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1. Information on This Operating Instruction

- The manual is aimed at specialists and semi-skilled personnel.
- Please read the instructions carefully before carrying out any operation and keep the specified order.
- Thoroughly read and understand the information in chapter 2 "Safety Instructions".

If you have any problems or questions, please contact your supplier or contact us directly at:



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Operating Instructions

Pressure Transmitter Models PTM..., CTM... and DTM...

1.1 Pictographs Used

In this manual, pictographs are used as hazard warnings.

Particular information, instructions and restrictions designed for the prevention of personal or substantial property damage:



WARNING! Is used to warn you against an imminent danger that may result in personal injury or death.

IMPORTANT! Is used to warn you against a possibly hazardous situation that may result in personal, property or environmental damage.

CAUTION! Is used to draw your attention to important recommendations to be observed. Disregarding them may result in property damage.



Passages in the text containing **explanations, information or advice** are highlighted with this pictograph.



The following symbol highlights **actions** you have to conduct or **instructions** that have to be strictly observed.

1.2 Exclusion of Liability

We accept no liability for any damage or malfunction resulting from incorrect installation, inappropriate use of the device or failure to follow the instructions in this manual.

1.3 General Information

Please inspect the transport packaging and the delivered items immediately upon their receipt to determine their integrity and completeness.

You have purchased an instrument that was manufactured according to high quality standards in our company, which is certified according to DIN ISO 9001. Should a reason for complaint however arise, please return your instrument with a precise description of faults to our factory.

The pressure transmitter models PTM..., CTM... and DTM... are manufactured according to the valid standards. The following manual was composed with due care. It is not possible, however, to take into account all versions and possible cases of application in this operating instruction. If you have any questions regarding a special application, instruments, storage, mounting, operation or difficulties, please contact us as manufacturer or the distributor.

Please support us in improving this operating instruction. We will gladly accept your advice.

2. Safety Instructions

Please read this operating instruction thoroughly before installing the device.

Disregarding the containing warnings, especially the safety instructions, may result in danger for people, the environment, and the device and the system it is connected to.

The device corresponds with the state of engineering at the time of printing. This concerns the accuracy, the operating mode and the safe operation of the device. In order to guarantee that the device operates safely, the operator must act competently and be conscious of safety issues.

The ARMANO Messtechnik GmbH provides support for the use of its products either personally or via relevant literature. The customer verifies that our product is fit for purpose based on our technical information. The customer performs customer and application specific tests to ensure that the product is suitable for the intended use. With this verification, all hazards and risks are transferred to our customers. Our warranty expires in case of inappropriate use.



Qualified personnel:

- The personnel that is charged for the installation, operation and maintenance of the instrument must hold a relevant qualification. This can be based on training or relevant tuition. The personnel must be aware of this manual and have access to it at all times.
- The electrical connection shall be carried out by a fully qualified electrician only.



General safety instructions:

- In all work, the existing national regulations for accident prevention and safety at the workplace must be complied with. Any internal regulations of the operator must also be complied with, even if these are not mentioned in this manual.
- Please regard relevant national and international safety instructions.
- All works must take place in a de-energised state.
- The instruments are not of the pressure sustaining type with a safety function in the sense of PED 2014/68/EU.
- Degree of protection according to DIN EN 60 529: Ensure that the ambient conditions at the installation location do not exceed the requirements of the specified degree of protection (⇒ chapter 4 "Technical Data").
- Use the instrument in its perfect technical condition only. Damaged or defective instruments need to be checked immediately and replaced if necessary.
- In particular, make sure that the diaphragm in version FB is intact. In case of visible damage, return the instrument immediately.
- In case of visible damage (e.g. leaking liquids) or malfunctions, the instrument must be put out of operation immediately and the installation and commissioning must not take place! Only use intact, faultless pressure transmitters!
- All parts, especially the diaphragm in version FB, have to be protected against incorrect handling during installation of the device. To avoid any damage, only touch the designated surfaces with the specified tool.
- Only use appropriate tools for mounting, connecting and dismantling the device.
- Nameplates or other information on the device shall neither be removed nor obliterated, since otherwise any warranty and manufacturer responsibility expires.



IMPORTANT! Disregarding the respective regulations may result in severe personal injuries and/or property damage.



Special safety instructions:

Warnings, which are specifically relevant to individual operating procedures or activities, are to be found at the beginning of the relevant sections of this operating instruction.

3. Device Description

Pressure transmitter models PTM..., CTM... and DTM... are temperature-compensated pressure sensors with integrated measuring amplifiers. They measure the pressure in the connected system and convert the measured pressure value into a calibrated output signal that is suitable for transmission and control purposes.

3.1 Intended Use

Versions FB with flush welded membrane can be used for highly viscous or crystallising media. Versions with standard connection (pressure connection with orifice) shall only be used for media that cannot clog the inlet port of the connection.

Do not use the device beyond its specification or contrary to the operating instructions.

The operational safety of the device supplied is only guaranteed by intended use. The specified limit values (⇒ chapter 4 "Technical Data") must not be exceeded.

This particularly applies for the adherence to the permissible full scale value and the permissible temperature range.

When using the device, a high degree of care and precaution is required. It has to be protected from strong vibrations, moisture, shocks, magnetic fields and static electricity.

Operating Instructions

Pressure Transmitter Models PTM..., CTM... and DTM...




IMPORTANT! Risk of injury or material damage due to overpressure!

Exceeding the maximum overload values may lead to material failure of the device. This may also cause serious damage to health.

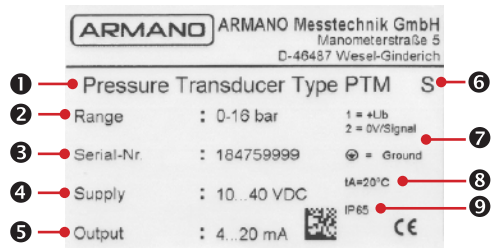
→ Ensure that the overload values are never exceeded.

Please check if the instrument is suitable for your application before ordering and installation.

 **Applications that are not explicitly listed as according to regulations, are improper to intended purpose!**

Models	Version	Data sheet
Piezoresistive sensors		
PTM	standard version	9810
PTMFB	flush welded membrane	9810
PTMk	compact version	9810.1
PTMkFB	compact version, flush welded membrane	9810.1
PTMv	sensor welded	9810.2
Ceramic sensors		
CTMc	standard version, capacitive	9820
CTMcFG	field housing, capacitive	9820
CTMd	wire resistance strain gauge (DMS)	9821
Thin film sensors		
DTM	standard version	9830
DTMk	compact version	9830.1
DTMFB	flush welded membrane	9830.3

The instrument version is indicated on the nameplate:



- 1 Basic model
- 2 Pressure range
- 3 Serial no.
- 4 Power supply
- 5 Output signal
- 6 Labelling S for special version
- 7 Pin assignment (power supply, signal, earthing)
- 8 Reference temperature
- 9 Degree of protection

4. Technical Data

The relevant technical data can be found in the data sheet, valid for the instrument type you purchased. The data sheets are available for download on our website.



IMPORTANT! It is obligatory to observe the limit values specified in the data sheet! Exceeding the limit values may cause a breakdown of the instrument and result in serious personal and property damage!

Operating Instructions

Pressure Transmitter Models PTM..., CTM... and DTM...

5. Installation and Operation

Remove the packaging with due care! Dispose of the packaging according to environmental conditions and in accordance with the local waste disposal regulations! Store the plastic protection caps for future de-commissioning.



CAUTION! Before installation, commissioning and operation, ensure that you have the suitable pressure measuring instrument regarding pressure range, version, degree of protection and materials (Risk of corrosion!) for the specific case of application!



Please note

Avoid any kind of contamination and damage at the process connection and especially at the sealing face!

Do not insert any objects into the process connection!

Avoid any contact with the membrane, especially in case of flush welded membranes or attached chemical seals!

Connections between chemical seals and pressure transmitters must never be loosened! Possibly existing seals must not be damaged! The sealing screw at the chemical seal must never be loosened.

At process connections with wrench flats, only use the matching torque wrench for installation at the measuring point.

The wrench must be applied at the designated wrench flat only.

The correct torque depends on the dimension of the process connection and the material and form of the used sealing.

- For pressure connections according to DIN EN 837 use profile sealings / flat sealing rings according to DIN 16 258.
tightening torques: G $\frac{1}{4}$ ": approx. 20 Nm;
G $\frac{1}{2}$ ": approx. 50 Nm
- For pressure connections according to DIN 3852 form E use pre-installed elastomer profile packing!
tightening torques: G $\frac{1}{4}$ ": approx. 5 Nm;
G $\frac{1}{2}$ ": approx. 10 Nm; G $\frac{3}{4}$ ": approx. 15 Nm;
G1": approx. 20 Nm

- Tighten conical pressure connections. Use sealing material!
tightening torques: $\frac{1}{4}$ " NPT: approx. 30 Nm;
 $\frac{1}{2}$ " NPT: approx. 70 Nm
- For chemical seal connections, e.g. diaphragm seals for the food industry, use the suitable sealing for this chemical seal!
- The specified tightening torques must not be exceeded!
- Ensure that sealing faces are clean and intact!
- Do not tilt the thread when screwing in.



IMPORTANT! The matching sealings for each connection must be used under all circumstances.

Depending on the type of application, even the smallest leak may result in unpredictable personal and property damage!

The installation position is optional, but the instrument must be installed free of vibration and must not be exposed to strong changes in temperature.

Additional measurement errors caused by deviations from the reference temperature of +20 °C have to be observed!

Avoid a direct pressure blast on the sensor diaphragm!

6. Electrical Connection

Electromagnetic compatibility (EMC) can only be ensured by using shielded cables and a properly connected ground connection.

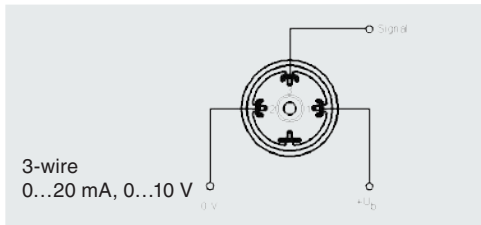
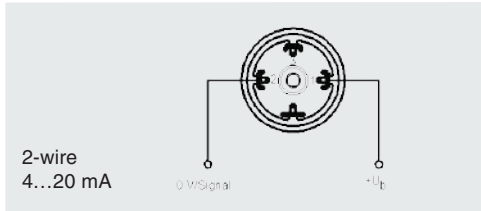
6.1 Pin Assignment

Type	Screw fitting	Cable cross-section	Cable diameter
DIN EN 175308-803-A	PG9	up to 1.5 mm ²	6–8 mm
Series G	PG7	up to 0.5 mm ²	4–7 mm
M12x1	PG9	up to 0.75 mm ²	4.5–7 mm
Skintop	M12x1.5	–	4.5–10 mm
Skintop	PG7	–	4–7 mm

Operating Instructions

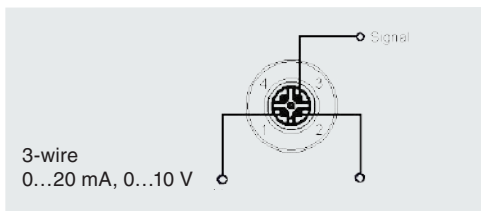
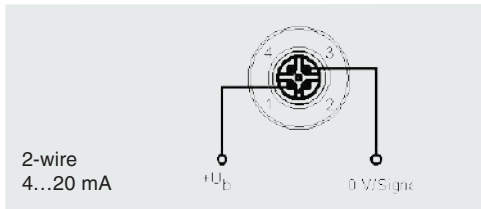
Pressure Transmitter Models PTM..., CTM... and DTM...

Pin assignment DIN EN plug / series G plug:

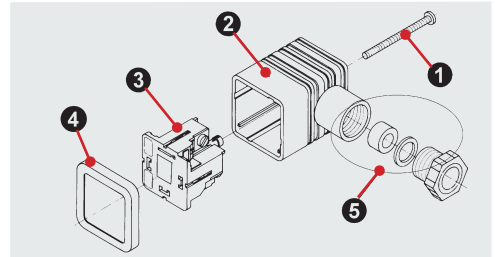


The indicated degree of protection can only be obtained with a firmly mounted cable box and a corresponding seal.

Pin assignment M 12 plug:



6.1.1 Mounting of the Connection Cable with Plug Connector According to DIN EN 175310-803



- 1 Central screw
- 2 Case part
- 3 Inner part
- 4 Profile packing
- 5 Screwed cable gland

- Unscrew the central screw **1** and remove the angular cable box from the transmitter.
- Remove the profile packing **4**.
- Lever the inner part **3** out of the case part **2** with a suitable screwdriver. For this, place the screwdriver in the provided recess at the edge.
- Insert the cable through the screwed cable gland **5** into the case part **2**.
- ☞ Use the right cable diameter!
- ☞ Regard the minimum bending radius of the cable used (manufacturer's information).
- ☞ Do not crimp the cable!
- ☞ Avoid condensation and humidity in the cable!
- At the inner part **3**, loosen the screws of the terminals, which are to be wired, then insert the cable ends and tighten the screws. (recommendation: use core cable ends with $l = 6 \text{ mm}$)
- ☞ Cable wiring according to the wiring diagrams!
- The inner part **3** can optionally be installed in 90° steps.
- Insert the inner part **3** in the required position, so that it engages audibly. If necessary, pull the cable back slightly.
- Tighten the screwed cable gland **5** until leak tightness and strain relief are obtained.
- Press the profile packing **4** back on.
- Attach the angular cable box to the transmitter, screw in the central screw **1** and tighten it hand-tight.

Operating Instructions

Pressure Transmitter Models PTM..., CTM... and DTM...

7. Maintenance/Cleaning, Storage and Transport



CAUTION! Material damage and loss of warranty!

Any modifications or interventions in the device, made by the customer, might damage important parts or components. Such intervention leads to the loss of any warranty and manufacturer's responsibility!
→ Never modify the device or perform any repairs yourself.

Maintenance:

The instruments are maintenance-free.

To ensure measurement accuracy, we recommend checking the instruments regularly (once or twice a year). For this, the instrument must be separated from the process and checked by using a pressure test device.

The instrument cannot be repaired by the operator. In case of faults, which cannot be eliminated without interference in the device, please return the instrument to the manufacturer for repair, together with a precise description of the faults (⇒ chapter 10 "Electrical Malfunctions"). Any arising repairs may only be executed by the manufacturer.

Zero adjustment:

In case of a process-related required zero adjustment, for:

PTM

→ the cable box must be removed.

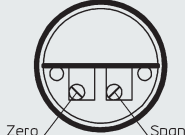
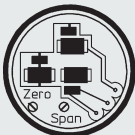
→ Remove the upper plug section carefully and tilt it to the side. Slip cable box over.

(Not possible for model PTM with M 12 plug!)

→ With a screwdriver, the potentiometer "Zero" can be adjusted within a range of approximately 5–10 % by turning it to the right (+) or left (-).

2-wire (4...20 mA)

3-wire (0...20 mA, 0...10 V)

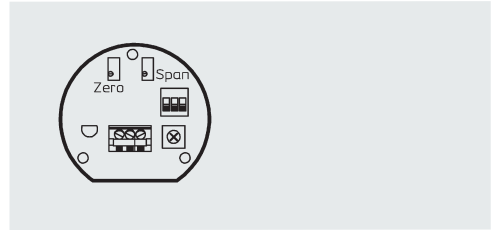


CTMCFG

→ the screw cap must be removed.

→ Adjust the potentiometer "Zero" with a screwdriver by turning it to the right (+) or left (-).

→ The potentiometer labelled "Span" next to the zero adjustment "Zero" must not be adjusted by any means!



CTMd, CTMc

→ the zero point is not adjustable.

DTM, DTMk, DTMFB

→ the zero point is programmed, therefore only comparable ex works.



Zero adjustment may only be conducted by trained personnel! An incorrectly calibrated zero point may result in unpredictable personal and property damage!

Cleaning:



CAUTION! Never use sharp or hard objects or ultrasonic baths when cleaning the pressure connection, as these destroy the sensor!

- Clean the device with a dry or slightly dampened lint-free cloth.
- Before cleaning the interior of connector or cable box, they must be de-energised.
- Before switching the instrument on again, please make sure that all parts have properly dried.
- Do not use any sharp objects or aggressive agents for cleaning.

Operating Instructions

Pressure Transmitter Models PTM..., CTM... and DTM...

Storage and transport:



Pressure transmitters are sensitive sensors and have to be handled with due care.

- Use the original packaging or comparable packaging for storage/for transport. Especially the protection cap has to be attached carefully to the process connection and must not be removed until the installation of the device.
- Avoid impacts or strong vibrations.
- Protect the device against damage caused by external influences.
- During storage, the specified temperature limits must not be exceeded.

8. Dismounting and Disposal



WARNING! Risk of injury!

Never remove the device from a system in operation.

Make sure that the system is switched off professionally.

Before dismounting:

Check before dismounting, whether the system

- is switched off,
- is in a safe and currentless state,
- is unpressurised and cooled down.

Dismounting:

→ Pay attention to potentially leaking media. Take appropriate precautions to collect them.

Disposal:



NO DOMESTIC WASTE!

The instrument comprises various materials. It shall not be disposed of together with domestic waste.

→ Bring the device to your local recycling plant

or

→ send the device back to your supplier or to the ARMANO Messtechnik GmbH.

9. CE Conformity



The CE marking of the instruments certifies the conformity with prevailing EU directives for placing products on the market within the European Community. The following directives apply:

2014/68/EU (PED)

2014/30/EU (EMC)

Operating Instructions

Pressure Transmitter Models PTM..., CTM... and DTM...

10. Electrical Malfunctions

Fault Description	Potential Cause	Correction
No output signal	missing operating voltage	apply operating voltage
	broken cable	check the cable and repair it
	wiring fault	check the wiring and correct it
	missing input pressure	check the pressure connection, apply pressure
	operating conditions not permissible	return to works with description of faults and operating conditions
Output signal constant	clogged orifice	check the measuring point, clean it carefully, if necessary return to works with description of faults
	defective pressure transmitter	return to works with description of faults
Output signal too high	pressure range incorrect	replace pressure transmitter
	defective pressure transmitter	return to works with description of faults
Output signal too low	pressure range incorrect	replace pressure transmitter
	for current signal: load impedance too high	reduce load impedance or increase operating voltage
	operating voltage too low	increase operating voltage
	defective pressure transmitter	return to works with description of faults
Incorrect zero signal	zero point altered due to non-permissible operating conditions	return to works with description of faults
	operating voltage not permissible	apply permissible operating voltage
	defective pressure transmitter	return to works with description of faults
Output signal non-linear	measuring span altered due to non-permissible operating conditions or improper adjustment at the potentiometer	return to works with description of faults
	defective pressure transmitter	return to works with description of faults

11. Declaration of Conformity

EU-Konformitätserklärung

EU Declaration of Conformity

Für die nachfolgend bezeichneten Erzeugnisse

We hereby declare for the following named goods

DRUCKMESSUMFORMER
Typen PTM..., CTM... und DTM...

PRESSURE TRANSMITTERS
Models PTM..., CTM... and DTM...

wird hiermit bestätigt, dass sie den wesentlichen Schutzanforderungen entsprechen, die in der Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit (2014/30/EU) festgelegt sind.

that they meet the essential protective requirements, which have been fixed in the Directive of the European Parliament and the Council on the approximation of the laws of the Member States relating to the electromagnetic compatibility (2014/30/EU).

Diese Erklärung gilt für alle Exemplare, die nach den Datenblättern 9810, 9810.1, 9810.2, 9820, 9821, 9830, 9830.1 und 9830.3 hergestellt werden.

This declaration applies to any specimen manufactured according to data sheets 9810, 9810.1, 9810.2, 9820, 9821, 9830, 9830.1 and 9830.3.

Zur Beurteilung der Erzeugnisse hinsichtlich elektromagnetischer Verträglichkeit wurden folgende Normen herangezogen:

The following standards have been used to assess the goods regarding their electromagnetic compatibility:

DIN EN 61000-6-3:2011-09
DIN EN 61000-6-2:2006:03

Des Weiteren fallen diese Geräte mit einem Druckmessbereich > 0,5 bar als „druckhaltende Ausrüstungsteile“ unter die

Moreover, these instruments with a pressure range >0.5 bar are, as pressure equipment parts, subject to

Druckgeräterichtlinie (2014/68/EU)

Pressure Equipment Directive (2014/68/EU)

Die Geräte werden nach geltender guter Ingenieurpraxis ausgelegt und gefertigt.

The instruments are designed and manufactured according to sound engineering practice.

Mit Messbereichen ab 0 – 200 bar werden sie folgendem Konformitätsbewertungsverfahren unterzogen:

Versions with pressure ranges from 0 – 200 bar are subjected to the following conformity assessment procedure:

Modul A
„Interne Fertigungskontrolle“

Module A
“Internal Production Control”

Soweit zutreffend erstreckt sich die CE-Kennzeichnung dann auch auf diese Richtlinie.

As far as they are concerned, the CE-marking then also applies to this directive.

Diese Erklärung wird verantwortlich für den Hersteller:
This declaration is issued under the sole responsibility of the manufacturer:

ARMANO Messtechnik GmbH

abgegeben durch / by
Grünhain-Beierfeld, 2021-04-14

Bernd Vetter
Geschäftsführender Gesellschafter / Managing Director

ARMANO

ARMANO Messtechnik GmbH

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