GEMÜ C33

Pressure transducer

EN **Operating instructions**

webcode: GW-C33

Contents

1 General information

1.1 Information

- The descriptions and instructions apply to the standard versions. For special versions not described in this document the basic information contained herein applies in combination with any additional special documentation.
- Correct installation, operation, maintenance and repair work ensure faultless operation of the product.
- Should there be any doubts or misunderstandings, the German version is the authoritative document.
- Contact us at the address on the last page for staff training information.

1.2 Symbols used

The following symbols are used in this document:

Symbol	Meaning
●	Tasks to be performed
▶	Response(s) to tasks
–	Lists

1.3 Warning notes

Wherever possible, warning notes are organized according to the following scheme:

SIGNAL WORD	
Possible symbol for the specific danger	Type and source of the danger ▶Possible consequences in case of non-compliance ●Measures for avoiding danger

Warning notes are always labelled with a signal word and sometimes also with a symbol for the specific danger.

The following signal words and danger levels are used:

⚠ DANGER

Imminent danger!

▶ Non-observance can cause death or severe injury

⚠ WARNING

Potentially dangerous situation!

▶ Non-observance can cause death or severe injury

⚠ CAUTION

Potentially dangerous situation!

▶ Non-observance can cause moderate to light injury

NOTICE

Potentially dangerous situation!

▶ Non-observance can cause damage to property

The following symbols for the specific dangers can be used within a warning note:

Symbol	Meaning
	Danger – high voltage

2 Safety information

The safety information in this document refers only to an individual product. Potentially dangerous conditions can arise in combination with other plant components, which need to be considered on the basis of a risk analysis. The operator is responsible for the production of the risk analysis and for compliance with the resulting precautionary measures and regional safety regulations.

The document contains fundamental safety information that must be observed during commissioning, operation and maintenance. Non-compliance with these instructions may cause:

- Personal hazard due to electrical, mechanical and chemical effects
- Hazard to nearby equipment
- Failure of important functions
- Hazard to the environment due to the leakage of dangerous materials

The safety information does not take into account:

- Unexpected incidents and events, which may occur during installation, operation and maintenance
- Local safety regulations which must be adhered to by the operator and by any additional installation personnel

Prior to commissioning:

1. Transport and store the product correctly.
2. Do not paint the bolts and plastic parts of the product.
3. Carry out installation and commissioning using trained personnel.
4. Provide adequate training for installation and operating personnel.
5. Ensure that the contents of the document have been fully understood by the responsible personnel.
6. Define the areas of responsibility.
7. Observe the safety data sheets.
8. Observe the safety regulations for the media used.

During operation:

9. Keep this document available at the place of use.
10. Observe the safety information.
11. Operate the product in accordance with this document.
12. Operate the product in accordance with the specifications.
13. Maintain the product correctly.
14. Do not carry out any maintenance work and repairs not described in this document without consulting the manufacturer first.

In cases of uncertainty:

15. Consult the nearest GEMÜ sales office.

3 Product description

3.1 Construction

Item	Name	Material
1	Cable*	FEP encapsulated
2	Housing*	PVDF, FKM
3	Housing (separation of media)**	PTFE
4	Body**	PTFE

* not media wetted

** media wetted

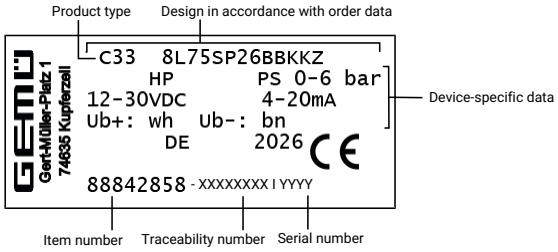
3.2 Description

The GEMÜ C33 HydraLine electronic pressure gauge comprises a PTFE body and a housing made of PTFE, PVDF and FKM. It has a ceramic pressure measurement cell which is separated from the process medium by an innovative new sealing concept. This means the process medium only comes into contact with PTFE. The GEMÜ C33 HydraLine has a leak detection hole for easy leakage detection and can be integrated directly into the piping system via flare unions.

3.3 Function

The product is used for pressure measurement in plants that require a high level of purity and resistance, such as in the semiconductor industry.

3.4 Product label



The month of manufacture is encoded in the traceability number and can be obtained from GEMÜ. The product was manufactured in Germany.

4 Intended use

⚠ DANGER

Danger of explosion!

- ► Risk of death or severe injury
- ● Do **not** use the product in potentially explosive zones.

⚠ WARNING

Improper use of the product!

- ► Risk of severe injury or death
- ► Manufacturer liability and guarantee will be void.
- ● Only use the product in accordance with the operating conditions specified in the contract documentation and in this document.

- The product must not be operated at excessive pressures.
- The product must not be used as a load-bearing part within a plant for supporting/fixing piping.
- The product is suitable for corrosive, inert, gaseous and liquid media which have no negative impact on the physical and chemical properties of the valve body and seal material.

5 Order data

The order data provide an overview of standard configurations.

Please check the availability before ordering. Other configurations available on request.

Order codes

1 Type	Code
Pressure gauge with ceramic pressure sensor	C33

2 Connection size	Code
1/4", international code: 4	4
3/8", international code: 6	6
1/2", international code: 8	8
3/4", international code: 12	12
1", international code: 16	16

3 Mounting version	Code
Dead-end	E
In-line	L

4 Connection type	Code
Flare connection with CPFA union nut	73
Flare connection with PVDF union nut	75
Flare connection with PFA union nut	77
Nexus Connect connection with PFA union nut	NX

5 Body material	Code
PTFE polytetrafluoroethylene, white	SP

6 Diaphragm material	Code
Modified PTFE, polytetrafluoroethylene	26

7 Unit	Code
bar	B
psi	P

8 Measuring range	Code
0–30 psi, 0.0–2.5 bar	BJ
0–100 psi, 0.0–6.0 bar	BK

9 Connection type	Code
Cable outlet with 2 m flying lead, (FEP encapsulated), IP 67	K

10 Display	Code
Without	Z

11 High Purity version	Code
High Purity	HP

12 Special version	Code
UL approval	U

Order example

Ordering option	Code	Description
1 Type	C33	Pressure gauge with ceramic pressure sensor
2 Connection size	8	1/2", international code: 8
3 Mounting version	L	In-line
4 Connection type	73	Flare connection with CPFA union nut
5 Body material	SP	PTFE polytetrafluoroethylene, white
6 Diaphragm material	26	Modified PTFE, polytetrafluoroethylene
7 Unit	B	bar
8 Measuring range	BK	0–100 psi, 0.0–6.0 bar
9 Connection type	K	Cable outlet with 2 m flying lead, (FEP encapsulated), IP 67
10 Display	Z	Without
11 High Purity version	HP	High Purity
12 Special version	U	UL approval

6 Technical data

6.1 Medium

Working medium: Corrosive, inert, gaseous and liquid media which have no negative impact on the physical and chemical properties of the body and seal material.

6.2 Temperature

Media temperature: 0 — 80 °C

Ambient temperature: 0 — 60 °C

6.3 Mechanical data

Installation position: Optional

Flow direction: Optional

Protection class: IP 67 (not rated by UL)

Mounting version: In-Line and Dead-End

Connection cable: 2 m, flying lead, FEP encapsulated, bend radius ≥ 20 mm

Weight: 500 g (In-Line 1/2")

Operating pressure: 2,5 - 6 bar
30 – 100 psi

6.4 Electrical data for measuring transducer

Supply voltage: 12–30 V DC

Output signal: 4–20 mA, two-wire

Error of measurement: ± 1% FS (100 psi and 6 bar, according to DIN EN 61298-2)
± 1.5% FS (30 psi and 2.5 bar, according to DIN EN 61298-2)

Jump response time:

Jump	response time
10–90% of measuring range	Typically 70 ms
5–15% of measuring range	Typically 50 ms
45–55% of measuring range	Typically 50 ms
85–95% of measuring range	Typically 50 ms

Duty cycle: Continuous duty

Reverse polarity protection: yes

Short-circuit resistance: yes

Input current: max. 22 mA

Ambient conditions: Use only in dry environments (only relevant for UL)

Height: Up to 2000 m (above sea level)

Relative air humidity: Maximum 95%, non-condensing

Degree of contamination: 3 (pollution degree)

Note regarding supply voltage in chapters 6.8.1 to 6.8.4 below (only relevant to UL):

- Class 2 power supply units in accordance with UL 1310.
- Safety extra-low voltage/limited power source.
- Safety extra-low voltage/limited energy circuits.

One of the three options listed above **must** be implemented by the customer.

6.5 Pressure

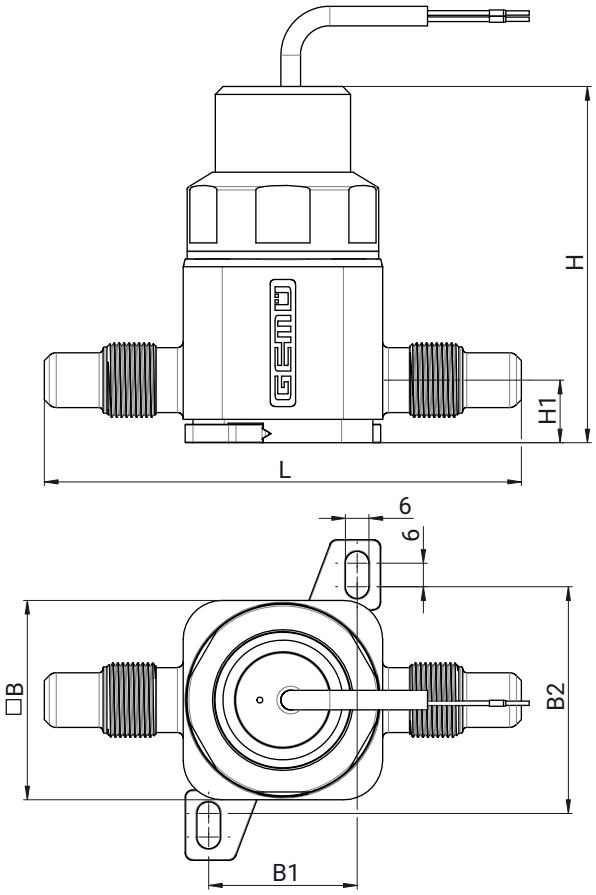
Measuring range: 0–30 psi (code P and JK)
0–2.5 bar (code B and JK)
0–100 psi (code P and BK)
0–6 bar (code B and BK)

6.6 Product conformity

Pressure Equipment Directive:	2014/68/EU
EMC Directive:	2014/30/EU
RoHS Directive:	2011/65/EU
UL approval:	UL approval (recognised) Component – Process – Control – Equipment, electrical QUYX2, QUYX8

7 Dimensions

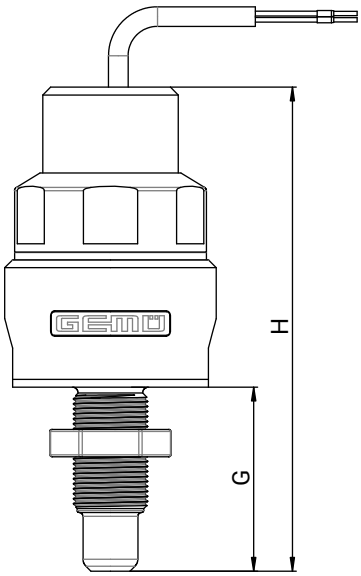
7.1 In-Line (Code L)

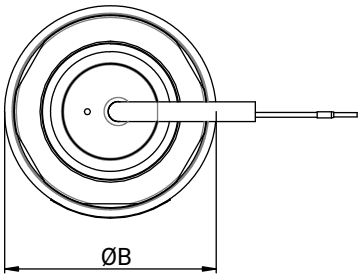


Connection	B	B1	B2	H	H1	L
3/8” Flare*	51.0	38.0	61.0	88.6	15.0	118.0
1/2” Flare*	51.0	38.0	61.0	91.1	16.0	122.0
3/4” Flare*	51.0	38.0	61.0	98.1	19.0	122.0
1” Flare*	55.0	43.0	65.0	106.8	25.0	165.0
3/8" Nexus*	51.0	38.0	61.0	90.6	17.0	81.0
1/2" Nexus*	51.0	38.0	61.0	94.1	19.0	86.0
3/4" Nexus*	51.0	38.0	61.0	102.1	23.0	95.0
1" Nexus*	55.0	43.0	65.0	110.1	28.42	109.0

Dimensions in mm
* Overall dimension (installation dimension) without union nuts

7.2 Dead-end (Code E)





Connection	B	G	H
1/4” Flare*	54.0	44.0	120.6
1/2” Flare*	54.0	47.0	123.6
1/4" Nexus*	54.0	11.0	87.6
1/2" Nexus*	54.0	17.5	94.1

Dimensions in mm
* Overall dimension (installation dimension) without union nuts

8 Manufacturer's information

8.1 Packaging

The product is sealed (HPW version) in two plastic bags and packaged in a cardboard box. This cardboard box can be recycled as paper.

8.2 Transport

1. Only transport the product by suitable means. Do not drop. Handle carefully.
2. After the installation dispose of transport packaging material according to relevant local or national disposal regulations / environmental protection laws.

8.3 Storage

1. Store the product free from dust and moisture in its original packaging.
2. Avoid UV rays and direct sunlight.
3. Do not exceed the maximum storage temperature (see chapter "Technical data").
4. Do not store solvents, chemicals, acids, fuels or similar fluids in the same room as GEMÜ products and their spare parts.
5. Close the compressed air connections with protection caps or sealing plugs.

8.4 Delivery

- Check that all parts are present and check for any damage immediately upon receipt.

The product's performance is tested at the factory. The scope of delivery is apparent from the dispatch documents and the design from the order number.

9 Installation in piping

9.1 Preparing for installation

⚠ WARNING

The equipment is subject to pressure!

► Risk of severe injury or death
- Depressurize the plant or plant component.
- Completely drain the plant or plant component.

⚠ WARNING

Corrosive chemicals!

► Risk of caustic burns
- Wear appropriate protective gear.
- Completely drain the plant.

⚠ CAUTION

Hot plant components!

► Burns
- Only work on plant that has cooled down.
- Wear protective gear.

⚠ CAUTION

Maximum permissible pressure exceeded!

► Damage to the product!
- Provide for precautionary measures against exceeding the maximum permissible pressure that may be caused by pressure surges (water hammer).

⚠ CAUTION

Use as step!

► Damage to the product
► Risk of slipping-off
- Choose the installation location so that the product cannot be used as a foothold.
- Do not use the product as a step or a foothold.

NOTICE

Suitability of the product!

► The product must be appropriate for the piping system operating conditions (medium, medium concentration, temperature and pressure) and the prevailing ambient conditions.

NOTICE

Tools!

► The tools required for installation and assembly are not included in the scope of delivery.
● Use appropriate, functional and safe tools.

1. Ensure the product is suitable for the relevant application.
2. Check the technical data of the product and the materials.
3. Keep appropriate tools ready.
4. Wear appropriate protective gear, as specified in the plant operator's guidelines.
5. Observe appropriate regulations for connections.
6. Have installation work carried out by trained personnel.
7. Shut off plant or plant component.
8. Secure plant or plant component against recommissioning.
9. Depressurize the plant or plant component.
10. Completely drain the plant (or plant component) and let it cool down until the temperature is below the media vaporization temperature and cannot cause scalding.
11. Correctly decontaminate, rinse and ventilate the plant or plant component.
12. Lay piping so that the product is protected against transverse and bending forces, and also from vibrations and tension.
13. Only install the product between matching aligned pipes (see chapters below).

9.2 Installation with flare connections

- For preparation and connection of the flare connections, please refer to operating instructions and assembly instructions for FlareStar.
- Depending on the ambient conditions, use resistant and suitable connection fittings.

9.3 Installation position

⚠ CAUTION

► The product must always be mounted so that it is mechanically stress-free. Extreme tension in the pipe system can cause damage to the product.

The product must not be mounted behind an outlet valve as it can run empty otherwise. To prevent gas diffusion and formation of blisters in the medium during static or dynamic pressure measurement, the product must always be installed on the pressure side of the system pump.

If the product cannot be mounted vertically, the line in which it is mounted must always be filled. An optimal measurement is ensured if no gas bubbles can form in the measurement channel of the product.

For applications with minimal deadleg, i.e. when it must be ensured that the lines are completely drained, we recommend vertical installation of the product. If the installation position is horizontal, remnants of liquid could remain in the product due to the geometry of the channel in the measurement channel interior.

Vibrations or mechanical stress can affect the accuracy of the product. If it is therefore necessary to additionally fix the product in place due to vibrations or mechanical movements, the product can be fixed in place using two mounting lugs.

9.4 Mounting point

NOTICE

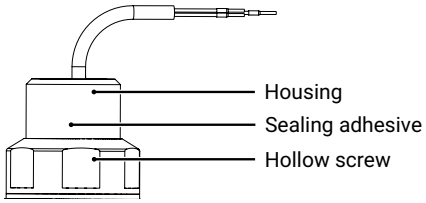
The housing has been twisted!

► Sealing adhesive is destroyed.
► Warranty coverage expires.
● Do **not** twist the housing.
● Only use the fastening options shown below.

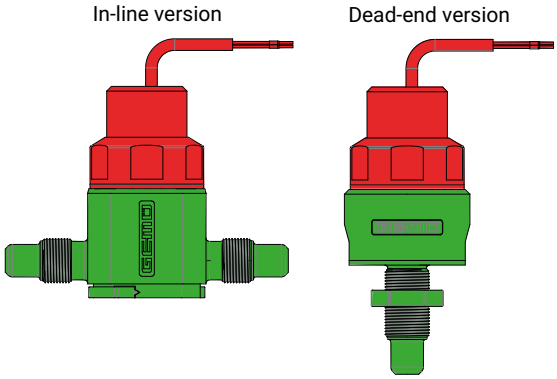
NOTICE

Hollow screw has been twisted!

► Sealing adhesive is destroyed.
► Tightness is affected.
► Measurement accuracy is affected.
► Electronics will be damaged.
● Do **not** twist the hollow screw.



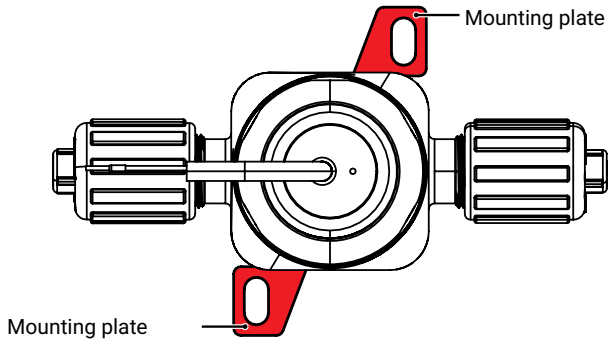
Overview of rotating/non-rotating parts:



Green	Rotatable (including union nut)
Red	Non-rotating

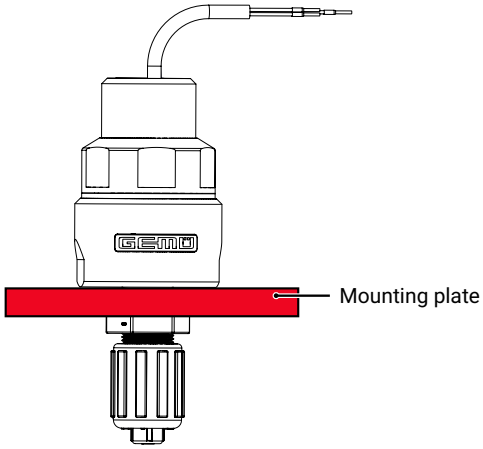
9.4.1 In-line version

For the in-line version, GEMÜ recommends fastening to the mounting plates.

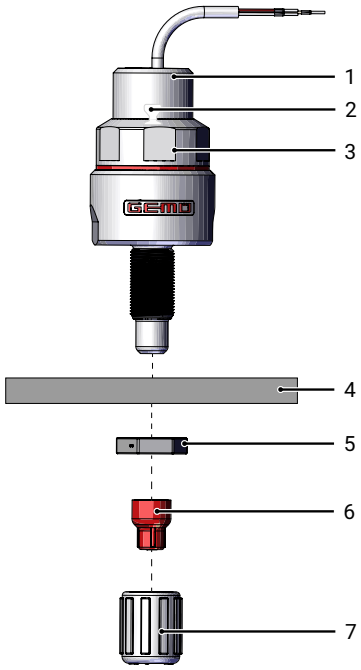


9.4.2 Dead-end variant

GEMÜ recommends fastening with a mounting plate for the dead-end variant.



9.4.2.1 Mount the mounting plate



Position	Designation
1	Housing
2	Sealing adhesive
3	Hollow screw
4	Mounting plate
5	Lock nut
6	Protective cap
7	Union nut

1. Unscrew union nut **7**.
2. Remove protective cap **6**.
3. Unscrew lock nut **5**.
4. Slide fixing plate **4** over the thread.
5. Screw lock nut **5** onto the thread until the mounting plate **4** is secured and lock it with the body (note the recesses for the spanner).
6. Replace union nut **7**.

9.5 After installation

- Re-attach or reactivate all safety and protective devices.

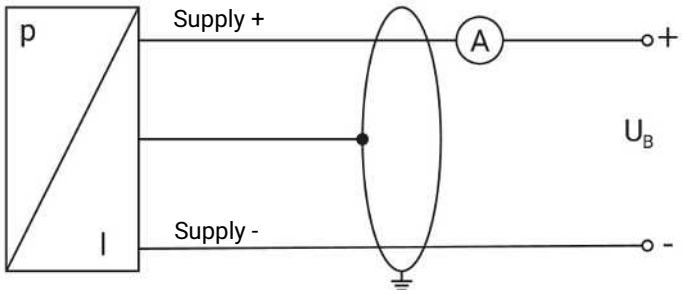
10 Electrical connection

⚠ CAUTION

Damage to the product!

► Short-circuit.

- Connect/reverse the polarity of the product correctly.
- Restriction that wiring has to be protected against mechanical abuse and not routed outside the external enclosure.



Strand colour	Function	Supply voltage	Analogue signal
White	Supply +	12–30 V DC	4–20 mA
Brown	Supply -		
Green-yellow	Shield	-	-

11 Commissioning

⚠ WARNING

Corrosive chemicals!

► Risk of caustic burns
● Wear appropriate protective gear.
● Completely drain the plant.

⚠ CAUTION

Cleaning agent!

► Damage to the GEMÜ product
● The plant operator is responsible for selecting the cleaning material and performing the procedure.

⚠ CAUTION

Excessive pressure/temperatures!

► Breakage of the valve body.
● Only operate the product within the pressure/temperature limits specified in the data sheet.

1. Install the product correctly.
2. Check the product for visible defects.
   ⇨ The hollow screw of the measuring device, which is sealed with a sealant, must not be loosened under any circumstances. Doing so will destroy the measuring arrangement and cause the process medium to leak.
3. Flush the pipe system in new installations and after repairs (the product must be fully open).

⇨ Harmful foreign substances have been removed.

⇨ The product is ready for use.

4. Operate the product within the specification (see technical data).

12 Potential faults

Leak detection hole:

There is a leak detection hole (opposite the GEMÜ logo). If working medium escapes from the leak detection hole, the product must be replaced.

Wire breakage safety:

The input signal of 4–20 mA is designed such that the product recognises at 0 mA if a wire in the cabling between the product and the control unit is interrupted (cable break or similar).

Water hammers:

Water hammers can damage the product. This can result in incorrect measured values. Ensure that the product is subjected to as few water hammers as possible.

Incorrect supply voltage:

If the product is operated outside the voltage specifications in the datasheet, this may result in incorrect measured values.

13 Inspection and maintenance

The operator must carry out regular visual inspections of the products in accordance with the conditions of use and the potential hazards in order to prevent leaks and damage.

The hollow screw of the measuring device, which is sealed with a seal adhesive, must not be loosened under any circumstances. Doing so will destroy the measuring arrangement and cause the process medium to leak out.

1. Maintenance and repair work must be carried out by trained specialists.
2. Wear suitable protective equipment in accordance with the plant operator's regulations.
3. Shut down the plant or part of the plant.
4. Secure the system or part of the system against being switched back on.
5. Depressurise the system or part of the system.

13.1 Replacing the pressure gauge

1. Observe the safety information from commissioning.
2. Switch off the electrical system.
3. Undo electrical connections.
4. Insert new pressure gauge.
5. Adopt the settings of the previous pressure gauge (optional).

14 Removal from piping

⚠ WARNING

Corrosive chemicals!

► Risk of caustic burns
● Wear appropriate protective gear.
● Completely drain the plant.

1. Remove in reverse order to installation.
2. Unscrew the electrical wiring.
3. Dismantle the product. Observe the warnings and safety information as per commissioning.
   ⇨ The operator must ensure the product is removed safely.

15 Disposal

1. Pay attention to adhered residual material and gas diffusion from penetrated media.
   ⇨ Observe the safety information from commissioning.
2. Dispose of all parts according to relevant local or national disposal regulations/environmental protection laws.
3. Dispose of electronic components separately.

16 Returns in the event of a complaint

Legal regulations for the protection of the environment and personnel require that the completed and signed return delivery note is enclosed with the dispatch documents. Returned goods can only be processed if this note is completed. If no return delivery note is enclosed with the product, no credit will be provided and no repair work will be carried out, and the product will instead be disposed of at your expense.

1. Clean the product (pay particular attention to the process connections area where medium residue can stick. This is especially important when the medium is hazardous to health, corrosive or has gas diffusions, etc.)
2. Request a return delivery note from GEMÜ.
3. Complete the return delivery note in full.
4. Send the product to GEMÜ together with a completed return delivery note.

17 Manufacturer's declaration according to the Pressure Equipment Directive 2014/68/EU

Manufacturer's declaration

according to the Pressure Equipment Directive 2014/68/EU

We, the company

GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG
Fritz-Müller-Strasse 6–8
74653 Ingelfingen-Criesbach, Germany

declare that the below-mentioned product is designed and manufactured in compliance with sound engineering practice according to Article 4, Paragraph 3 of the Pressure Equipment Directive 2014/68/EU.

Product: GEMÜ C33

Product name: Pressure transducer

The product has been developed and produced according to GEMÜ's in-house process instructions and standards of quality which comply with the requirements of ISO 9001 and ISO 14001. According to Article 4, Paragraph 3 of the Pressure Equipment Directive 2014/68/EU, this product must not be identified by a CE-marking.

Other applied technical standards / Remarks:

- EN ISO 16138:2006/A1:2019

M. Barghoorn
Head of Global Technics

Ingelfingen, 30/04/2024

18 EU Declaration of Conformity in accordance with 2014/30/EU (EMC Directive)

EU Declaration of Conformity

in accordance with 2014/30/EU (EMC Directive)

We, the company	GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG Fritz-Müller-Strasse 6–8 74653 Ingelfingen-Criesbach, Germany

hereby declare under our sole responsibility that the below-mentioned product complies with the regulations of the above-mentioned Directive.

Product:	GEMÜ C33
Product name:	Pressure transducer
The following harmonized standards (or parts thereof) have been applied:	EN IEC 61326-1:2021 EN IEC 61326-2-3:2021

M. Barghoorn
Head of Global Technics

Ingelfingen, 30/04/2024

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Subject to alteration

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