

## Perforation counter PZ 3





*Keep in a safe place for future reference!*

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## Types

PZ 3	(115 V)	12.0801.000
PZ 3	(230 V)	12.0800.000



# 1 Notes on operating instructions

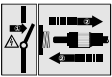
In these operating instructions, the PZ 3 is also referred to as "unit".

## 1.1 Pictorial markings used

➤ In these operating instructions



**WARNING!**  
High voltage!  
Danger of fatal accidents!  
Do not open unit!



**WARNING!**  
Only plug in/unplug coaxial connector  
when the unit is switched off!



**CAUTION!**  
**Important instructions!**

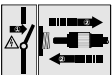


**ATTENTION!**  
**Important instructions!**

➤ On the unit



**WARNING!**  
High voltage!  
Danger of fatal accidents!  
Do not open unit!



**WARNING!**  
Only plug in/unplug coaxial connector  
when the unit is switched off!

## 2 Safety

The unit is operationally safe, provided that it is operated in accordance with its intended use.

Operating errors, misuse or defects will result in dangers:

- For life and limb of the operator.
- For the unit and other assets.

Also note Chapter 4.1 (refer to page 13 "Important installation notes").

### 2.1 Intended use



#### **ATTENTION!**

**Do not install or use the unit in areas subject to explosion hazards!**

The perforation counter PZ 3 is intended solely for the supply of high voltage to HAUG counting electrodes.

The PZ 3 generates an adjustable high-voltage of up to 18 kVDC.

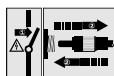
For reasons of safety, unauthorized conversions and modifications of the unit are not permitted. The installation and operating conditions indicated in these Operating Instructions must be adhered to.

## 2.2 Danger sources

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**WARNING!**

High voltage!  
Danger of fatal accidents!  
Do not open unit!

**WARNING!**

Only plug in/unplug coaxial connector  
when the unit is switched off!

---

**CAUTION!**

**The counting electrode connected to the perforation counter conducts high-voltage during operation!**

A residual voltage may remain at the counting electrode for several minutes after the PZ 3 has been switched off! Any contact may lead to injury and consequential accidents. The operator must provide protective equipment against direct contact when installing the counting electrode.

Defective high-voltage terminals and cables may lead to danger of electric shocks. Shut down the unit immediately in case of visible damage and suspected electrical defects.

## 2.3 Installer qualifications

The unit may be installed by trained electricians only. The above mentioned person must have read the operating instructions and must follow the instructions, notes and safety advice.

## 2.4 Operator qualifications

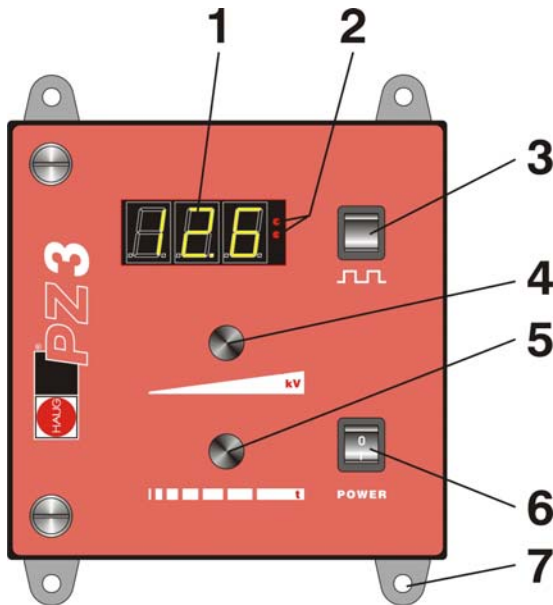
This unit must only be maintained and put into operation by authorized persons who are instructed in the potential dangers. The above mentioned person must have read the operating instructions and must follow the instructions, notes and safety advice.

### 3 Description of unit

#### 3.1 Perforation counter

Figure 1

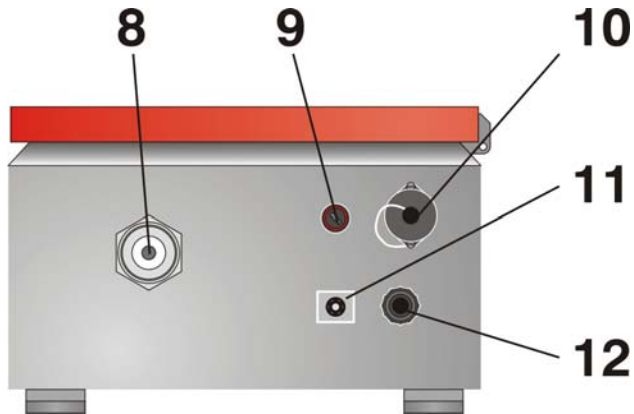
1. Voltage display kV
2. Counter pulse reading (light-emitting diodes light up during the blocking time)
3. Operating mode switch for pulse/continuous operation
4. Potentiometer kV for setting the output voltage (high-voltage)
5. Potentiometer t for setting the duration of the counting pulse (blocking time for new counting pulse)
6. Mains switch; green lamp is on when unit is switched on
7. Mounting bracket





**Figure 2**

8. High-voltage terminal for counting electrode
9. Fuse
10. Signalling socket
11. Ground connection
12. Mains supply



### 3.2

#### Functional description

The unit generates an adjustable high-voltage of up to 18 kVDC.

The output voltage is set so that a spark-over occurs between the counting electrode and the earthed counter electrode, e.g. through the perforation of the test medium to be counted.

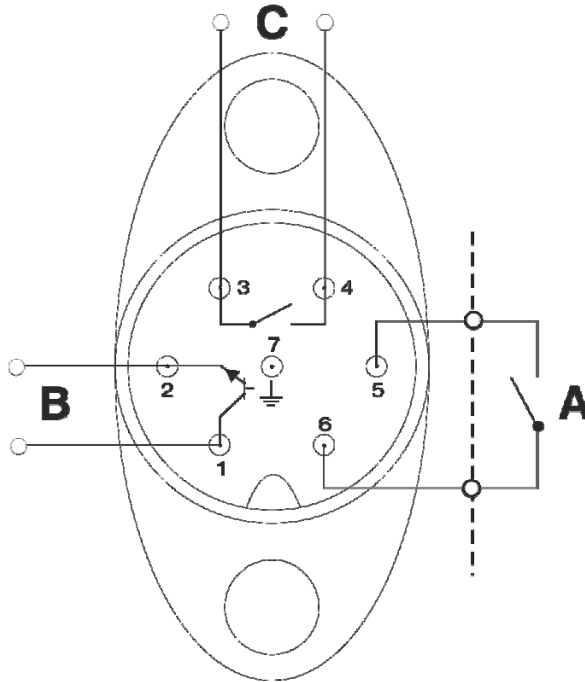
Using the perforation counter PZ 3 and a counting electrode, perforations of, for example, bags made of plastic film can be detected. Using an external counter, e.g. in a control panel, machine functions can be triggered.

### 3.3 Signalling socket

Figure 3

- A:** External pulse switch (floating NO contact)  
**B:** Counter with contact input (open collector switching to 0 V)  
**C:** Relay contact for operational readiness (contact is closed when the mains voltage and the unit is switched on)

- Pin 1 External voltage 2 – 24 VDC, max. 50 mA (collector)  
 Pin 2 Counting pulse output (emitter)  
 Pin 3 Floating contact for operational readiness  
 Pin 4 Floating contact for operational readiness  
 Pin 5 Pulse switch connection  
 Pin 6 Pulse switch connection  
 Pin 7 PE



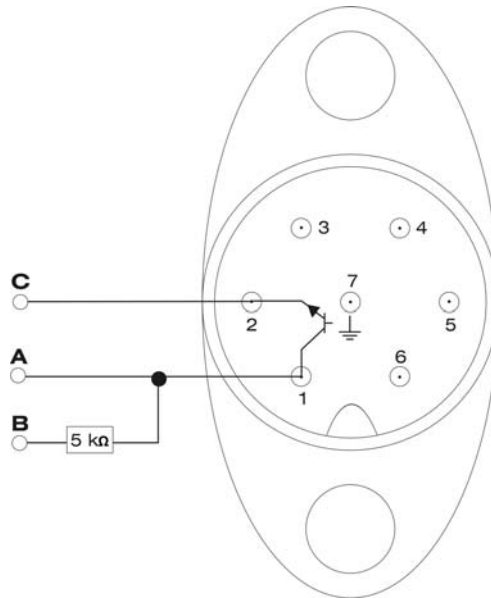
### 3.4 Wiring suggestion for counter output (inverting)

Figure 4

Signal for counting event: 0 V

Signal for no counting event: 2 – 24 VDC

- A: Counting pulse output (inverting)
- B: External voltage 2 – 24 VDC
- C: Ground reference potential



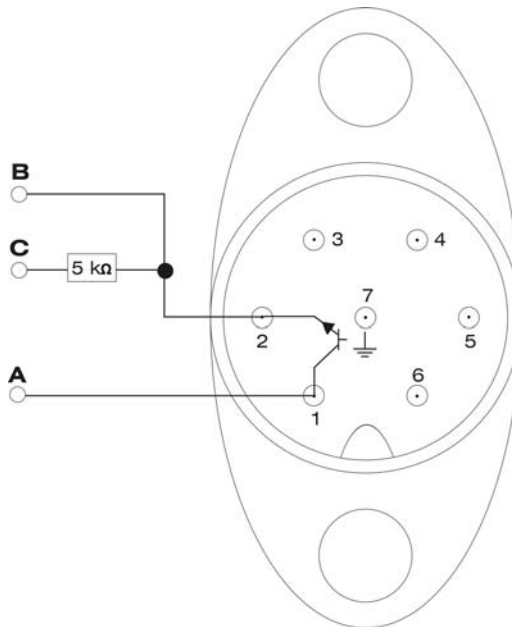
### 3.5 Wiring suggestion for counter output (not inverting)

Figure 5

Signal for counting event: 2 – 24 VDC

Signal for no counting event: 0 V

- A: External voltage 2 – 24 VDC
- B: Counting pulse output (not inverting)
- C: Ground reference potential



**ATTENTION!**

The input resistance of the counting device must be  $> 20 \text{ k}\Omega$ !

The duration of the counting pulse output can be adjusted by means of the potentiometer  $t$  (see page 8, Fig. 1, item 5).

For counting pulses with maximum counting rate, the connected counter must be able to process a pulse width of  $< 2 \text{ ms}$ !

## 4 Installation

The unit may be installed by trained electricians only. The above mentioned person must have read the operating instructions and must follow the instructions, notes and safety advice.

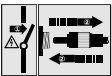
### 4.1 Important installation instructions

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**WARNING!**

High voltage!  
Danger of fatal accidents!  
Do not open unit!



**WARNING!**

Only plug in/unplug coaxial connector  
when the unit is switched off!

---



**CAUTION!**

**The counting electrode connected to the PZ 3 carries high-voltage during operation!**

A residual voltage may remain at the counting electrode for several minutes after the PZ 3 has been switched off! Any contact may lead to injury and consequential accidents. The operator must provide protective equipment against direct contact when installing the counting electrode.

The operation of the unit is not affected by the position in which it is installed. However, we recommend installing the unit so that the high-voltage terminal points downwards (to protect it from humidity, oil and dirt). Connect the counting electrode directly to the unit.

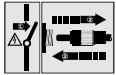
Do not place the unit on a surface generating or radiating heat. Avoid installation positions exposed to direct sunlight.

## 4.2 Setting up, connecting

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**WARNING!**

High voltage!  
Danger of fatal accidents!  
Do not open unit!

**WARNING!**

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when the unit is switched off!

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1. Before connecting always check that the unit is suitable for the local mains voltage (the voltage is indicated on the name plate). Incorrect mains voltage may result in damage to the unit.
2. Install the unit at the desired location using the mounting brackets (see page 8, Fig. 1, item 7).
3. Ensure that the unit is switched off (for mains switch, refer to page 8, Fig. 1, item 6).
4. Connect the PE conductor (green-yellow) with the protective earth of the mains. Connecting the PE conductor via parts of a machine body is insufficient.
5. Connect the counting electrode to the high-voltage terminal.
6. If required, connect the signalling line K1 to the signalling socket (see page 9, Fig. 2, item 10).
7. Connect the unit to the mains.
8. Put unit into operation.

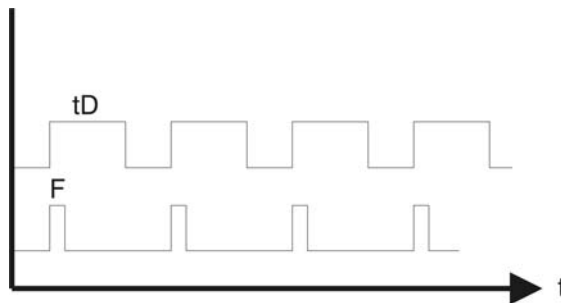
## 5 Application

This unit must only be put into operation by authorized persons who are instructed in the potential dangers. The above mentioned person must have read the operating instructions and must follow the instructions, notes and safety advice.

1. Attach the counting electrode directly above a material web, e.g. above a film bag web, opposite an earthed counter electrode. Ensure that the counting electrode is located in the perforation area.
2. Switch on the supply voltage after properly connecting the perforation counter and the counting electrode.
3. The mains switch will illuminate when set on "On".
4. Adjust the output voltage using the potentiometer kV (refer to page 8, figure 1, section 4) so that a spark-over occurs through the perforation between the counting electrode and the earthed counter electrode. No spark-over must occur where non-perforated material is present between the counting electrode and the earthed counter electrode.
5. Adjust the duration of the counting pulse using potentiometer t (see page 8, Fig. 1, item 5). The LEDs of the counting pulse counter (see page 8, Fig. 1, item 2) will light up during the blocking interval. During this period, no further spark-over will be counted.

**Figure 6**

**tD:** Adjustable duration of the counting pulse  
**F:** Spark-over / Trigger of counting pulse  
**t:** Time



### ATTENTION!

The blocking time for the counting pulse is intended to prevent the counting of multiple spark-overs originating from one counting event.

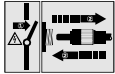
## 6 Remedy of defects

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**WARNING!**

High voltage!  
Danger of fatal accidents!  
Do not open unit!



**WARNING!**

Only plug in/unplug coaxial connector  
when the unit is switched off!

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Any remedy of defects must be carried out by trained electricians only. The above mentioned person must have read the operating instructions and must follow the instructions, notes and safety advice.

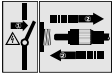
In case of defects regarding the PZ 3 and the counting electrode, please check for correct installation and fusing first (for replacement, refer to page 17, chapter 7.1). If this does not remedy the fault, please return the PZ 3 with the counting electrode to **HAUG GmbH & Co. KG** for checking (see address on back page).



## 7

**Maintenance and repairs****WARNING!**

High voltage!  
 Danger of fatal accidents!  
 Do not open unit!

**WARNING!**

Only plug in/unplug coaxial connector  
 when the unit is switched off!

This unit does not include any parts which can be maintained or repaired by the operator. **HAUG GmbH & Co. KG** only is authorized to repair or calibrate the unit.

Should the unit prove defective or if a defect is suspected, switch off unit immediately and secure against subsequent reuse.

## 7.1

**Changing the fuse**

1. Switch off unit.
2. Determine and remove the cause for the blown fuse.
3. Detach the fuse holder using a screwdriver and lift out.
4. Replace fuse and reattach fuse holder.

**Use the following fuses only:**

Unit type	Fuse
115 V	0,50 A slow, 5 x 20 mm
230 V	0,25 A slow, 5 x 20 mm

The unit type and the rated voltage are indicated on the nameplate.  
 Only use fuses of the type indicated.

## 7.2 Accessories

Article	Order number
Circular plug	X – 0616
Right-angle plug	X – 5718
Signalling line K1 (incl. plug, assembled)      5 m shielded	06.8941.000
Signalling line K1 (incl. plug, assembled)      10 m shielded	06.8941.001
Signalling line K1 (incl. plug, assembled)      20 m shielded	06.8941.002
Counting electrode 50 mm	08.8598.105
Counting electrode 80 mm	08.8598.108
Counting electrode 110 mm	08.8598.111
Counting electrode (variable length)	On request

## 8 Technical data

### 8.1 Characteristics and specification

Reference temperature 23 °C

High-voltage terminals	1 HAUG high-voltage terminal for counting electrodes
High-voltage	$U = 2.4$ to 18 kVDC
Short-circuit current (high-voltage)	$I_k \leq 1$ mA
Duration of counting pulse	5 to 1000 ms
Max. counting frequency	approx. 15 Hz, corresponding to 900 pulses per minute
Voltage on counting output	2 VDC to max. 24 VDC / max. 50 mA, internally separated via optocoupler

### 8.2 Supply voltage



**ATTENTION!**

Always connect the PE conductor (green/yellow conductor) to the protective earth of the mains!

Unit type	Nominal value	Operating range	Frequency range	Power input
12.0801.000	115 VAC	$\pm 10$ %	50 - 60 Hz	$P_{\max} = 15$ VA
12.0800.000	230 VAC	$\pm 10$ %	50 - 60 Hz	$P_{\max} = 15$ VA

### 8.3 Ambient conditions

<b>Ambient temperature:</b>	
Rated application range	+5 °C to +45 °C
Extreme range for storage and transport	-15 °C to +60 °C
<b>Humidity:</b>	
Rated application range	20 % to 65 % RH
Extreme range for storage and transport	0 % to 85 % RH
<b>Air pressure:</b>	
Rated application range	800 mbar to 1060 mbar
<b>Vibrations:</b>	
Extreme range for storage and transport	max. 1.5 g (10 to 55 Hz), 1 h
Shock	max. 15 g in each direction
<b>Recommended service position:</b>	
	vertical, supply cable downwards

### 8.4 Housing

Protection type	IP 54
Protection class	I
Mains supply	approx. 2,6 m fixed on unit
<b>Dimensions:</b>	
Height	approx. 100 mm
Width	approx. 200 mm
Depth	approx. 200 mm
<b>Weight:</b>	
	approx. 2 kg

**9****Disposal**

Observe and maintain national and regional waste disposal regulations for the disposal of the unit!





made by



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