

## Setting up and operating the engraving unit **ENGRAVING UNIT**

User manual

# User manual

## Setting up and operating the engraving unit ENGRAVING UNIT

UM EN ENGRAVING UNIT, revision 00

2017-04-04

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This user manual is valid for:

Designation	Revision	Order No.
ENGRAVING UNIT		0804500

107816\_en\_00

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# 1 For your safety

Read this user manual carefully and keep it to hand for future reference.

## 1.1 Designating the warning instructions



This is the safety alert symbol. It is used to alert you to potential personal injury hazards.

There are three key words for the severity of the potential injuries.

### **DANGER**

Indicates a hazard with a high degree of risk. If the hazard is not avoided, it could result in death or a serious injury.

### **WARNING**

Indicates a hazard with a medium degree of risk. If the hazard is not avoided, it could result in death or a serious injury.

### **CAUTION**

Indicates a hazard with a low degree of risk. If the hazard cannot be avoided, then it could result in a minor or moderate injury.



This symbol, with the key word **NOTE** warns of actions that can result in material damages or malfunctions.



Here you can find additional information or further sources of reference.

## 1.2 User qualification

This user manual is directed at those persons who are familiar with the relevant safety concepts for handling electrical machines. Only persons who can commission, operate, and maintain the device are entitled to use the device, as well as identify the hazards.

Minors participating in an apprenticeship scheme may only operate the device when over 16 years of age. They must be appropriately supervised.

## 1.3 Field of application

The ENGRAVING UNIT engraving unit is only suitable for use with the PLOTMARK plotter from Phoenix Contact. If you wish to replace the plotter lowering unit with the engraving unit, the PLOTMARK becomes an engraving unit.

The engraving unit is designed for engraving special two-layer plastics. Appropriate materials are available from Phoenix Contact. It is not possible to engrave other materials. This includes aluminum, brass, steel or glass.

The suction unit on the engraving unit sucks up the shavings from engraving. Do not use lubricant or coolant, as the suction unit cannot process these. Only operate the engraving unit together with the suction unit.

Marking is implemented with special engraving chisels which are available in a range of stroke widths from Phoenix Contact.

You may only use the engraving unit with materials and engraving chisels from Phoenix Contact which are intended for this purpose. The use of other materials and engraving chisels can result in damage to the unit.

## 1.4 Safety notes

### Danger due to mains voltage

Never open the housing of the unit or power supply unit.

### Risk of burns

During operation, the engraving spindle can get hot. Allow the engraving spindle to cool before disassembling the engraving head.

### Risk to operational reliability

Incorrect operation or modifications to the device can endanger your safety or damage the plotter. Do not repair the product yourself. If the device is defective, please contact Phoenix Contact.

### Damage to the device

- Only operate the engraving unit in dry locations, protected from spray, that are as dust-free as possible. Operation outside is not permitted.
- Protect the engraving unit and materials from humidity, damp, and dirt.
- To operate the engraving unit on the power grid, only use the supplied wide range power supply unit. The electrical connection conditions must comply with the details on the rating plate.

### Handling the engraving spindle



Only use the engraving spindle in surroundings that are as free from dust as possible. If the environment is too dusty, this could result in the bearings clogging with dust. Dirty bearings wear faster.

The tip of the engraving chisel is very sensitive. Handle the engraving chisel carefully. A damaged engraving chisel has a significant impact upon the quality of the marking.

**Safety symbols**

These safety symbols are affixed to the engraving spindle. Do not remove these stickers.

Table 1-1 Engraving spindle safety symbols

Symbol	Meaning
	<p>Cutting danger</p> <p>The engraving chisel is sharp. Be careful not to injure yourself on the engraving chisel.</p> <p>The tip of the engraving chisel is very sensitive. Handle the engraving chisel carefully. A damaged engraving chisel has a significant impact upon the quality of the marking.</p>
	<p>Observe the instructions.</p>

## 2 Starting up the engraving unit



The engraving unit is controlled via the plotter. Starting up the engraving unit requires the plotter to be set up.

### 2.1 Unpacking and setup

#### Scope of supply

- Control unit (ENGRAVING CONTROLLER)
- Suction unit (ENGRAVING VC), incl. filler plugs and suction unit bag
- Engraving head
- Engraving spindle with 0.5 mm engraving chisel inserted (P1 GRAVER 0.5, 5145504)
- Mains cable (Euro)
- D-SUB cable, to connect the control unit and PLOTMARK
- 3-pos. cable, to connect the control unit and engraving spindle
- 4-pos. cable, to connect the control unit and suction unit
- Suction hose
- Stand tube
- Mounting bracket for the stand tube, with contact bolts for zero setting
- Clamp for the stand tube
- Data medium with driver and the CLIP PROJECT advanced software. Furthermore, the data medium also contains this user manual in several languages.
- User manual in German and English

#### Unpacking

- Check the device for damage which may have occurred during transport.
- Retain the original packaging for subsequent transport.

#### Requirements for the installation location

**NOTE: Damage to the device**

Place the device in a location that is as dry, dust-free, and protected from water as possible. Protect the device and materials from humidity, damp, and dirt. Do not expose the device to direct sunlight.

## 2.2 Overview of the device

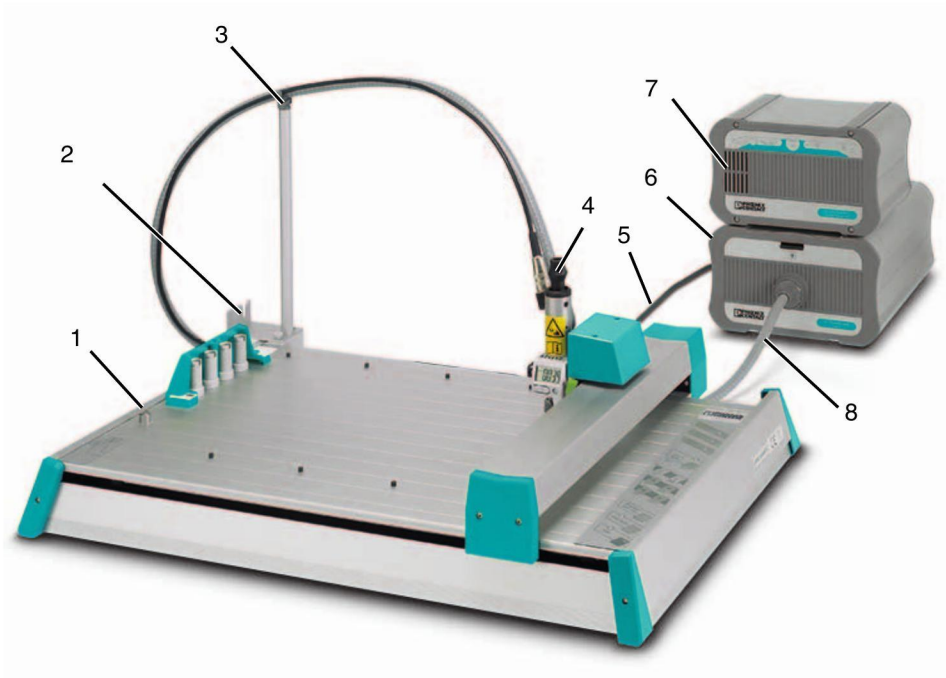


Figure 2-1 Overview

- 1 Contact bolts for zero setting
- 2 Mounting bracket for the stand tube, with storage option for the plotter lowering unit or engraving head
- 3 Stand tube with clamp for the suction tube and the engraving spindle cable
- 4 Engraving head with engraving spindle
- 5 3-pos. cable, to connect the control unit and engraving spindle
- 6 Suction unit
- 7 Control unit
- 8 Suction hose



## 2.3 Mounting the engraving unit on the plotter

### 2.3.1 Securing the stand tube

Secure the mounting bracket for the stand tube on the plotter.

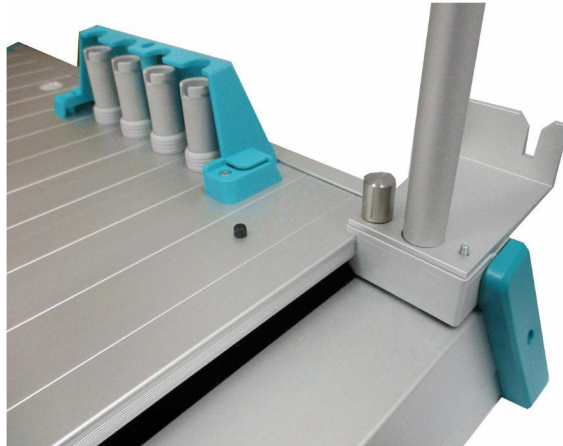


Figure 2-2 Securing the stand tube on the plotter

- Press the mounting bracket laterally on the writing surface of the plotter.
- Then slide the mounting bracket into the side profile.
- Insert the stand tube into the mounting bracket.
- Securing the clamp in the stand tube

### 2.3.2 Securing the engraving head on the writing arm

Replace the lowering unit for the engraving head. Remove the lowering unit from the plotter

- To remove the lowering unit from the writing arm, press the green slide to the right.
- Carefully lift out the lowering unit.
- Position the lowering unit in the mounting bracket.



Figure 2-3 Positioning the lowering unit in the mounting bracket

#### Inserting the engraving head

- Position the engraving head in the center of the bracket on the writing arm.
- To secure the engraving head, press the green slide to the right.

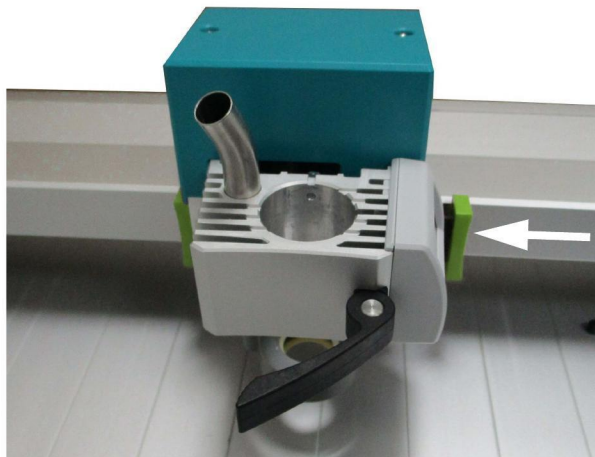


Figure 2-4 Securing the engraving head on the writing arm

### 2.3.3 Connecting the suction unit and control unit

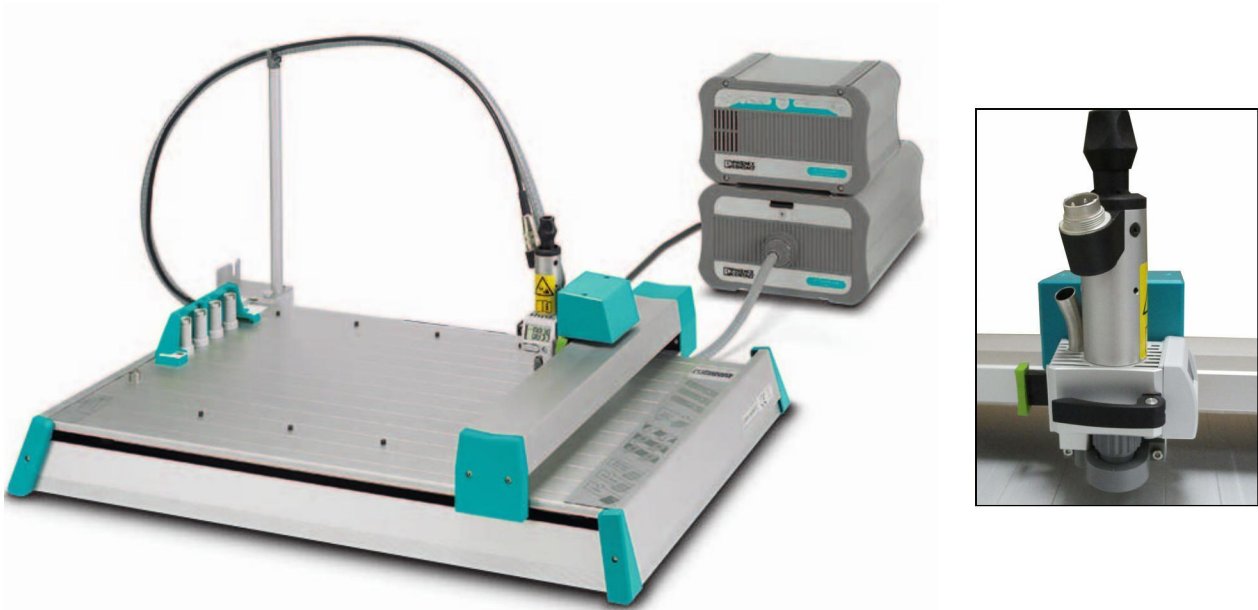


Figure 2-5 Engraving unit design

#### Connecting the suction unit and control unit

- Place the suction unit and control unit behind the plotter.
- Connect the suction unit and control unit with the 4-pos. cable.
- Connect the suction unit and control unit with the plotter. To do so, use the D-SUB cable. Secure the connection by means of the knurled screws.
- Connect the mains cable to the control unit.

#### Connecting the engraving spindle



The sequence described ensures that the engraving head can move freely during operation. It is important that the suction tube and cable are the correct length to be secured to the stand tube.

- Insert the engraving spindle in the engraving head.
- Securely clamp the engraving spindle in place with the lever.
- Make sure that the plotter is switched off.
- Slide the engraving head into the right lower corner of the plotter.
- Insert the suction tube into the engraving head. Position the suction tube in a gentle curve. Secure it in the stand tube clamp.
- Connect the suction tube to the suction unit.
- Connect the 3-pos. cable to the engraving spindle. Guide the cable in a gentle curve. Secure it in the stand tube clamp.
- Connect the engraving spindle cable to the control unit.



**2.3.4 Setting up the engraving unit**

- Switch on the control unit via the mains switch on the rear.
- Switch on the plotter.  
The engraving unit travels to the zero position.  
The green “Engraving mode” LED lights up on the plotter.  
Then the plotter travels to the zero position.
- Before sending a print job, adjust the engraving depth (refer to “Setting the engraving depth” on page14).

The engraving unit is ready to operate.

The control unit automatically switches on the suction unit. To remove residual particles after engraving, you can switch the suction unit ON or OFF using the button on the control unit.

Table 2-1 Control unit display elements

LED			Meaning
Power	Green	On	Engraving spindle is ready for operation
	Yellow	On	Error-free operation of the engraving spindle
	Red	On	ERROR

## 3 Creating engravings

### 3.1 Connecting to a computer via USB



The engraving unit is controlled via the plotter. Starting up the engraving unit requires the plotter to be set up.

- Connect the plotter to the computer via USB.

### 3.2 Setting up the engraving unit in CLIP PROJECT

- Open “File, Printer setup”.
- Via “Plotter, ENGRAVING UNIT”, create a new device or edit the ones that are already there.
- Switch to the “Interface” tab. Select “USB” as the interface.

### 3.3 Inserting the magazines

Eight catch pins are located on the plotter's writing surface. Up to four different magazines can be located on these catch pins. Depending on the size of the marking elements, different magazines are available. The magazines can occupy one, two or four segments on the writing surface.

When starting a print job, CLIP PROJECT indicates the position of the magazine on the writing surface. Always place the first magazine at the top left of the writing surface.

### 3.4 Creating print jobs

Create the print jobs using the CLIP PROJECT marking software.

CLIP PROJECT marking can be used to create markings on a computer, which are tailored to the Phoenix Contact marking material.

There, select the ENGRAVING UNIT as the output device. You will be provided with a list of materials that are suitable for this device.

The CLIP PROJECT marking software is supplied with the engraving unit.

CLIP PROJECT marking can also be downloaded at [phoenixcontact.net/qr/5146053](https://phoenixcontact.net/qr/5146053).

During a print job, CLIP PROJECT marking indicates where the magazine with the material is expected. During a print job, you must confirm that you have inserted the corresponding magazine and material.

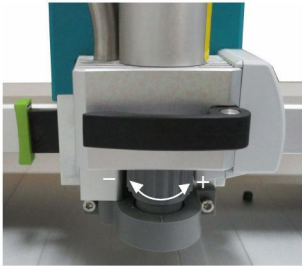
### 3.5 Setting the engraving depth

#### Securing the contact bolts

On the plotter's writing surface, at the lower right, there is a cover for the contact bolts for zero position.

- Release the cover using a coin or screwdriver.
- In order to not lose the cover, screw the cover onto the mounting bracket.
- Unscrew the contact bolts from the mounting bracket.
- Screw the contact bolts onto the writing surface.

#### Setting the engraving depth with the depth adjuster



At the base of the engraving head, there is a gray cap with a thumbwheel, the depth adjuster. If you turn the depth adjuster to the right, clockwise, the engraving depth increases, and vice versa. **The direction of rotation is observed from below, considering the engraving chisel.**

Each detent is noticeable. One detent changes the engraving depth by 0.05 mm. A complete rotation of the depth adjuster, with 20 detents, corresponds to 1 mm.

The engraving head is equipped with a display that indicates the depth adjuster increments. To turn on the display, briefly touch the button. To change the unit display to mm or inches, press the button for 3 s.

If the display is not used for approx. 15 min., it switches off.

Before determining the engraving depth, you must define the zero setting.

#### Setting the engraving chisel to zero

- Switch on the plotter.  
The plotter travels to the zero position
- Press the "Penstation open / close" button.  
The plotter travels to the contact bolts and lowers itself. If contact is made between the engraving spindle and the contact bolts, a beep signal sounds.
- Turn the depth adjust to the left, until the signal goes out. The depth adjuster is standardized.

If the signal doesn't sound, the engraving chisel is not protruding. Turn the depth adjuster to the right, until the signal sounds. Then rotate one detent to the left. The signal goes out. The depth adjuster is standardized.

- Set the indicator on the display to zero.
- Press the "Penstation open / close" button.  
The plotter then travels back to the initial position.

## 4 Maintenance and troubleshooting

### 4.1 Cleaning

#### Cleaning the device

- Protect the device from dust and other contaminants.
- Wipe down the device with a duster. The duster can either be dry or dampened with a mild cleaning agent.

#### Cleaning the magazines

- Clean the magazines regularly under running water. The materials only adhere properly to a clean magazine.

#### Cleaning the engraving spindle

**WARNING: Risk of burns**

During operation, the engraving spindle can get hot. Allow the engraving spindle to cool before disassembling the engraving head.

**NOTE: Damage to engraving spindle**

Never clean the engraving spindle with compressed air, as by doing so, the lubricant can be removed from the ball bearings. Never clean the engraving spindle with water.

- Remove the engraving chisel.
- Unscrew the collet with the help of the rotary button.
- Wipe the front part of the collet with a clean cotton bud.

## 4.2 Replacing the engraving chisel

**WARNING: Risk of burns**

During operation, the engraving spindle can get hot. Allow the engraving spindle to cool before disassembling the engraving head.

**WARNING: Cutting danger**

The engraving chisel is sharp. Be careful not to injure yourself on the engraving chisel.

- Release the connections from the engraving spindle.
- Open the lever on the engraving head. Remove the engraving spindle.
- Unscrew the depth adjuster from the engraving spindle. The depth adjuster is the gray plastic cap, behind which is the engraving chisel.
- Press the black rotary button at the top of the engraving spindle. Find the deepest point and rotate the rotary button slightly to the left. The collet is now open. You can remove the engraving chisel.
- Insert the new engraving chisel, until it reaches the ring.
- Press in the black rotary button. Tighten the collet by rotating clockwise.
- Turn the depth adjuster on the engraving spindle, until the engraving chisel slightly protrudes from the top of the depth adjuster. You do not have to tighten the depth adjuster until it hits the stop.
- Secure the engraving spindle in the engraving head. Establish the connections.
- Set the engraving chisel to zero (refer to “Setting the engraving chisel to zero” on 14).

## 4.3 Replacing the suction unit bag

- Pull off the suction tube.
- Open the cover latching of the suction unit.
- Replace the suction unit bag.  
Replacement bag: P1 ENGRAVING VC BAG, 5145559

## 4.4 Replacing the fuse

If the control unit indicator does not light up, the fuse may be defective.

- Disconnect the control unit from the mains.
- Open the cover near the power switch.
- Replace the fuse (micro-fuse, 4 A).



## 4.5 Troubleshooting

Table 4-1 Troubleshooting

Problem	Cause	Remedy	Page
The control unit will not switch on.	Power supply defective	Check mains cable	–
The green LED on the control unit does not light up	Fuse faulty	Replace fuse	16
The engraving unit breaks off engraving. The red LED lights up on the control unit.	Engraving spindle overloaded	Press the “ON” and “OFF” buttons simultaneously. The suction unit starts up. By pressing the “ON” or “OFF” button, you can alter the speed of the engraving spindle. The red “STOP” LED goes out.	–
	Engraving spindle defective	Replace the spindle defective	–
Engraving not possible	Connecting lines faulty	Check the connecting lines	–
	Engraving head not positioned correctly	Reinsert the engraving head	–
Engraving is not clean	Engraving chisel broken off	Replace the engraving chisel	16
	Engraving shavings in the spindle head or collet	Clean the engraving spindle	15
Engraving depth not reached	Zero position or engraving depth not set correctly	Reset the engraving depth	14
The display on the engraving head cannot be switched on	Battery discharged	Replace the display battery (type CR 2032)	–

## 4.6 Repairs



**WARNING: Risk to operational reliability**

Incorrect operation or modifications to the device can endanger your safety or damage the device. Do not repair the product yourself. If the device is defective, please contact Phoenix Contact.

## 4.7 Transporting the device

- Package the device in the original packing for shipping.

## 4.8 Storage

- Only store the engraving unit in dry surroundings.
- Store the engraving unit in such a way as to avoid any potential damage.
- Store the engraving unit complete with individual parts and accessories. Otherwise, key components could be missing when restarting.

## 4.9 Disposal



Dispose of the item separately from other waste, i.e., via an appropriate collection site.

## 5 Appendix

### 5.1 Ordering data

#### Engraving unit

Description	Type	Order No.	Pcs./Pkt.
<b>Engraving unit</b> , by replacing the plotter head with the engraving unit, the PLOTMARK is converted into an engraving unit	ENGRAVING UNIT	0804500	1
<b>Plotter</b> , weight: 8 kg, width: 480 mm, height: 155 mm, color: silver-colored	PLOTMARK	0804499	1
<b>Replacement suction unit bag</b> for engraving unit	P1 ENGRAVING VC BAG	5145559	1

#### Engraving chisel

Description	Type	Order No.	Pcs./Pkt.
<b>Engraving chisel</b> , with a point angle of 15°, point diameter: 0.2 mm	P1 GRAVER 0.2	5145478	1
<b>Engraving chisel</b> , with a point angle of 15°, point diameter: 0.3 mm	P1 GRAVER 0.3	5145481	1
<b>Engraving chisel</b> , with a point angle of 15°, point diameter: 0.4 mm	P1 GRAVER 0.4	5145494	1
<b>Engraving chisel</b> , with a point angle of 15°, point diameter: 0.5 mm	P1 GRAVER 0.5	5145504	1
<b>Engraving chisel</b> , with a point angle of 15°, point diameter: 0.7 mm	P1 GRAVER 0.7	5145517	1
<b>Engraving chisel</b> , with a point angle of 15°, point diameter: 1.0 mm	P1 GRAVER 1.0	5145520	1
<b>Engraving chisel set</b> , chisel with a point angle of 15°, point diameter: 0.2 mm, 0.3 mm, 0.4 mm, 0.5 mm, 0.7 mm, 1.0 mm	P1 GRAVER SET	5145533	1

#### Magazines

Description	Type	Order No.	Pcs./Pkt.
<b>Magazine</b> for insertion of GPE materials, specially for engraving	CMS-P1-M/GPE ENGRAVING	5145711	1
<b>Fixing mat</b> for fixing engraving material, accessories for CMS-P1-M/GPE ENGRAVING	CMS-P1-M/GPE-PAD	5144880	1

## ENGRAVING UNIT

### Engraving material with rounded corners

Description	Type	Order No.	Pcs./Pkt.
Engraving material with rounded corners			
<b>Engraving material</b> , silver-colored, unmarked, mounting type: adhere, marking field size: 22 x 22 mm	GPE 22X22 SR/R	0806628	10
<b>Engraving material</b> , silver-colored, unmarked, mounting type: adhere, marking field size: 27 x 8 mm	GPE 27X 8 SR/R	0806877	10
<b>Engraving material</b> , white, unmarked, mounting type: adhere, marking field size: 27 x 8 mm	GPE 27X 8 WH/R	0815198	10
<b>Engraving material</b> , silver-colored, unmarked, mounting type: adhere, marking field size: 27 x 12.5 mm	GPE 27X12,5 SR/R	0806880	10
<b>Engraving material</b> , silver-colored, unmarked, mounting type: adhere, marking field size: 27 x 18 mm	GPE 27X18 SR/R	0806893	10
<b>Engraving material</b> , white, unmarked, mounting type: adhere, marking field size: 27 x 18 mm	GPE 27X18 WH/R	0815208	10
<b>Engraving material</b> , silver-colored, unmarked, mounting type: adhere, marking field size: 27 x 27 mm	GPE 27X27 SR/R	0806903	10
<b>Engraving material</b> , silver-colored, unmarked, mounting type: adhere, marking field size: 28 x 17.5 mm	GPE 28X17,5 SR	0807889	10
<b>Engraving material</b> , silver-colored, unmarked, mounting type: adhere, marking field size: 45 x 14 mm	GPE 45X14 SR/R	0807009	10
<b>Engraving material</b> , white, unmarked, mounting type: adhere, marking field size: 45 x 14 mm	GPE 45X14 WH/R	0815282	10
<b>Engraving material</b> , silver-colored, unmarked, mounting type: adhere, marking field size: 60 x 12 mm	GPE 60X12 SR/R	0806631	10
<b>Engraving material</b> , white, unmarked, mounting type: adhere, marking field size: 60 x 12 mm	GPE 60X12 WH/R	0807630	10
<b>Engraving material</b> , white, unmarked, mounting type: adhere, marking field size: 60 x 30 mm	GPE 60X30 WH/R	0815292	10

### Engraving material without rounded corners

Description	Type	Order No.	Pcs./Pkt.
<b>Engraving material</b> , white, unmarked, mounting type: adhere, marking field size: 13 x 9 mm	GPE 13X 9 WH	0806932	10
<b>Engraving material</b> , white, unmarked, mounting type: adhere, marking field size: 17.5 x 12 mm	GPE 17.5X12 WH	0806916	10
<b>Engraving material</b> , white, unmarked, mounting type: adhere, marking field size: 20 x 7 mm	GPE 20X 7 WH	0806990	10
<b>Engraving material</b> , white, unmarked, mounting type: adhere, marking field size: 20 x 8 mm	GPE 20X 8 WH	0806945	10
<b>Engraving material</b> , white, unmarked, mounting type: adhere, marking field size: 22 x 12 mm	GPE 22X12 WH	0806929	10
<b>Engraving material</b> , white, unmarked, mounting type: adhere, marking field size: 52 x 26 mm	GPE 52X26 WH	0806958	10

**Engraving material without rounded corners**

Description	Type	Order No.	Pcs./Pkt.
<b>Engraving material</b> , red/white, unmarked, mounting type: adhere, marking field size: 60 x 12 mm	GPE 60X12 RD-WH	0824202	10
<b>Engraving material</b> , white, unmarked, mounting type: adhere, marking field size: 60 x 30 mm	GPE 60X30 WH	0806961	10
<b>Engraving material</b> , yellow, unmarked, mounting type: adhere, marking field size: 70 x 32 mm	GPE 70X32 YE	0824215	10

**Plastic labels**

Description	Type	Order No.	Pcs./Pkt.
<b>Plastic label</b> with bore hole for button ø 24 mm, white, unmarked, mounting type: adhere, marking field size: 30 x 12 mm	EMLP 24 (30X12)	0822301	10
<b>Plastic label</b> with bore hole for button ø 24 mm, silver, unmarked, mounting type: adhere, marking field size: 30 x 12 mm	EMLP 24 (30X12) SR	0822330	10
<b>Plastic label</b> with bore hole for button ø 24 mm, black, unmarked, mounting type: adhere, marking field size: 30 x 12 mm	EMLP 24 (30X12) BK	0822314	10
<b>Plastic label</b> with bore hole for button ø 32 mm, white, unmarked, mounting type: adhere, marking field size: 38 x 14 mm	EMLP 32 (38X14)	0822291	10
<b>Plastic label</b> with bore hole for button ø 32 mm, silver-color, unmarked, mounting type: adhere, marking field size: 38 x 14 mm	EMLP 32 (38X14) SR	0822343	10
<b>Plastic label</b> with bore hole for button ø 32 mm, black, unmarked, mounting type: adhere, marking field size: 38 x 14 mm	EMLP 32 (38X14) BK	0822327	10

## 5.2 Technical data

Engraving spindle	
Speed	At least 5000 rpm, maximum 50,000 rpm
Torque	6 Ncm
Frequency	83 Hz ... 830 Hz
Power consumption	Maximum: 60 watts
Collets	Shaft diameter 3 mm
Clamping mechanism	Compliance voltage
Concentricity with collet	0.03 mm
Clamp diameter	25 mm
Field of application	Engraving plastic labels
Control unit	
Power supply	100 VAC ... 240 V AC / 50 Hz ... 60 Hz
Fuse	4 A, slow-blow
Dimensions	180 mm x 250 mm
Weight	Approx. 2.7 kg
Suction unit	
Power supply	24 V DC
Power consumption	Maximum 55 watts
Dimensions	350 mm x 250 mm
Weight	Approx. 4.6 kg
Ambient conditions	
Relative humidity	
Operation	35% ... 75%
Storage	10% ... 90%
Ambient temperature	
Operation	+10°C ... +35°C
Storage	-10°C ... +50°C

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### Subsidiaries

If there are any problems that cannot be solved using the documentation, please contact your Phoenix Contact subsidiary.

Subsidiary contact information is available at [phoenixcontact.com](http://phoenixcontact.com).

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