Handling and Connection of Cables and Lines for Fixed Laying – Course: Basic Skills and Knowledge of Electrical Engineering. Instruction Examples for Practical Vocational Training

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Introduction

The present boklet contains 3 selected instruction examples to practise the main skills in “Handling and Connection of Cables and Lines for Fixed Laying”.

Since the skills in handling and connection of cables and lines for fixed laying can be acquired only by practising as much as possible, the instruction examples should be repeated many times.

In order to facilitate the preparation and execution of the work, the necessary materials, working, measuring and testing tools as well as additional knowledge required for carrying out the exercises are specified for each instruction example, where necessary.

Moreover, working drawings are attached showing more details of the exercises.

Instruction Example 5.1. Connection of a Line for Fixed Laying to an Electrical Equipment

Material

Plastic cable, electrical equipment with socket screw joint

Working tools

Side cutting plier, cable stripper (knife), sheath stripper, insulation stripping plier, screwdriver, hexagon−head wrench, round−nose plier

Measuring and testing tools

Scale

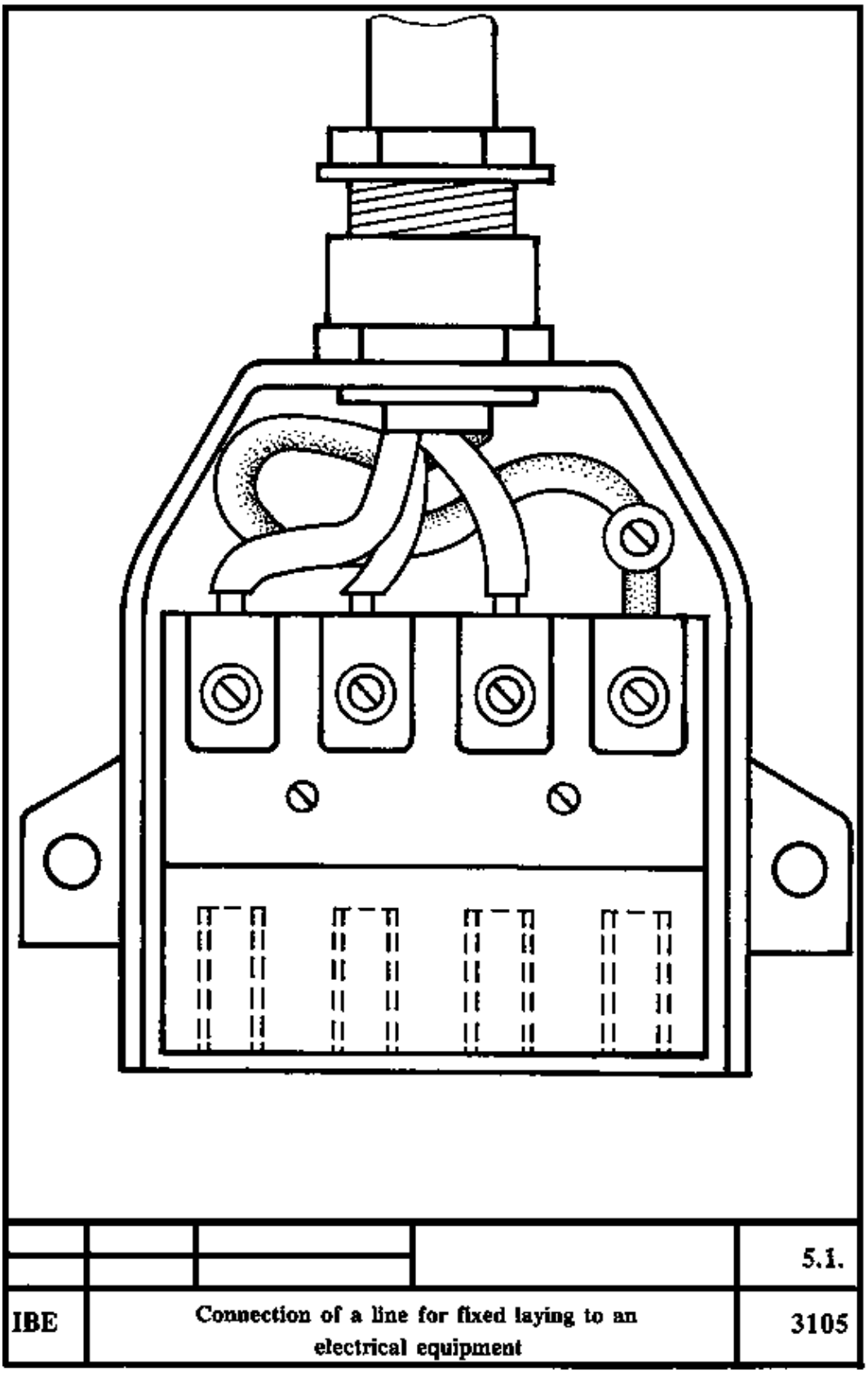
Accessories

Anti−corrosive grease

Necessary additional knowledge

Knowledge of types of lines and core coding as well as phase conductor sequence, making fastening joints

	Sequence of operations	Comments
1.	Cutting the cable to length required.	
2.	Opening the point of connection of the electrical equipment.	
3.	Removing the insulation sheath.	
4.	Taking out and arranging the elements of the gland screw joint on the cable.	
5.	Feeding–in the cable into the electrical equipment.	
6.	Adapting the conductors to the points of connection.	
7.	Stripping the individual conductors.	Pay attention to type of connection. (clamping, bending of lugs etc.)
8.	Clamping of the conductors.	Protective conductor first and then the phase conductor. In case of Al conductors, grease with anti–corrosive grease!
9.	Tightening the screw joint.	
10.	Closing the electrical equipment.	If necessary, take further protective measures to improve the safety quality.



Instruction Example 5.2. Installation and Connection of Devices with Different Types of Connection

Material

Plastic cables of different cross sections, branch box with gland screw joint, socket with gland screw joint, line fixing clamps

Working tools

Side cutting plier, cable stripper (knife), sheath stripper, insulation stripping plier, screwdriver, round−nose plier, pressing plier, gimlet

Measuring and testing tools

Folding rule, continuity tester

Accessories

Press−sleeves, fastening screw for devices and clamps, anti−corrosive grease, sealing compound for gland screw joints

Necessary additional knowledge

Knowledge of cable types and core coding as well as phase conductor sequence, making fastening joints, making pressed joints

	Sequence of operations	Comments
1.	Marking the arrangement of the line and the location of the electrical equipment.	
2.	Installation of the equipment and mounting of the line fixing clamps.	
3.	Cutting the cables to the required length.	
4.	Opening the points of connection of the equipment.	
5.	Removing the insulation sheath at either end of the cable.	If the cable is to be laid between two electrical equipments repeat operations 5 and 61
	Taking out and arranging the elements of the gland screw joint on the cable.	
	Feeding−in the cable into the electrical equipment.	
	Laying the cable, fixing with clamps and aligning up to shortly before the other equipment.	
6.	Repeating the operations as per 5. with the other equipment.	
7.	Adapting the conductors to the points of connection.	
8.	Stripping of the individual conductors.	

9. Connecting the conductors.

Type of connection

– by means of press–sleeves

– by means of lugs

– by means of clamping

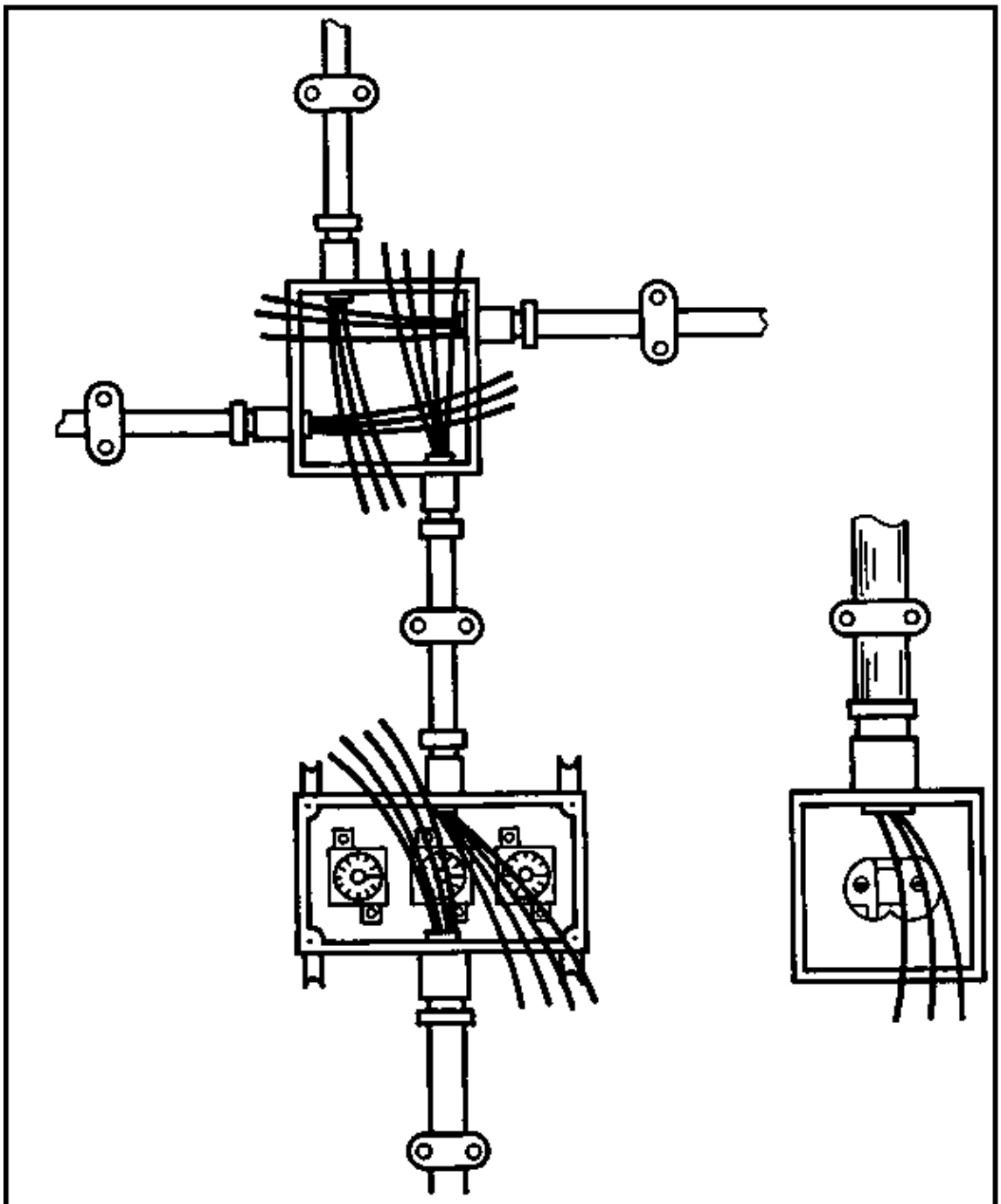
to be considered!

10. Tightening the screw joints.

11. Testing the connected lines by means of continuity tester.

12. Closing the electrical equipment.

13. Sealing the gland screw joints.



				5.2.
IBE	Installation and connection of devices with different types of connection			3105

Instruction Example 5.3. Handling Plastic−sheathed Wires, Connecting them to Tag Blocks and Combining them into Wiring Harnesses

Material

Plastic−sheathed wires NY or NYF (1mm^2), tag blocks (multi−step)

Working tools

Side cutting plier, cable stripper (knife), insulation stripping plier, long flat−nose plier, soldering iron, paint scraper

Measuring and testing tools

Folding rule

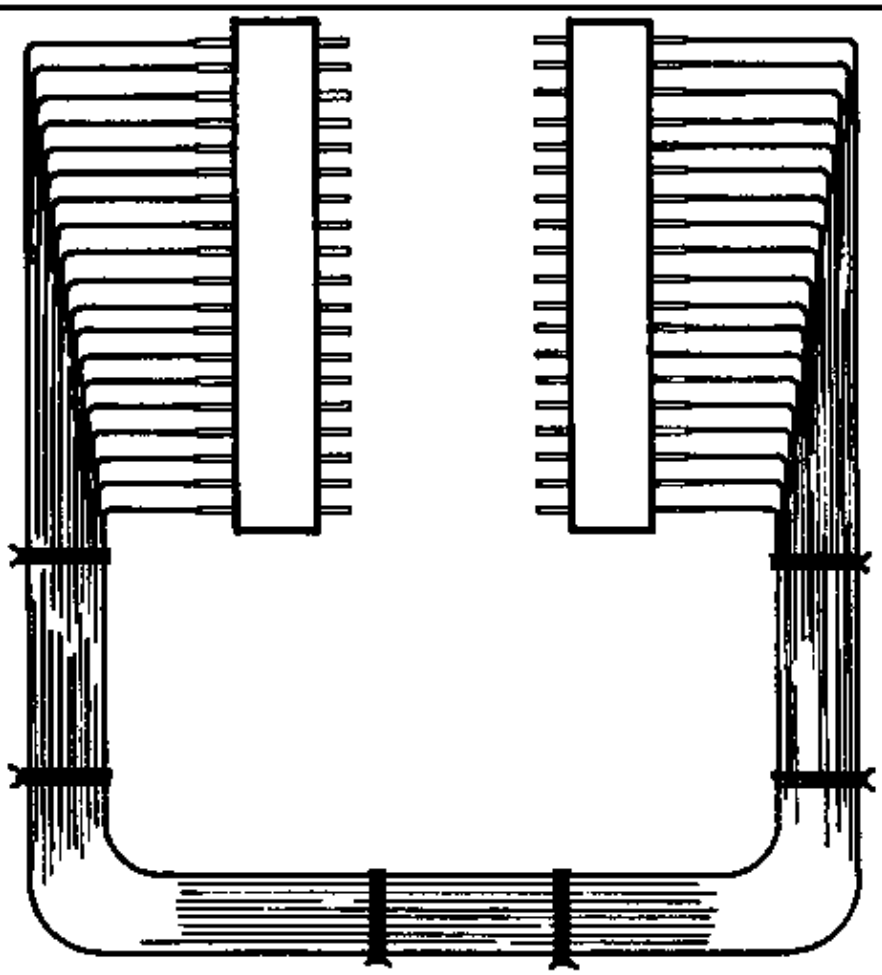
Accessories

Wiring harness form, soldering−iron stand, extension line, Perfol tape, flux, soldering tin

Necessary additional knowledge

Knowledge of core lines, solder, flux, making permanent joints

	Sequence of operations	Comments
1.	Uncoiling the plastic−sheathed wire.	
2.	Cutting the plastic−sheathed wire to size.	Pay attention to size!
3.	Bunching the plastic−sheathed wires into a wiring harness and binding by means of Perfol tape.	
4.	Adapting the wire ends to the tag blocks.	
5.	Stripping the wire ends.	
6.	Tin−coating the wire ends.	
7.	Soldering the wire ends to the soldering tags of the tag blocks.	



				5.3.
IBE	Handling plastic-sheathed wires, connecting them to tag blocks and combining them into wiring harnesses			3105