

# Leseprobe

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Vocational training

## Principles of electrical engineering

Part 1: Electrical engineering



Trainee

Dr.-Ing. Paul Christiani GmbH & Co. KG  
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**Vocational training –**

# **Principles of electrical engineering**

**Section: Trainee**

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Dr.-Ing. Paul Christiani GmbH & Co. KG

## Preface

The exercises cover the basic principles of electrical engineering. They represent the basic knowledge required for the electronics profession and are implemented at the start of the training course.

All exercises have been created by trainees. "Laboratory conditions" have deliberately not been presented, in favour of realistic implementations. This means each of the exercises introduced can be discussed with the trainees and evaluated. This enhances awareness of their own work.

In addition to the direct exercise materials to be handed out to the trainees, other documentation is also available:

Forms for

- Parts lists (suitable for handwritten entries)
- Work plans (suitable for handwritten entries)
- Circuit and functional analysis
- Inspection as per DIN VDE 0701-0702
- Inspection as per DIN VDE 0100-600
- Notes (one notes sheet is already attached to each exercise)

Trainers can arrange to hand out these forms at a time convenient to them, at their own discretion.

Please note that no reference indicators (equipment indicators) have been assigned to the equipment in the practical set-ups. This is because, when using reference designations according to DIN EN 81356-2, it should remain open whether only the main class should be used, or the main class and supplementary class.

In the circuit diagram illustrations, it was decided to use only the main class, as is usual in the professional examinations for many electronics professions.

Of course, the installed equipment must be provided with reference indicators.

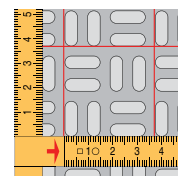
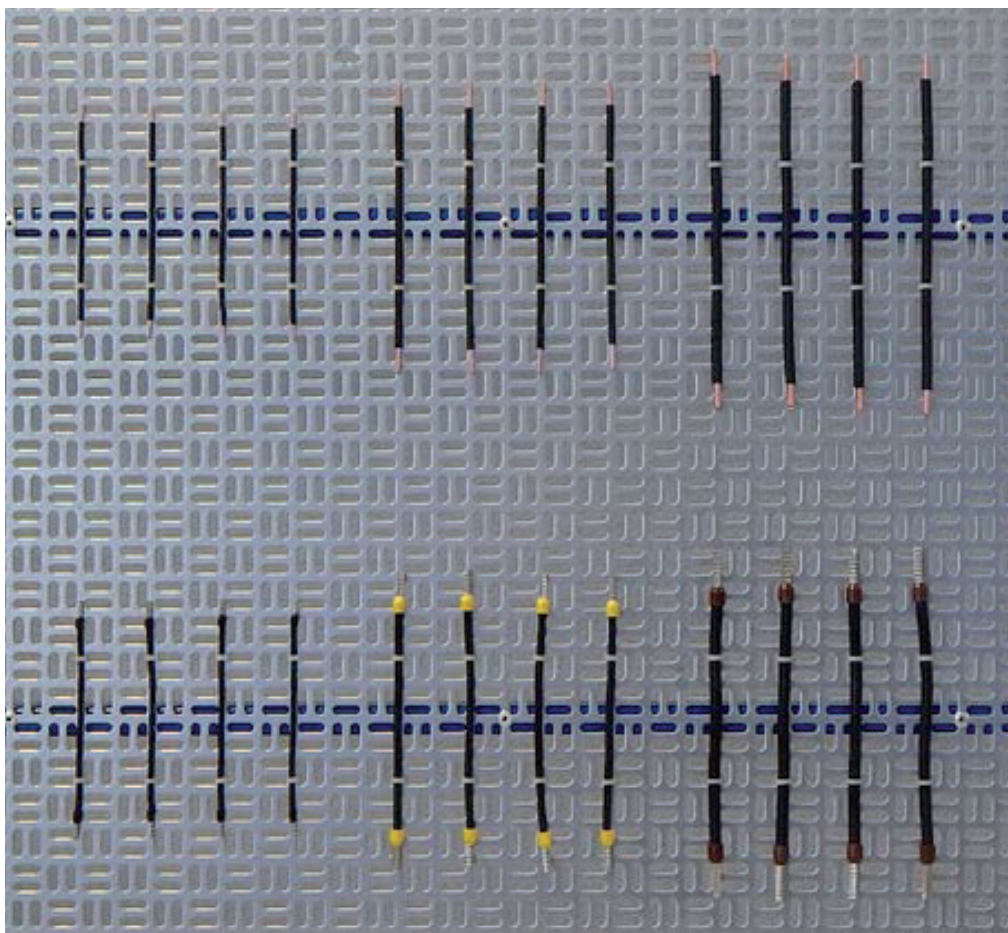
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**Exercise 1: Preparing cables**

**Task/assignment**

- Strip the PVC single-core non-sheathed cables H07V-U as shown in the figure.
- Strip the PVC single-core non-sheathed cables H07V-K as shown in the figure. Attach a wire end ferrule to one end of each cable.
- Fix the cables in position as per the specifications shown in the photo.



**Note**

Cable lengths and mounting positions should be observed only approximately, but should be even.

	Stripping PVC single-core non-sheathed cables and attaching wire end ferrules	Task/assignment
	Principles of electrical engineering	Exercise 1.1



<b>Work plan</b>				
Stripping PVC single-core non-sheathed cables and attaching wire end ferrules				
Name:		Department:		Date:
No.	Work process	Tools and materials	Remark	Time
1	Trimming the H07V-U cable to length	H07V-U cable Side-cutting pliers Tape measure	Cross-section 1.5 mm <sup>2</sup>	1 min
2	Removing the insulation on both cable ends	Wire stripper		2 min
3	Trimming the H07V-U cable to length	H07V-U cable Side-cutting pliers Tape measure	Cross-section 6 mm <sup>2</sup>	1 min
4	Removing the insulation on both cable ends	Wire stripping tool		2 min
5	Trimming the H07V-U cable to length	H07V-U cable Side-cutting pliers Tape measure	Cross-section 10 mm <sup>2</sup>	1 min
6	Removing the insulation on both cable ends	Wire stripping tool		2 min
7	Trimming the H07V-K cable to length	H07V-K cable Side-cutting pliers Tape measure	Cross-section 1.5 mm <sup>2</sup>	1 min
8	Removing the insulation on both cable ends	Wire stripper		2 min
9	Attaching and crimping wire end ferrules	Crimping tool		3 min
10	Attaching cables to perforated plate	Cable ties	140 x 3.5 mm 140 x 2.5 mm	5 min
11	Repeat procedures 7 to 10 with H07V-K cable 6 mm <sup>2</sup> and 10 mm <sup>2</sup>	See above	Cross-section 6 mm <sup>2</sup> Cross-section 10 mm <sup>2</sup>	18 min
Vocational electrical engineering training	<b>Whenever performing work, the personal protective equipment required for the respective task must always be used.</b>			Electrical engineering Task/assignment <b>Exercise 1.1</b>
	<b>Stripping PVC single-core non-sheathed cables and attaching wire end ferrules</b>			
	<b>Work plan</b>			

## Control questions

Name:

Department:

Date:

**1.** What must you pay particular attention to when removing insulation from cables?

**2.** Wire end ferrules should be crushed so that they are gas-tight. What does that mean?

	Principles of electrical engineering	<b>Electrical engineering</b>
	<b>Stripping PVC single-core non-sheathed cables and attaching wire end ferrules</b>	Control questions
	<b>Control questions</b>	<b>Exercise 1.1</b>



### Control questions

Name:

Department:

Date:

**3.** Although certainly a rather “makeshift solution”, using a cable stripping knife to remove the insulation is a skill that all electrical specialists should command. In practice, however, wire strippers are used for this. Describe the work sequence.

**4.** What must you pay particular attention to when using the wire strippers shown?



	Principles of electrical engineering	<b>Electrical engineering</b>
	<b>Stripping PVC single-core non-sheathed cables and attaching wire end ferrules</b>	Control questions
	<b>Control questions</b>	<b>Exercise 1.1</b>

## Control questions

Name:

Department:

Date:

**5.** The wire end ferrules shown are suitable for which conductor cross-sections?



**6.** What setting can be made on the tool shown?



	Principles of electrical engineering	<b>Electrical engineering</b>
	<b>Stripping PVC single-core non-sheathed cables and attaching wire end ferrules</b>	Control questions
	<b>Control questions</b>	<b>Exercise 1.1</b>