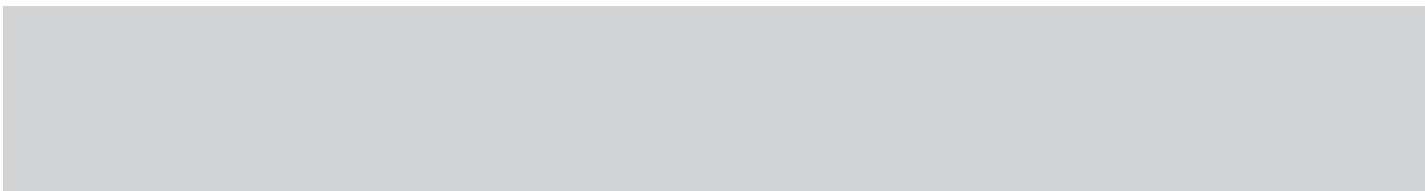
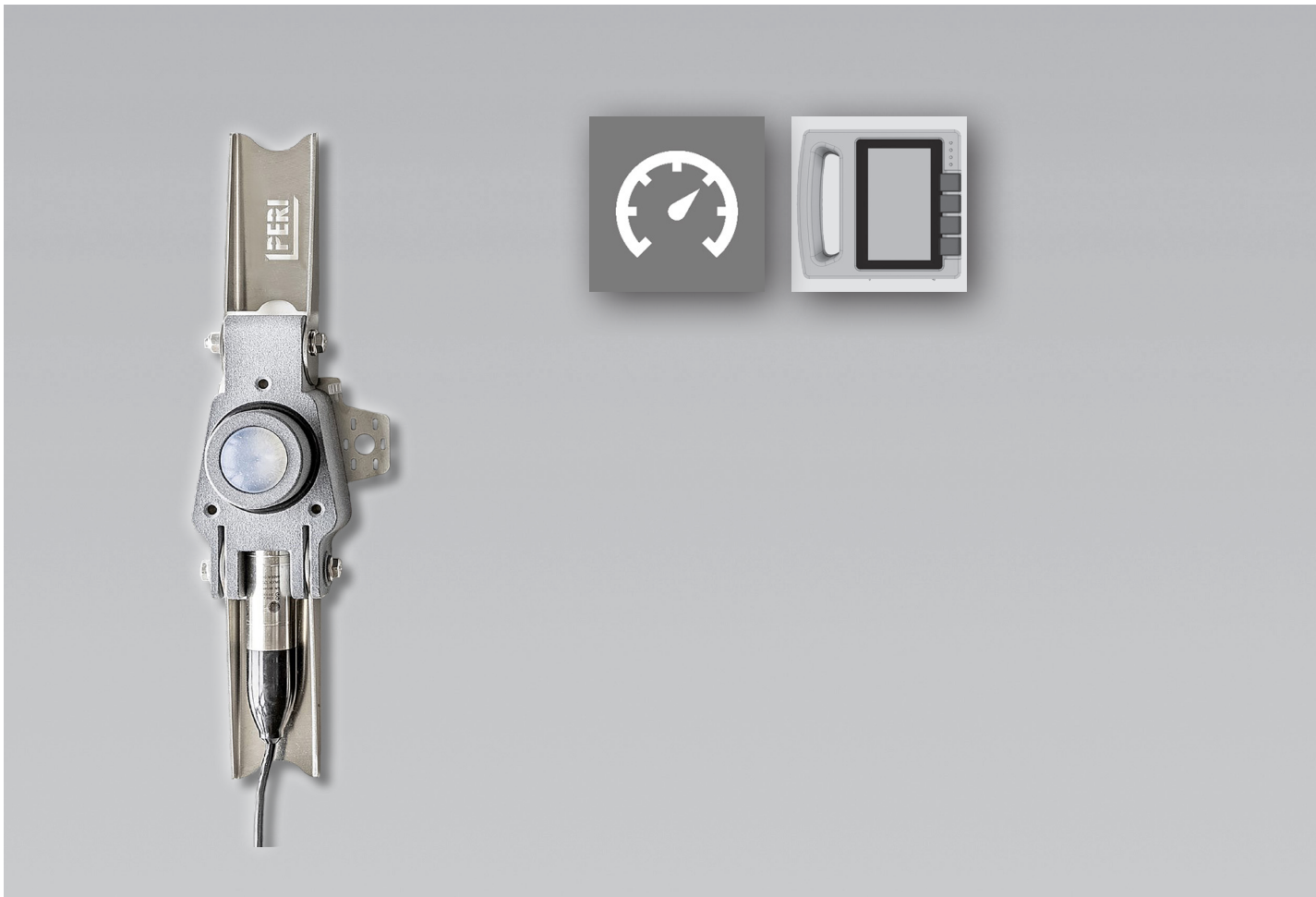


PREMO Concrete Pressure Monitoring Data acquisition system

Installation and operating instructions – Version 1.2



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Overview

Main components

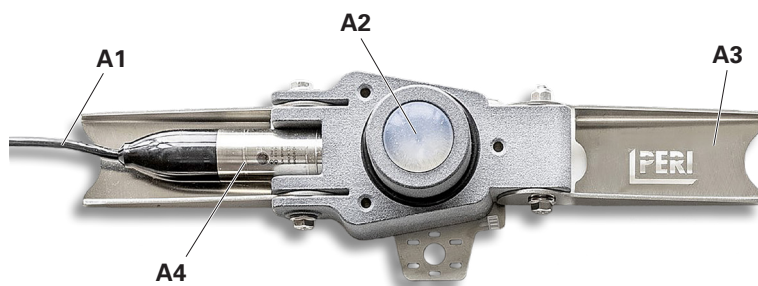


Fig. 01

Thermocouple

- A1** Connecting cable
- A2** Pressure membrane
- A3** Removable bracket
- A4** Pressure transducer

Overview

Key

Pictogram | Definition



Danger/Warning/Caution



Note



To be complied with



Visual inspection



Tip



Incorrect use



Safety helmet



Safety shoes



Safety gloves



Safety goggles



Personal protective equipment to prevent falling from a height (PPE)

Arrows in drawings



Arrow representing an action



Arrow representing a reaction of an action*



Arrow representing forces

* If not identical to the action arrow.

Warning notices

Warnings appear before instructions for action and are categorised as follows:



Danger

means that serious bodily injury or death will occur if the aforementioned precautions are not taken.



Warning

means that serious bodily injury or death may occur if the aforementioned precautions are not taken.



Caution

means that minor bodily injury may occur if the aforementioned precautions are not taken.



means that damage to property or an undesirable situation may occur if the aforementioned precautions are not taken.

Layout of the warning messages



Signal word

Type and source of hazard!

Consequences of non-compliance.

⇒ Preventative measures.

Conventions of representation

- Instructions are numbered with: 1. ..., 2. ..., 3. ...
- Individual actions are represented by:
▶
- The result of an instruction is shown by: →
- Position numbers are clearly provided for the individual unit components and are given in the drawing, e.g. **A1**, in the text in brackets, for example (**A1**).
- Several position numbers, i.e. alternative components, are represented with a slash: e.g. **A1/2**.

Introduction

Target groups

Contractor

These installation and operating instructions are intended for contractors involved in concrete construction for structural and civil engineering projects.

Competent person

(construction site coordinator)
The Safety and Health Protection Coordinator*

- is appointed by the client,
- must identify potential hazards during the planning phase,
- determines measures that provide protection against risks,
- creates a safety and health protection plan,
- coordinates the protective measures for the contractor and site personnel so that they do not endanger each other,
- monitors compliance with the protective measures.

Competent persons qualified to carry out inspections

Due to the specialist knowledge gained from professional training, professional experience and recent professional activity, the competent person qualified to carry out inspections has a reliable understanding of safety-related issues and can carry out inspections correctly. Depending on the complexity of the inspection to be undertaken, e.g. scope of testing, type of testing or the use of certain measuring devices, a range of specialist knowledge is necessary.

Qualified personnel

The data acquisition system may only be used by instructed** specialists. The specialist must have concrete engineering skills and be able to manage and oversee the process of concreting and curing in professional structural and civil engineering projects.

Instruction on the system must cover at least the following points:

- Instruction on the functions and operation of the ISC hub.

- Description of the associated sensors, and how to install and connect them.
- Instruction on data collection and evaluation of results.

The user of the system must also be technically capable of drawing the correct conclusions from the measurement results in order to be able to take the appropriate measures, e.g. the decision to strip the formwork.



- **In other countries, ensure that the relevant national guidelines and regulations in the respective current version are complied with!**
- **If no country-specific regulations are available, it is recommended to proceed according to German guidelines and regulations.**

* Valid in Germany: Regulations for Occupational Health and Safety on Construction Sites 30 (RAB 30).

** Instructions are given by the contractor themselves or a competent person selected by them.

Additional technical documentation

- Installation and operating instructions:
 - InSite Construction (main instructions)
 - TEMO Temperature Monitoring
 - PHONO Concrete Detection and Compaction Measurement

Introduction

Intended use

Product description

Vemaventuri AB products have been designed to be used exclusively in industrial and commercial sectors by suitably trained personnel only.

The PREMIO concrete pressure sensor is used to measure the pressure that fresh concrete exerts on the formwork. The sensor data is collected and evaluated using the InSite Construction (ISC) data acquisition system. This allows the concrete pressure to be monitored in real time and the concreting speed to be optimally adjusted.

The system may only be used in concrete construction for structural and civil engineering projects.

The information regarding the intended use of the data acquisition system must be observed.

The concrete pressure sensor is designed for outdoor use. However, the unit should be protected from intense weather, strong sunlight and dirt.

Features of the concrete pressure sensor

- Dust- and waterproof metal housing
- Membrane for absorbing the concrete pressure
- PERI bus connections
- No calibration required

Standards and guidelines

The sensor meets the requirements of the EU directives:

- 2014/30/EU (EMC)
- 2014/35/EU (low voltage)
- 2011/65/EU & 2015/863/EU (RoHS)
- 2014/68/EU (pressure equipment)

Harmonised standards applied:

- EN 61000-6-1/2/3/4
- EN 61326-1
- EN 61326-2-3

Instructions for Use

Improper use may result in incorrect measurements or damage to the unit.

Only the pressure sensors approved by the manufacturer may be used. Each sensor type is designed for a specific purpose and must not be used for other purposes.

Safety instructions



Safety instructions apply to all service life phases of the system.

General information

The contractor must ensure that the installation and operating instructions provided by the manufacturer are available at all times and understood by the site personnel.

Before using the system

- ⇒ Read and understand this manual and the safety instructions it contains carefully.
- ⇒ Observe the laws and regulations in force in the country of use. This includes, in particular, safety precautions as required when handling live equipment.
- ⇒ Check units, mains cables and accessories for damage and functional correctness.
- ⇒ Damaged connectors and cables must be removed immediately and no longer used.
- ⇒ Only use original spare parts from the manufacturer.
- ⇒ Send damaged units to a service workshop approved by the manufacturer for inspection and repair, see the chapter "Transport and storage" in the main manual of the data acquisition system.

Failure to observe these safety precautions may result in injury or damage to the unit.

Obligations of the operating company

The operating company owns the unit and its peripherals or has rented both. It is responsible for adhering to the intended use at all times.

The operating company must:

- assign the various tasks carried out on the unit to qualified and authorised personnel
- instruct the personnel on how to carry out their duties and responsibilities, and provide evidence of this instruction
- provide all the means necessary for the personnel to carry out the tasks assigned to them
- ensure that the unit is only operated in a technically faultless condition
- ensure that the unit is protected against unauthorised use

Technical details

PREMO Concrete Pressure Sensor

Properties

Pressure transducer	Type	DPS 5000
	Power supply	2.7 ... 3.6 V DC, 2 mA
	Working pressure	0 ... 2 bar (0 ... 200 kPa)
	Precision	± 0.1 % FS (full scale)
	Output signal	I2C digital

Ambient conditions

	Operating temperature	-15 ... +55°C (5 ... 131°F)
	Ambient humidity	≤ 95 % rF non-condensing

Interfaces, communication

PERI bus	Serial interface	1 × 5-pin socket, digital, semi-proprietary
	Protocol	I2C

Unit structure

	Material, housing	Stainless steel
	Membrane filling	Glycerol
	Protection type	IP68 up to 700 metres water column
	Weight	0.86 kg

Tab. 01

Unit description

Dimensions

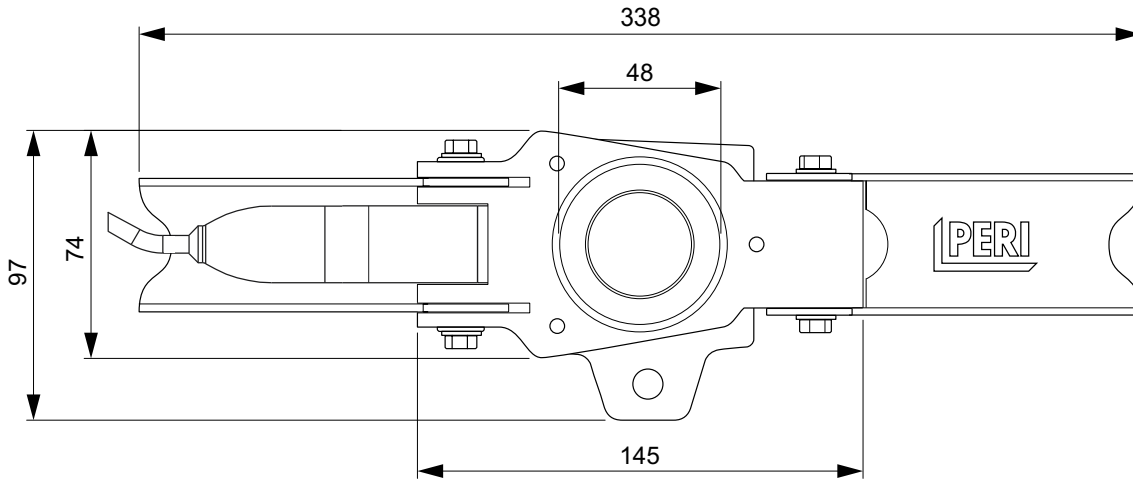


Fig. 02 All dimensions in millimetres

Structure and function



The PREMIO Concrete Pressure Sensor is a measuring sensor with a pressure-sensitive membrane.

The membrane is filled with a liquid that transfers the mechanical pressure from fresh concrete to a pressure transducer. The pressure transducer generates a digital output signal that is sent to the data acquisition system.

The concrete pressure sensor is designed to be attached to the concrete formwork.

The unit can also be fitted without U-sections. (Fig. 03)

The sensor can be removed after the concrete has hardened and reused in full, incl. the cabling.

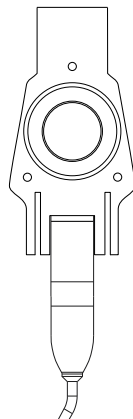


Fig. 03

Installation and connection (construction site)

Safety instructions

The sensor may only be installed by instructed specialists, see section "Target groups" on page 6.

Observe the general safety instructions (Page 8) and the intended use (Page 7).



Damage to electronics!

⇒ Only establish or release connections when the units are switched off.

Connections, pin assignment

The concrete pressure sensor transmits its data via the digital PERI bus. The pressure transducer is connected to the PERI bus directly or via a splitter.

Pressure transducer

Pin	Wire colour	Function
1	Red	Power supply (+ve)
2	Orange	I2C SDA (serial data)
3	Black	I2C SCL (serial clock)
4	White	GND (0 V)
5	Yellow	Not assigned
6	Blue	Not assigned
		Shield

Tab. 02



Incorrect pin assignment!

Unit malfunctions or defects may occur as a result.

- ⇒ Only use the pin assignment shown in the connection diagram.
- ⇒ Only the cables supplied and approved by the manufacturer may be used.

Installation positions

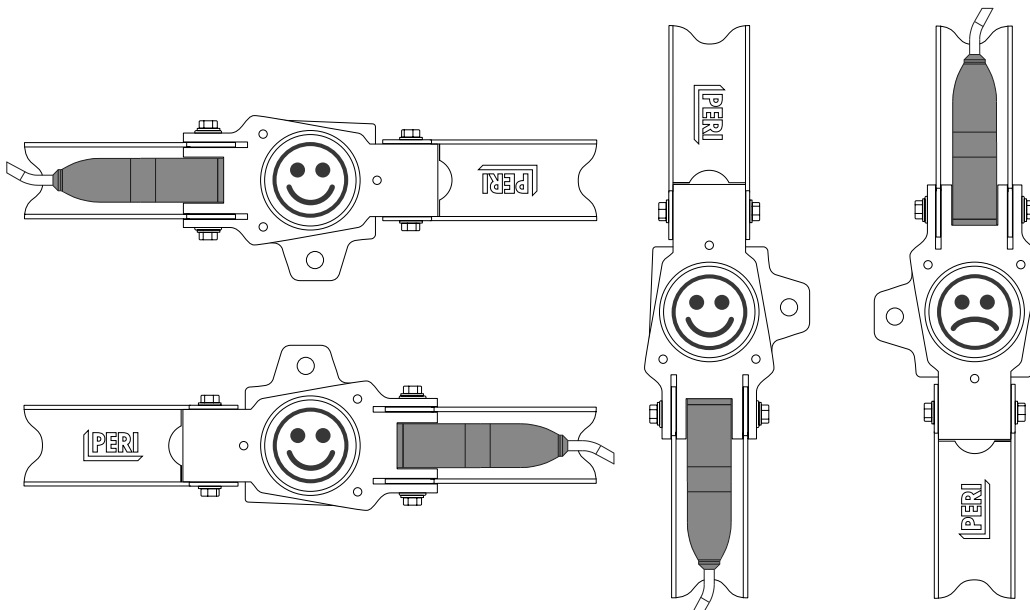


Fig. 04

Installation and connection (construction site)

Fitting and connecting the pressure sensor

Preparation

- ▶ Check the sensor cable, connector, housing and membrane for damage and ensure that the filling is free of bubbles.
- ▶ Have a drill with a 50 mm hole saw and centre drill, screws and grease (e.g. Vaseline) to hand.

1. Drill the hole for the sensor into the formwork using the hole saw. (Fig. 05)
 - Make sure that there is enough space for the sensor housing.
2. Grease the membrane and housing (recommendation: Vaseline). (Fig. 06)
3. Place the sensor on the formwork and pre-drill the holes.
4. Tighten the sensor with 3 screws. (Fig. 07)
5. Affix the node safely and securely near the measuring points.
6. Connect the sensor to the PERI bus connection of the node module.
7. The sensor can also be connected directly to the hub.
8. Switch on the node.
The measured data from the sensor is received automatically.
9. Switch on the hub.
Measurements can also be taken when the hub is switched off. The measured values are stored in the node. The hub receives the stored values as soon as it is switched on.
10. Document the node number and position or installation heights of the pressure sensor in the formwork.



Fig. 05



Fig. 06



Fig. 07



It is also advisable to note the fixing locations of the nodes. In an ever changing construction site, it can be difficult to find the units again.

Installation and connection (construction site)

Installing the sensor group

1. Determine and mark the positions of the sensors. (Fig. 08)
 - The distance between the sensors should be approx. 1.5 m for an 8-m-high wall.
 - Position the sensors in the lower part of the formwork.
 - An additional series of sensors will increase the accuracy.
2. Fit the sensors as described in section "Fitting and connecting the pressure sensor" on page 12.
3. Affix the node safely and securely near the measuring points.
4. Connect the sensors to each other as shown in Fig. 09.
 - For cable types, see Tab. 03.
5. Connect sensor T2 to the node module.
6. Document the node number, quantity and positions or installation heights of the pressure sensors in the formwork.

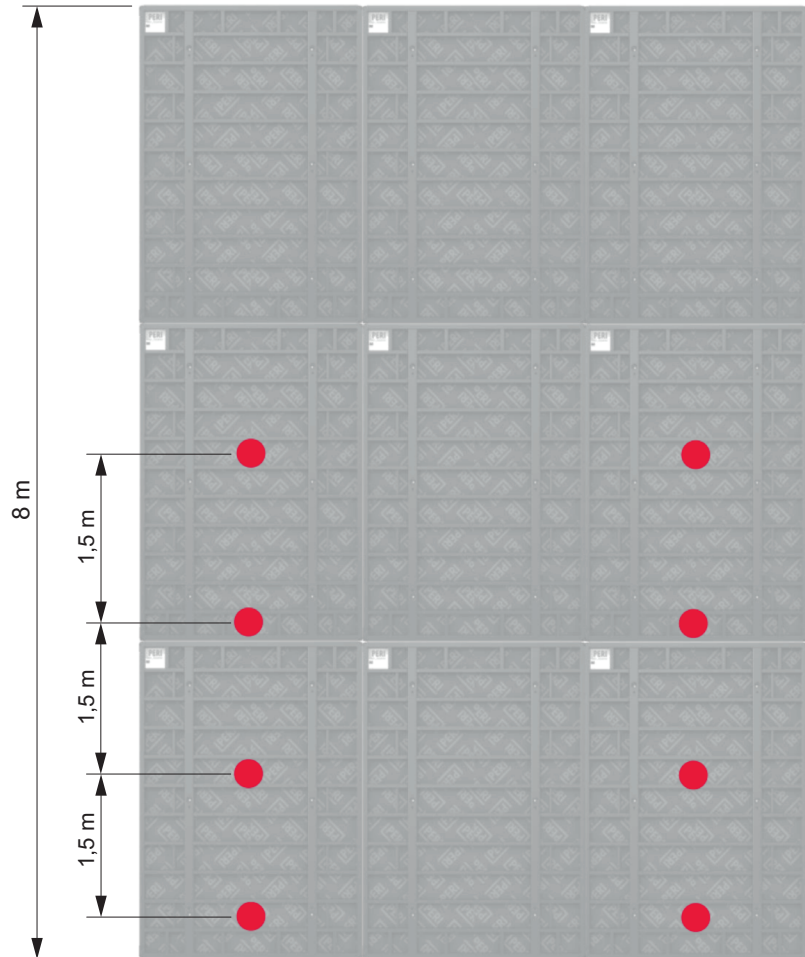


Fig. 08 Example of positioning of sensors in the formwork

Cable type	Length	P1	P2	Description (see Fig. 09)
A	3 m	Fixed connection	Connector	Pressure transducer (sensor T1/T4) to splitter (sensor T2/T3)
B	Short	Fixed connection	Connector	Pressure transducer (sensor T2/T3) to splitter (sensor T2/T3)
C	3 m	Connector	Bushing	Splitter (sensor T2) to node
D	3 m	Connector	Bushing	Splitter (sensor T2) to splitter (sensor T3)

Tab. 03

Installation and connection (construction site)

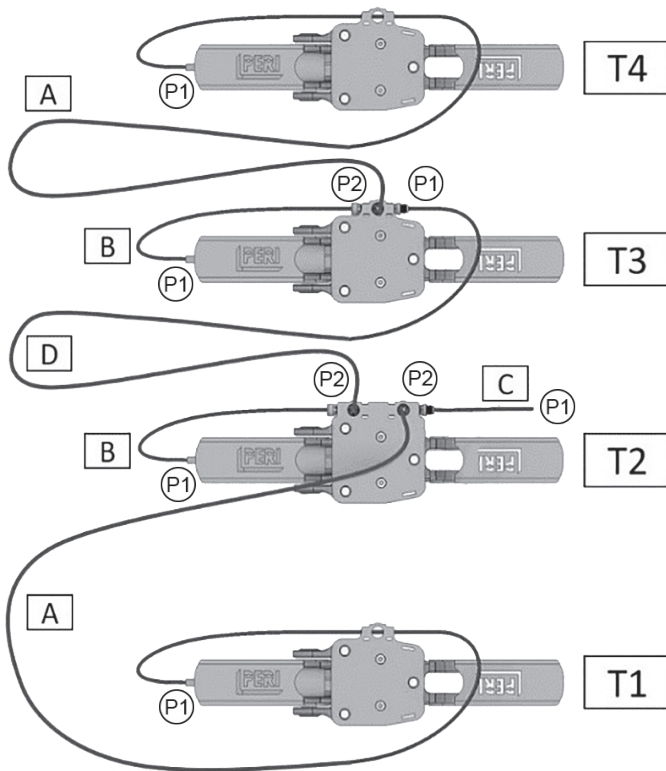


Fig. 09 Sensor group

Checking the functional integrity

Check the functional integrity and data transmission before concreting.

On the node, the four LEDs will flash simultaneously in blue when measured data is being transmitted to the hub.

The hub's **Pressure** screen displays the status and readings of the connected sensors.

You can check there whether all the measured data is being received correctly.

The current pressure is displayed in kilopascals (kPa). 1 kPa = 0.01 bar.

Faults

Possible causes of unsuccessful testing:

- No pressure sensor connected
- Defective connecting cable
- Pressure sensor damaged (pressure transducer or leaky membrane)
- Node not switched on or low battery

Deinstallation

1. Switch off the hub or node.
2. Disconnect the bus cable connector from the hub/node and pressure sensor.
3. Disconnect the connecting cables between the sensors.
4. Unscrew the sensors from the formwork.
5. Clean the housing and membrane.
 - Do not use pointed or sharp objects.

Cleaning and Repairs

Cleaning

- ▶ Wipe down the metal housing with a damp (not wet) cloth. Water must not be allowed to get into the connections.
- ▶ Clean the membrane with a soft cloth and commercial cleaning agent.



- ⇒ Do not use abrasive or aggressive cleaning agents or solvents (e.g. scouring powder, thinner or gasoline).
- ⇒ Do not remove stubborn dirt with sharp-edged objects.
- ⇒ Do not wash the unit under running water or immerse it in water.
- ⇒ Do not use a high-pressure cleaner.

Maintenance

The concrete pressure sensor is maintenance-free. Regular inspections ensure operational safety and functional integrity.

Before each use

- ▶ Check the data cable for external damage.
- ▶ Check the housing and membrane for damage.
- ▶ No air bubbles should be visible beneath the membrane.
- ▶ Check the connection sockets for damage and dirt.

Repairs

Specific skills and knowledge of the unit are required to carry out repairs. Therefore, this work may only be carried out by qualified specialists after consultation with the manufacturer.



- ⇒ Take defective or damaged units out of operation immediately.

Cleaning and Repairs

Replacing the membrane

Preparation

► Have tools, aids and repair parts to hand.

- 1 Cleaning cloth
- 2 Syringe without needle (approx. 20 ml)
- 3 Screwdriver (TORX T15)
- 4 TORX bit T10
- 5 Glycerol
- 6 Base plate
- 7 Membrane
- 8 Screw ring with O-ring

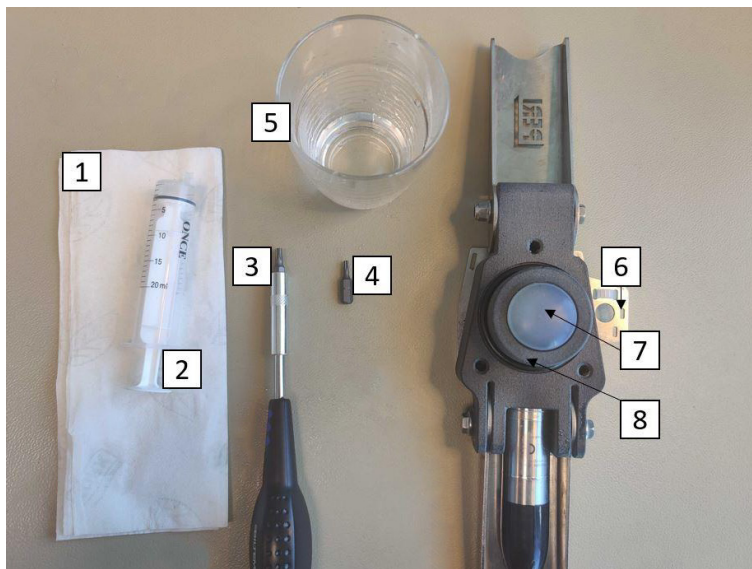


Fig. 10

1. Unscrew the base plate (6).
2. Carefully clean the inside and outside of the housing if it is dirty.

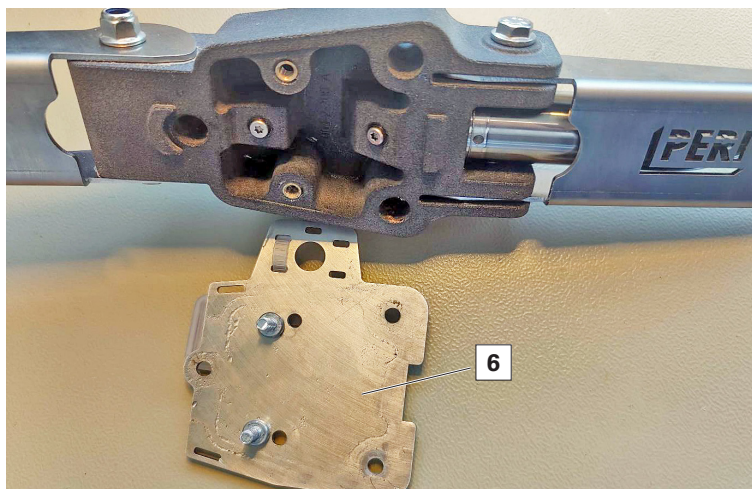


Fig. 11

3. Unscrew the bleed screws (9) and (10).
4. If the membrane is not ruptured, pour the glycerol through the vent holes into a container.
5. Press on the undamaged membrane to squeeze out the remaining liquid through the vent holes.
The glycerol can be reused if it is clear and free of dirt particles.

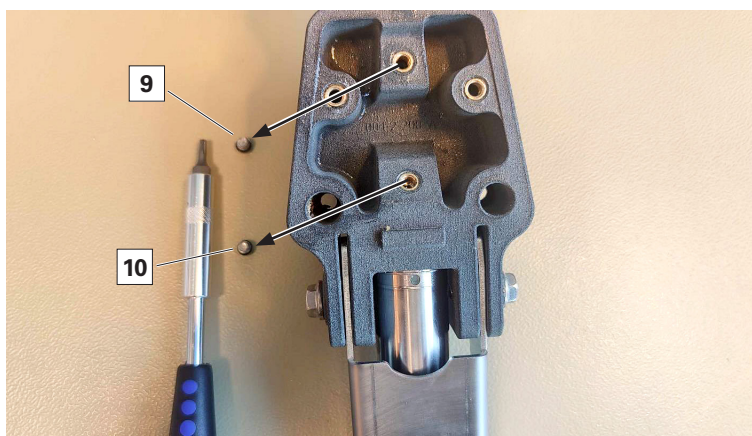


Fig. 12

Cleaning and Repairs

Replacing the membrane (continued)

6. Unscrew the screw ring (8) counter-clockwise by hand. Using a damp cloth may improve your grip.



Damage to the screw ring!

- ⇒ If the screw ring cannot be loosened by hand, use a pipe wrench together with a damp cloth.
- ⇒ Do not use force.

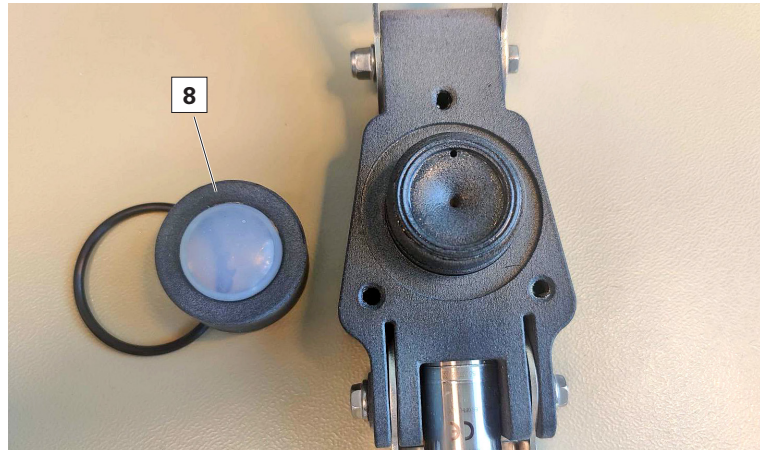


Fig. 13

7. Remove the damaged or old membrane from the screw ring.
8. Clean the screw ring.
9. Insert the new membrane into the screw ring with the bulge facing outwards as shown in Fig. 14.
10. Replace the O-ring if it is worn or damaged.
11. Wipe the threads in the screw ring and on the sensor housing until dry. This will make it easier to spot any leaks later on.
12. Screw the screw ring onto the sensor housing and tighten it by hand.



Do not use tools to tighten the screw ring.



Fig. 14

13. Fill the syringe with glycerol. When drawing up the syringe, do not allow air bubbles to form.
14. Keep the sensor housing horizontal and insert the syringe into the vent hole (a) (hole closest to the pressure transducer).
15. Pour glycerol into the housing until it emerges at the vent hole (b).

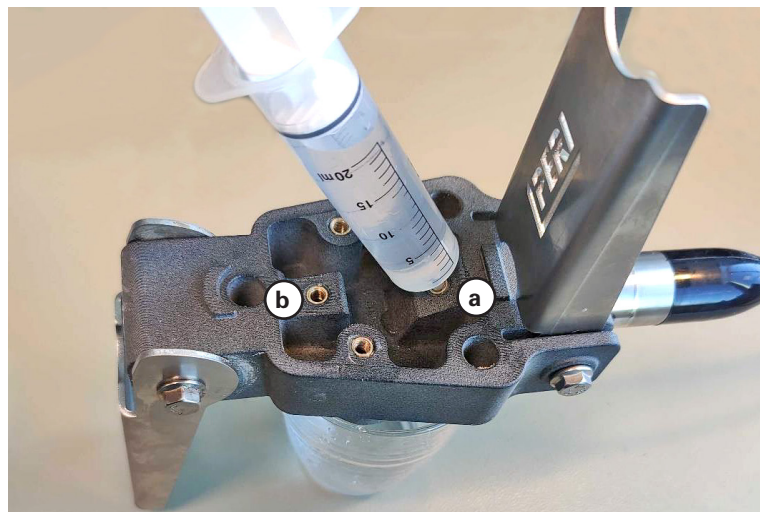


Fig. 15

Cleaning and Repairs

Replacing the membrane (continued)

16. Remove the syringe and close the opening (a) with a bleed screw (10). Leave the second vent hole (b) open.
17. Tilt the sensor housing by approx. 45 degrees so that the open vent hole (b) is at the top and the pressure transducer is at the bottom.
18. Carefully press on the membrane with your finger until liquid can be seen in the vent hole. Keep the pressure on the membrane.
19. Use the syringe to replenish with glycerol through the opening (b). Slowly reduce the finger pressure on the membrane.
20. Remove the syringe and close the opening (b) with the bleed screw (9).

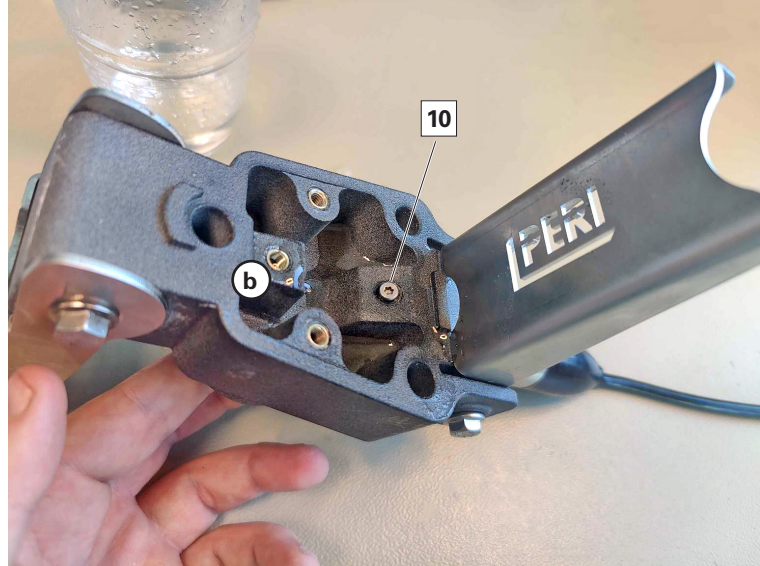


Fig. 16



Damaged seals or a lack of seals can cause leakage and incorrect measurements!

An O-ring is fitted to the bleed screws.

- ⇒ Do not overtighten the screws.
- ⇒ Do not over-compress the O-rings.
- ⇒ Replace damaged or missing O-rings.

21. Turn the unit with the membrane facing upwards and hold it horizontally.
22. Repeat steps 17 to 21 if air bubbles are visible beneath the membrane.
23. Carefully wipe the housing and the bleed screw until they are dry.
24. Press on the membrane for several seconds with the heel of your hand, using only a little force. Check the housing for leaks.
25. Once the unit is leak-tight, screw the base plate (6) back on. (Fig. 11)



Fig. 17

Recycling and disposal

The unit must be disposed of and recycled in accordance with local environmental protection regulations.



- ⇒ Do not dispose of electronic components with household waste.
- ⇒ In the European Union, comply with Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE).



Spare parts and accessories

Article no.	Weight in kg
137080	3.400

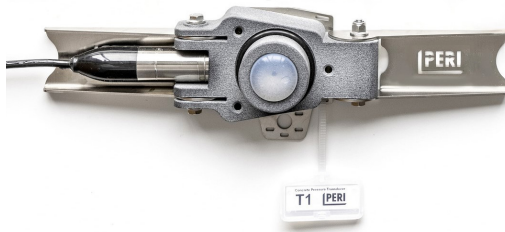
PREMO Pressure Sensor set (T1 to T4)

Set with 4 concrete pressure sensors, incl. installation and maintenance kit



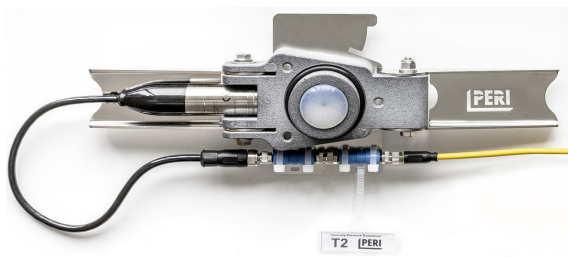
Article no.	Weight in kg
137088	0.820

PREMO Pressure Sensor without splitter (T1/T4)



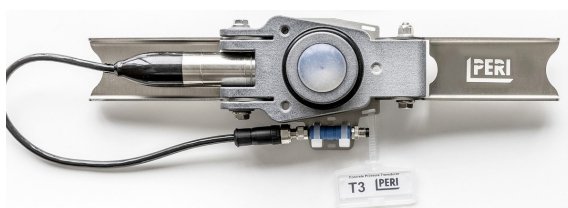
Article no.	Weight in kg
137089	0.920

PREMO Pressure Sensor with two splitters (T2)



Article no.	Weight in kg
137087	0.830

PREMO Pressure Sensor with one splitter (T3)



Spare parts and accessories

Article no.	Weight in kg
137093	2.200

System case for PREMO Pressure Sensors

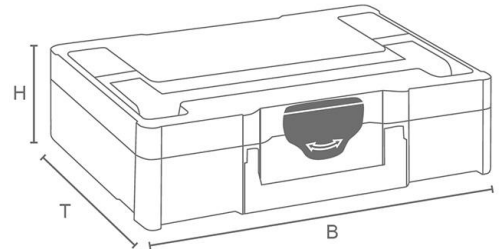
For safe transport and protected storage of up to 4 pressure sensors.

Sturdy, lockable plastic box with carry handle and foam inlays

Technical details

Outer dimensions (HxBxT): 180 x 508 x 296 mm

Internal volume: 20.2 litres



Article no.	Weight in kg
137082	0.640

PREMO Pressure Sensor installation kit

For replacing damaged membranes

Content

- 2 x TORX bit T25
- 1 x hole saw, 50 mm
- 1 x PREMO drilling template
- 20 x wood screw, 4.8 x 50 mm (T25)



Article no.	Weight in kg
137081	0.300

PREMO Pressure Sensor maintenance kit

For replacing damaged membranes

Content

- 1 x 80 ml of glycerol
- 4 x PREMO pressure membrane
- 100 x cable ties
- 4 x cable ties with label
- 1 x screwdriver for TORX bits
- 1 x TORX bit T10
- 1 x TORX bit T15
- 2 x syringes, 20 ml



Article no.	Weight in kg
137084	0.020

PREMO pressure membrane

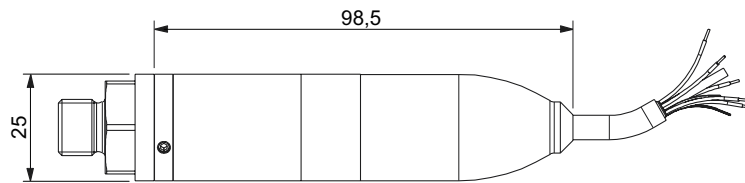
4 membranes for repairing pressure sensors



Spare parts and accessories

Article no.			
139002		O-ring NBR70 48.7x3.5 Sealing ring for membrane screw ring/housing	Technical details Internal diameter: 48.7 mm Ring thickness: 3.5 mm Material: synthetic rubber

Article no.	Weight in kg		
138999	0.202	Pressure transducer DPS 5000 For recording the concrete pressure on the membrane and digitally transmitting the measured data to a node	Note For technical details, see "Tab. 01" on page 9



Article no.			
139001		O-ring NBR70 9.5x2.5 Sealing ring for pressure transducer/housing	Technical details Internal diameter: 9.5 mm Ring thickness: 2.5 mm Material: synthetic rubber

Article no.	Weight in kg		
137090	0.260	PREMO Pressure Sensor cable set 4 connecting cables, see "Tab. 03" on page 13	

Article no.	Weight in kg		
139008	0.028	Digital bus cable M12 For transmitting the measured data from the PREMO Pressure Sensor to the ISC node	

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