.

Plug the cable connector of the pressure sensor into the socket of the module until it snaps into place (blue arrow). Please note that the plug will fit only one way!

To remove it, pull on the metal sleeve of the plug. Thus, the lock is released and the plug can be easily removed. (red arrows)

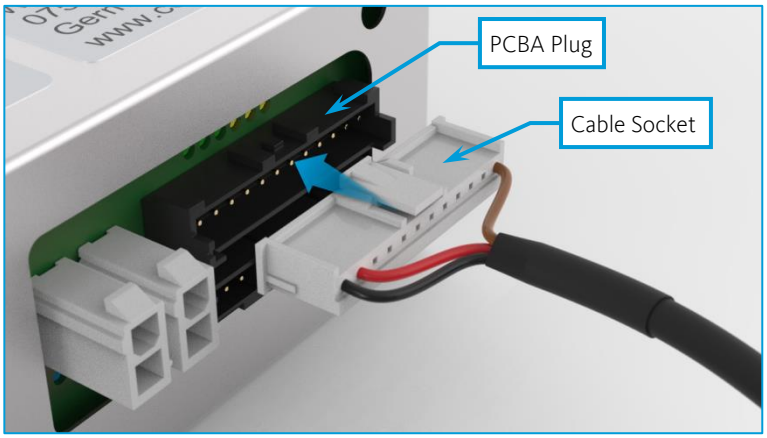


5.2.2 Connection to neMESYS OEM I/O-interface

The pressure sensor with the 12-pin JST cable socket can be connected to all neMESYS devices that are fitted with the corresponding 12-pin JST PCBA plug.

Plug the cable socket of the pressure sensor into the plug of the module until it snaps noticeable into place. Please note that the connection will fit only one way!

To remove it, pull on the snap-fit rocker of the cable socket. Thus, the lock is released and the cable can be removed easily.

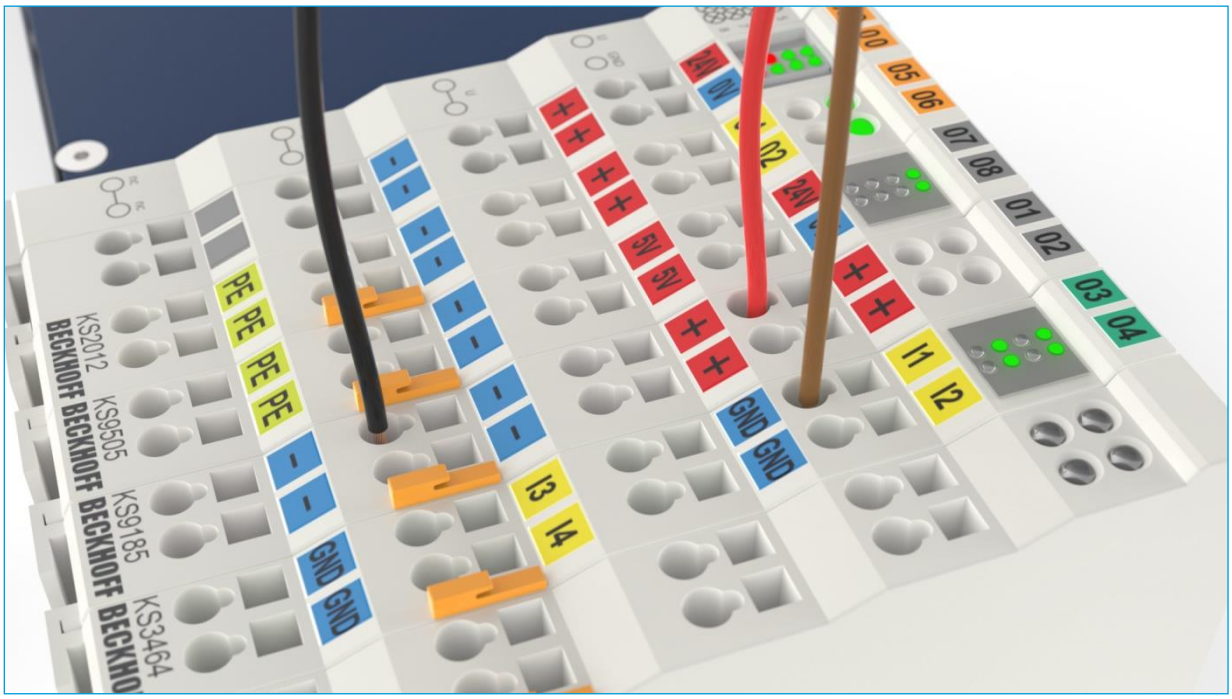


5.2.3 Connection to Qmix I/O-B module

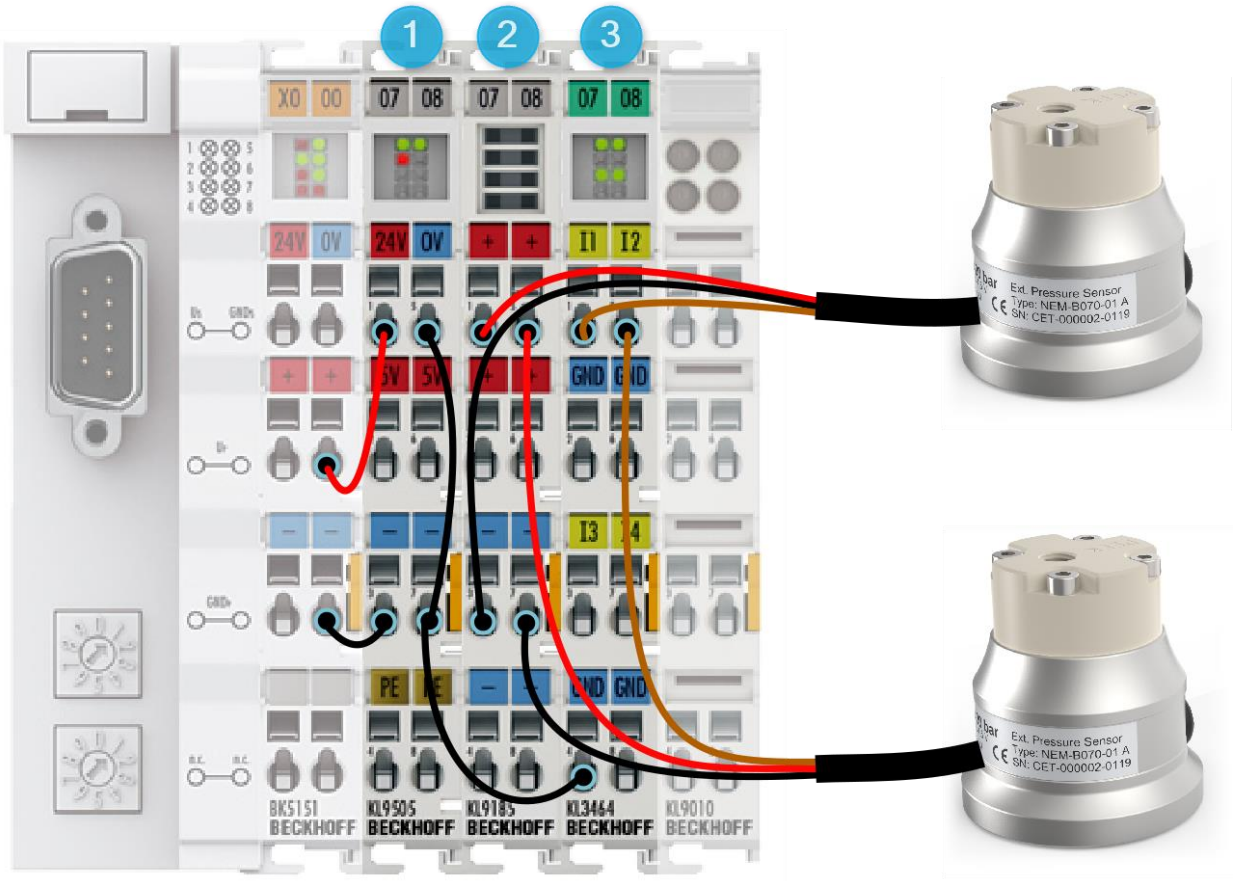
The pressure sensor with free leads can be connected to the Qmix I/O module or other suitable evaluation systems. The following table shows the assignment of the wires according to their color:

WIRE COLOR	ASSIGNMENT
BLACK	Ground
RED	Supply Voltage 5 ± 0,5 VDC
BROWN	Signal 0,5 ... 4,5 V

The recommended connection method for the Qmix I/O-B module is to use the KL3464 analog input terminal (4-channel analog input terminal 0...10 V) together with the KL9185 potential distribution terminal and the KL9505 5V power supply terminal.



The following wiring diagram shows how the pressure sensors are connected to the terminals. The 5V for the voltage supply of the pressure sensors is generated via the KL9505 power supply terminal (1). The potential distribution terminal KL9185 (2) provides these 5V and the ground for the connection of up to 4 pressure sensors. The brown signal lines of the pressure sensors can be connected directly to the 4 inputs (I1 - I4) of the KL3464 analog input terminal (3).



Up to 4 pressure sensors can be connected with this terminal configuration. If you want to connect additional pressure sensors, simply add another KL9185 potential distribution terminal and an additional KL3464 analog input terminal to the system.

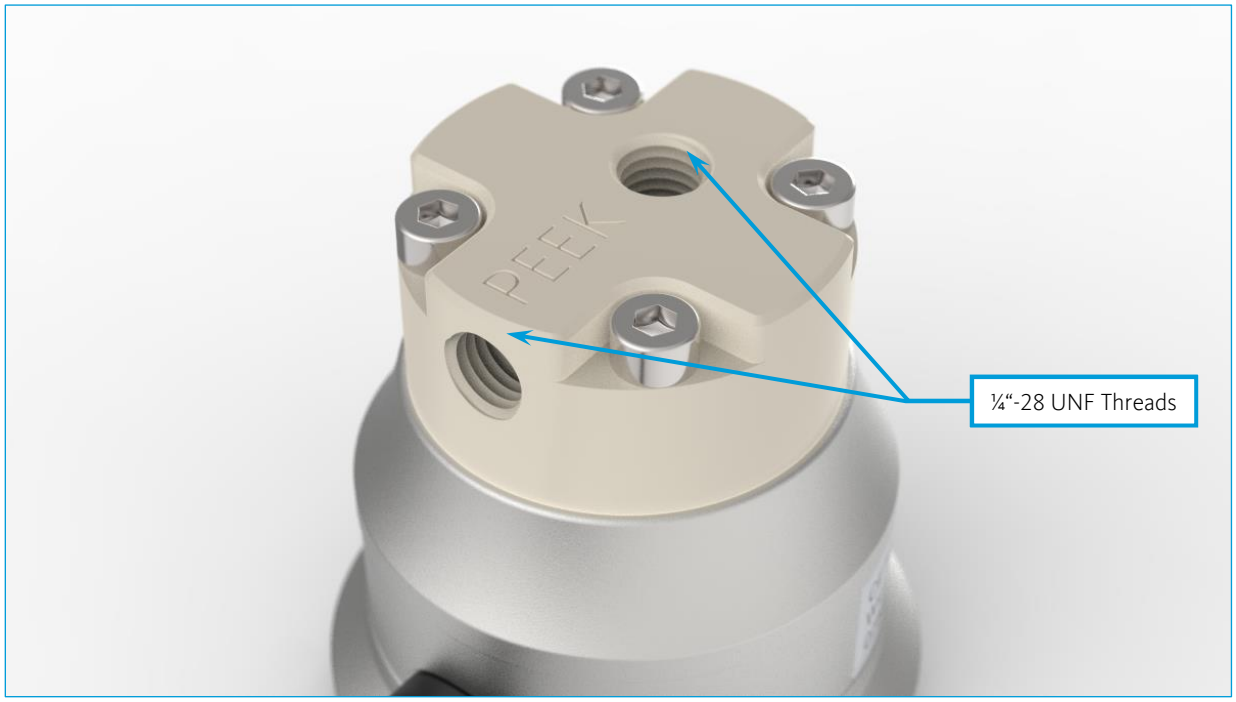
IMPORTANT. Depending on the terminals used, the wiring actually required may differ from the illustration.

5.3 Fluidic Connection

5.3.1 Pressure Range up to 50 bar

For pressure sensors up to and including 50 bar the fluidic connection is made via fittings with ¼"-28 UNF thread. When selecting the fittings and tubing, make sure that they can withstand the expected pressure.

HINT. The pressure sensors can be flowed through in any direction. However, for better venting, it is advisable to use the side port as the inlet and the top port as the outlet.



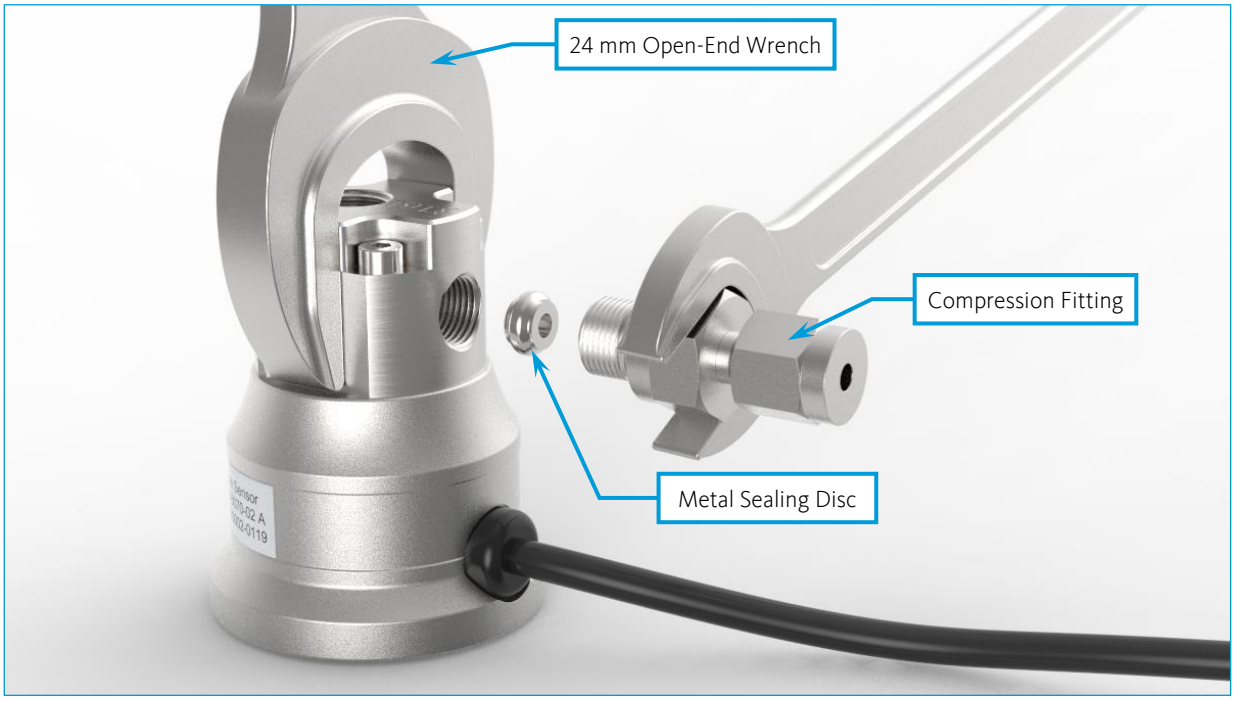
CAUTION. Only use fittings and capillaries specified for the anticipated pressure levels. After connecting, check the tightness of all fluidic connections on a regular basis.

5.3.2 Pressure Range 100-200 bar

Pressure sensors for 100 and 200 bar have G1/8" connection holes into which compression fittings can be screwed. For a tight connection, a metal sealing disc is inserted into the hole before screwing in the compression fitting. The compression fittings you ordered are already assembled.

If you want to replace the compression fittings, hold the housing in place with a 24 mm open-end wrench and loosen or fasten the compression fitting with one of the open-end wrenches of the following size. The required tightening torque is 45 Nm.

- 9/16" for compression fittings for 1/16" and 1/8" pipes
- 14 mm for compression fittings for 2, 3 and 4 mm pipes



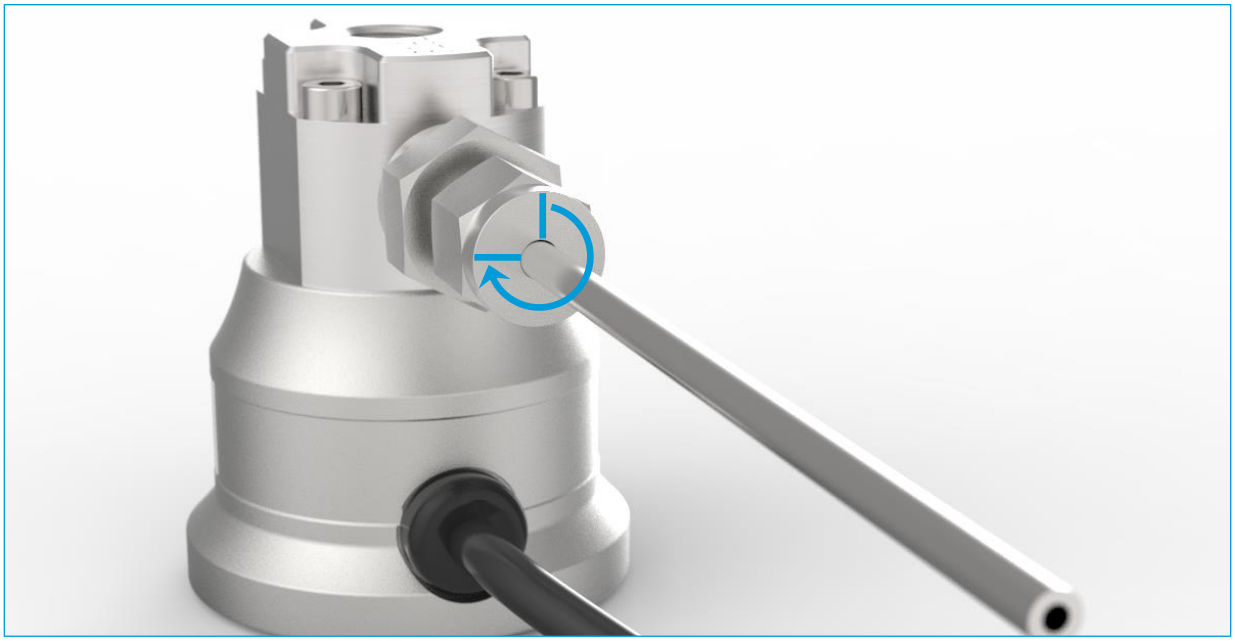
HINT. The pressure sensors can be flowed through in any direction. However, for better venting, it is advisable to use the side port as the inlet and the top port as the outlet.

5.3.2.1 FIRST-TIME TUBE INSTALLATION

(1) Fully insert the tube into the fitting and against the shoulder; rotate the cap nut finger-tight.

(2) Mark the cap nut at the 12 o'clock position.

(3) Tighten the cap nut three-quarters turn to with an open-end wrench.



HINT. The following wrench sizes are required to operate the cap nut:

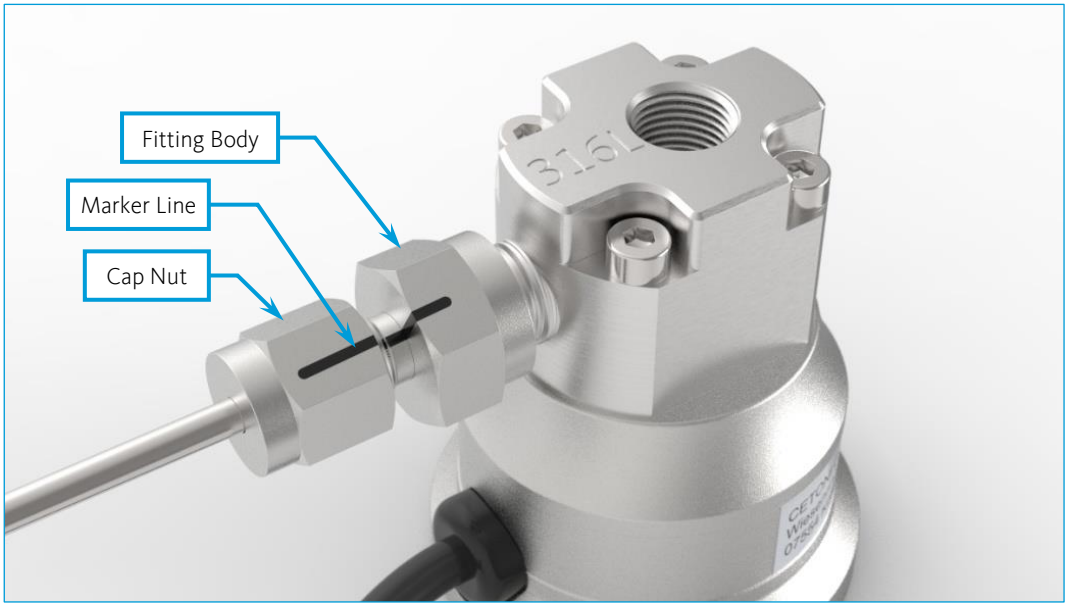
- 5/16" for compression fittings for 1/16" tubes
- 7/16" for compression fittings for 1/8" tubes
- 12 mm for compression fittings for 2, 3 and 4 mm tubes

CAUTION. Only use fittings and capillaries specified for the anticipated pressure levels. After connecting, check the tightness of all fluidic connections on a regular basis.

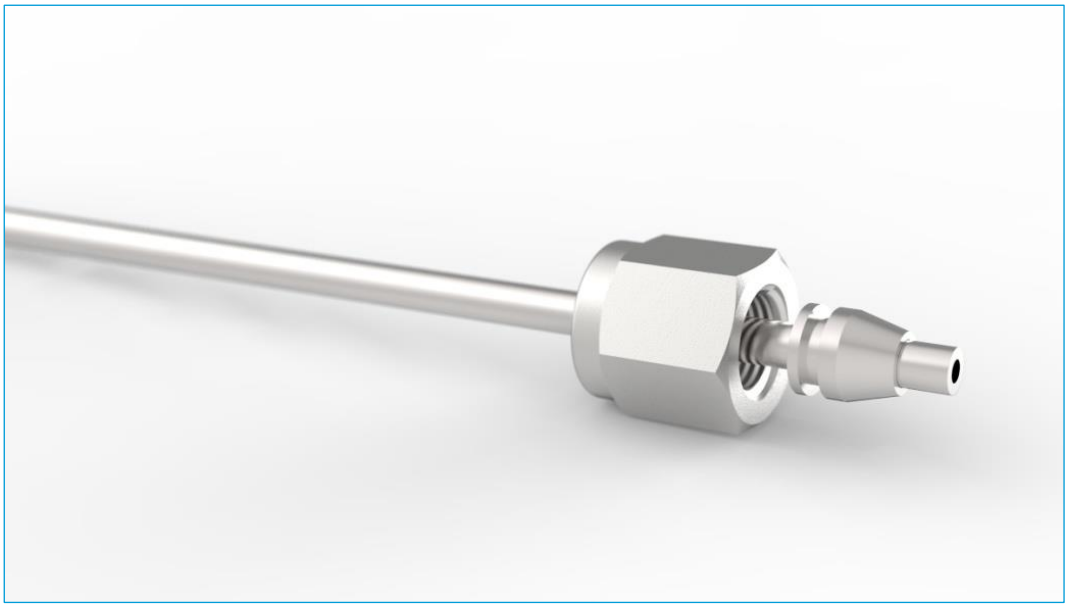
5.3.2.2 TUBE DISASSEMBLY

CAUTION. Release pressure from the system before loosening the fittings.

(1) Before disassembly, draw a marker line across the nut and the fitting body. In this way you create a reference for retightening the cap nut to exactly the same position it was in before.



(2) Pull out the tube. The cap nut and the ferrules remain on the tube.



5.3.2.3 TUBE REASSEMBLY

(1) To reassemble, insert the tube with preassembled ferrules into the fitting body until the front ferrule seats against the fitting body.

(2) Rotate the cap nut with an open-end wrench to the previously pulled-up position as indicated by the marks you made before; at this point you will feel a significant increase in resistance.

(3) Retighten the nut slightly.

6 Maintenance and Care

If used in accordance with intended purpose, the device is maintenance-free. Should there be a failure despite this, which you cannot eliminate yourself, or which requires opening the device beyond what is described below, please contact CETONI GmbH to coordinate further actions. The device may only be opened by CETONI GmbH or thereby authorized service staff. Otherwise the warranty claims are void.

Software-related troubles are dealt with in the Software Manual.

For cleaning it please rub the surface gently with a soft, damp cloth. The cloth must not be wet, so that no fluency can trickle into the device. In case of a heavier soiling you can also use a little bit of detergent or alcohol.

To change the seal, which may be necessary due to media resistance, it is necessary to remove the upper part of the housing. To do this, proceed as follows:

6.1 Disassembly/Assembly

Remove the four Allen screws with a 2.5mm Allen wrench and remove the upper part of the upper part of the housing. Now you can carefully wipe off the sensor surface and the inside of the upper part of the housing or replace the seal.

Up to and including 50 bar the seal is an O-ring with 10 mm inner diameter and 1.5 mm cord thickness, from and above 100 bar it is an O-ring with 7 mm inner diameter and 1.5 mm cord thickness. In addition to the O-ring, in the 100 and 200 bar versions the reduction ring highlighted in blue in the following picture is located in the recess. This can also be removed for cleaning purposes.

When reassembling, make sure that the O-ring seal and reducing ring (if present) are correctly seated in the recess and tighten the four screws evenly crosswise to secure the upper part of the housing.

CAUTION. Wipe pressure sensors, particularly those with a nominal pressure below 10 bar, very carefully to avoid damaging the ceramic diaphragm.

HINT. The orientation of the upper part of the housing relative to the connecting cable is not important. You can rotate the upper part of the housing in 90° steps if required by the tubing.

7 Disposal

Please send your old devices back to CETONI GmbH. We will take care of proper disposal.

If necessary, please decontaminate the device before sending it back and attach a completed decontamination declaration with your shipment.