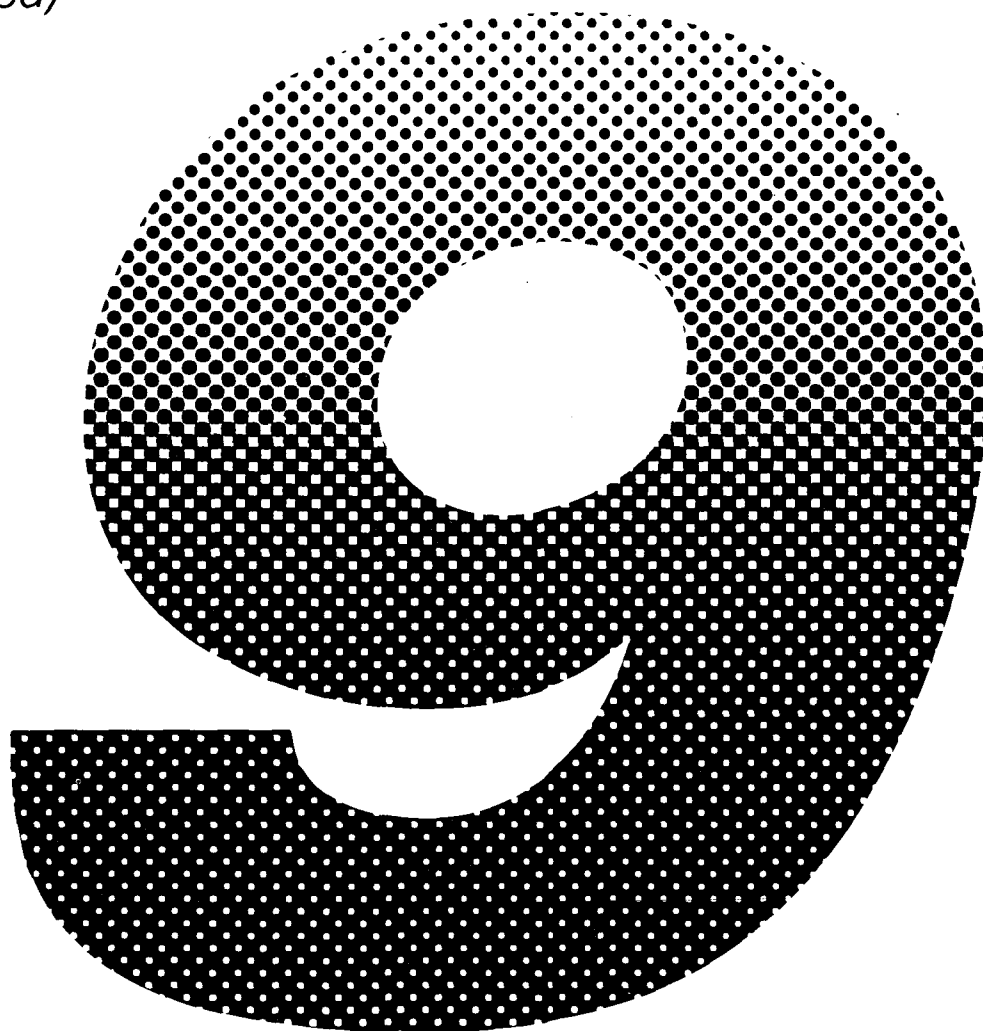


*Equipment planning guide
for vocational and technical training and education programmes*

Electrical occupations

Second edition (revised)



International Labour Office Geneva



0 0 5 7 5 5

Second (revised) edition copyright © International Labour Organisation 1988

Publications of the International Labour Office enjoy copyright under Protocol 2 of the Universal Copyright Convention. Nevertheless, short excerpts from them may be reproduced without authorisation, on condition that the source is indicated. For rights of reproduction or translation, application should be made to the Publications Branch (Rights and Permissions), International Labour Office, CH-1211 Geneva 22, Switzerland. The International Labour Office welcomes such applications.

ISBN 92-2-106455-7

ISSN 0250-8834

First published 1978

Second (revised) edition 1988

The designations employed in ILO publications, which are in conformity with United Nations practice, and the presentation of material therein do not imply the expression of any opinion whatsoever on the part of the International Labour Office concerning the legal status of any country, area or territory or of its authorities, or concerning the delimitation of its frontiers. The responsibility for opinions expressed in signed articles, studies and other contributions rests solely with their authors, and publication does not constitute an endorsement by the International Labour Office of the opinions expressed in them. Reference to names of firms and commercial products and processes does not imply their endorsement by the International Labour Office, and any failure to mention a particular firm, commercial product or process is not a sign of disapproval.

ILO publications can be obtained through major booksellers or ILO local offices in many countries, or direct from ILO Publications, International Labour Office, CH-1211 Geneva 22, Switzerland. A catalogue or list of new publications will be sent free of charge from the above address.

FOREWORD

1. This second (revised) edition of Equipment Planning Guide No. 9 aims at bringing up-to-date and improving the content of the first edition with regard to latest didactic and technological developments.

2. The purpose of equipment planning guides is to provide guidance and help to:

- government departments and national institutions in the developing countries, national project directors, teachers, instructors, chief technical advisers, experts, consultants, etc., so that they may plan their equipment requirements with accuracy and speed and produce precisely defined technical specifications for equipment requests and workshop layouts;
- purchasers in developing and industrialised countries, with a view to simplifying procedures for international competitive bidding and placing orders;
- firms in developing and industrialised countries, to enable them to understand exactly what is needed when they receive invitations to tender;
- teachers and instructors everywhere, so that they may provide learners with technical specifications and information on the characteristics of items of equipment in the guide lists.

3. The text of this guide is in English. An alphabetical index of item titles included in the equipment lists is attached in English; numerical indexes are attached in English, French and Spanish. A French version of this guide is also available.

4. This planning guide is the result of a collective effort. The authors are:

- S. Schoen, Chief of ILO's Technical Co-operation Equipment and Subcontracting Branch (EQUIPRO), who developed the conceptual and editorial framework;
- V. Remesh, Technical Standards Adviser (ILO/EQUIPRO), who prepared the technical content.

5. The authors recognise that their attempt to define and compile comprehensive equipment planning guides cannot be inclusive of all possible needs. The Technical Co-operation Equipment and Subcontracting Branch (EQUIPRO) at ILO headquarters would be grateful to the users for any comments and suggestions on how this guide may be improved further. The guides will be revised at intervals of about five years or as the need arises.

6. While every care has been taken to ensure the accuracy of the technical data in this guide, the ILO and the authors cannot accept responsibility nor may they be held liable for :

- (a) any editorial or typographical errors which may have occurred; and
- (b) any defaults arising from manufacture, method of selection, use, etc., of the equipment described in this guide.

Specifications which are subject to change should be confirmed when placing orders with suppliers.

7. Subject to mutual agreement, users of this planning guide may also avail themselves of the experience, expertise and services which the ILO can render in planning, purchasing and delivering technical co-operation equipment. Enquiries should be addressed to:

Technical Co-operation Equipment
and Subcontracting Branch (EQUIPRO)
International Labour Office
CH-1211 Geneva 22 (Switzerland)

CONTENTS

	Page
FOREWORD	III
HOW TO PLAN EQUIPMENT REQUIREMENTS	1
HOW TO USE THE EQUIPMENT GUIDE LIST	3
SECTION 1 Trainers and training kits	5
SECTION 2 Tests and measurement instruments	59
SECTION 3 Winding and balancing equipment	99
SECTION 4 Machines and tools	110
SECTION 5 Components and consumables	155
SECTION 6 Audio-visual aids and reference library	190
SECTION 7 Computer-aided instructions (CAI)	202
Electrical engineering laboratories and workshop layouts	211
ALPHABETICAL INDEX OF ITEM TITLES	
- English	212
NUMERICAL INDEX OF ITEM TITLES	
- English	223
- French	233
- Spanish	243
EQUIPMENT REQUEST (MODEL)	254
LIST OF ILO EQUIPMENT PLANNING GUIDES	256

HOW TO PLAN EQUIPMENT REQUIREMENTS

1. When planning equipment for vocational and technical training and education programmes, it is important to provide a clear idea of the equipment and layout features desired. Equipment lists for workshop layouts need not be as detailed as purchasing requests but they should give the architect all the information he needs to design an effective layout and to provide safe and adequate operating space.

2. The responsibility for recommending equipment should be given to experienced instructors/educators who are directly involved in the relevant programme.

3. Cost should not be the primary criterion for selection. Function, design and after-sales service are the three most important considerations; others are durability, accuracy, versatility and low operating costs.

4. Functional equipment must be well-designed, safe and easy to use. It must be selected for its compatibility with and contribution to the training/education programme, to which it should form an essential complement, and it should have the capacity and degree of technical sophistication appropriate to the level of skills of those who will use it.

5. Incomplete or over-elaborate specifications in purchasing requests slow down the process and may result in late deliveries or the supply of inadequate, unnecessary or costly equipment. Requests should be carefully reviewed to ensure that the equipment is in accordance with the needs of the particular programme.

6. To ensure fair competition, specifications should be so worded and detailed as to permit and encourage the widest possible market coverage. Specifications must be broad enough to allow several suppliers to submit bids whilst containing enough detail to indicate clearly the essential characteristics of each item. Such specifications enable the suppliers to understand particular requirements and to quote correctly.

7. Specifications should not list features which are not strictly necessary, otherwise certain suppliers might, quite wrongly, be discouraged from bidding or unnecessary expenditure might be incurred. It is, however, important to mention special requirements of local laws or conditions, such as tropicalisation and/or dust proofing, the system of weights and measures in use, etc. The electricity supply system should always be described in the equipment requests.

8. In exceptional cases the programme may require equipment which is not readily available and will have to be specially made. In such cases, detailed descriptions and drawings should be provided in enough copies, depending on the type of equipment and the number of firms to be consulted. When the use to which an item of equipment is to be put is not made sufficiently clear by the mention of its name alone, it should be described fully in the equipment request.

9. It is essential that there should be an efficient inventory system on the spot, in which the records are kept of all equipment purchased. As new equipment is received it should be recorded immediately in the inventory, which should contain such information as:

- (a) inventory number;
- (b) name or description;
- (c) serial number;
- (d) purchase order number;
- (e) cost;
- (f) supplier or manufacturer;
- (g) date of purchase;
- (h) location;
- (i) maintenance record.

The information in the inventory will be useful when ordering replacement items and for accounting for annual maintenance costs. It will also indicate when maintenance is required more frequently than is normal, in which case it may be time to consider the purchase of new equipment.

HOW TO USE THE EQUIPMENT GUIDE LIST

1. In general, a complete training package approach has been adopted in this guide to ensure the delivery of both hardware and corresponding ready-to-use software.

However, a variety of item specifications for separate testing and measuring instruments is also included in this guide to meet the specific training and research requirements of particular projects.

In comparison to the first edition, the content of this revised edition has been given more emphasis in such fields of electrical engineering known as general electricity, power electronics, rotating and static electrical machines (operation, maintenance and repair), installation of electrical facilities, electric power generation, transmission, distribution and supply, electrical measurements.

General purpose heavy machine tools and welding equipment have not been included.

2. This revised edition of guide No. 9 contains main items related to Cable Installation (C), Electrical Fitting (F), Electrical Installation (I) and Maintenance of Electrical Facilities (M). Corresponding abbreviations of the occupations (C, E, I, and M) are given in the "USE" column of the guide list pages. Users of this guide are also advised to consult guide no. 10, Electronics (revised), when preparing equipment lists.

Ancillary items, which may be required for equipping an electrical engineering laboratory and a workshop, such as metalworking machines, welding facilities, heavy handtools, sheetmetal machines, audiovisual, draughting, office and reproduction equipment are available in guides Nos. 1, 2, 3, 4, 6 and 15.

3. To facilitate the preparation of equipment lists, facilities, components and consumables closely related to the main items are listed in the same sections usually below the main item. However, general purpose tools, components and consumables are included in separate sections.

4. The list of main equipment in this guide consists of "basic" and "optional" items commonly used in vocational and technical training and education programmes at different levels. The minimum essential items required to start a training programme for 16 learners in a particular occupation are marked with an asterisk and are regarded as "basic". To provide a maximum degree of flexibility, it is left to users of the lists to decide which of the "optional" items are necessary, taking account of local conditions, varying numbers of learners, different levels of training and the funds available.

5. The terminology in this guide relates to commonly used expressions although definitions may vary from country to country. Wherever possible internationally recognised standards were applied. Only SI Units have been used in this guide.

6. For the sake of clarity and to avoid duplication when ordering, a numerical code is used to identify each item, the first figure indicating the planning guide, the second the section and the third the individual item. For example, the code for the first item in section 1 (trainers and training kits) is 109.1.1, and for the second item 109.1.2. Based on project requirements a similar numerical code should be used whenever equipment requests are prepared (see also "Equipment Request (Model)").

7. At the beginning of each section a short description of its content is provided as well as some ideas, of how to use the items.

8. All items in the list have "neutral" technical specifications so that they may be used for international competitive bidding.

9. The illustrations represent equipment similar to the items described.



SECTION 1 TRAINERS AND TRAINING KITS

This section describes the selection of trainers for teaching basic and specific areas of electrical engineering.

The trainers for Basic Electricity (109.1.1) and Power Electronics (109.1.2) are introductory in nature and offer the trainee a basic knowledge in electrical engineering and in electronics, upon which the trainee can then build.

The trainers for electrical machines and controls (109.1.3 to 109.1.31) are selfcontained units complete with teachware and laboratory manuals. Each of them covers a specific area. A comprehensive coverage of practically all main areas of operation and maintenance is given in two complete electrical machines laboratories, 109.1.37 (for machines up to 0.5kVA) and 109.1.38 (for machines up to 3kVA). Depending upon the objectives of a project and the circumstances, one or several different trainers or one complete electrical machines laboratory may be chosen.

The section of trainers also covers construction, assembling and machine winding activities (109.1.32 to 109.1.35). Installation and wiring occupations are represented by trainers and kits (109.1.39 to 109.1.40).

The power system simulation laboratory deals with electric power generation, transmission and distribution.

Furthermore, a range of loading devices (resistive, inductive and capacitive) as well as distribution boards, power supplies and stabilizers are included in this section. It may be noted that some facilities may overlap in areas of use. Such items of equipment should not be duplicated.

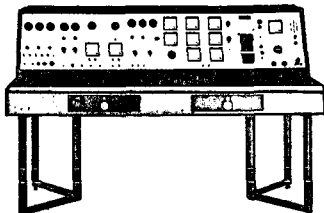
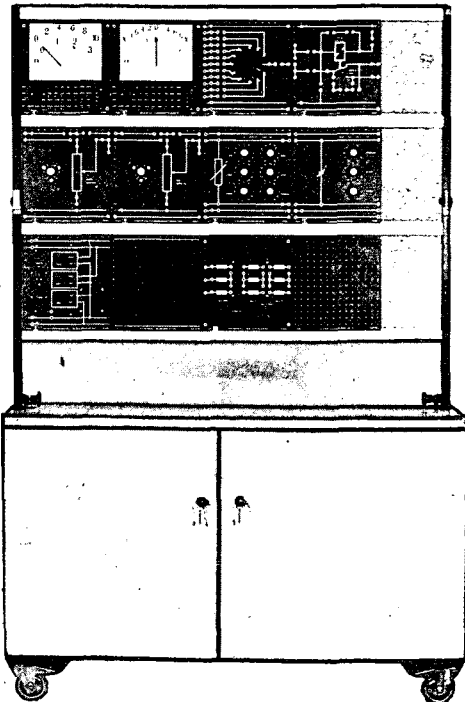


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.1	<p>BASIC ELECTRICITY TRAINER</p> <p>for basic training and instruction in the principles of electricity and electrical measurements. The equipment shall be specifically designed for student use. The equipment shall be safe to use, conforming to international standards of safety in schools, workshops and laboratories. Manuals are required for all the topics detailing circuit diagrams and instructions specifically aimed to aid the student in setting up the experiments and tests.</p> <p>Approx. specifications: Max. circuitry power of about 100 W. The trainer shall cover the following exercises in:</p> <p>1. DC circuitry:</p> <ul style="list-style-type: none">- assembly of simple electrical circuits- measurements of currents and voltages- Ohm's Law- voltage dividers under load and no-load conditions- Wheatstone Bridge principles and measurements- determination of specific resistivity including influence of temperature- non-linear resistances- different connections of resistors and capacitors (in series, in parallel, mixed); transient process measuring and observing- experiments with coils (self-induction); transient process measuring and observing- determination of power, energy and work. <p>2. AC circuitry:</p> <p>frequency, peak-to-peak voltage (U_{pp}), root-mean-square voltage (U_{rms})</p> <ul style="list-style-type: none">- ohmic resistance in AC circuits- inductance in AC circuits- connection in series of ohmic and inductive resistances- capacitive resistance	8	F M I C *	 
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		Page 6

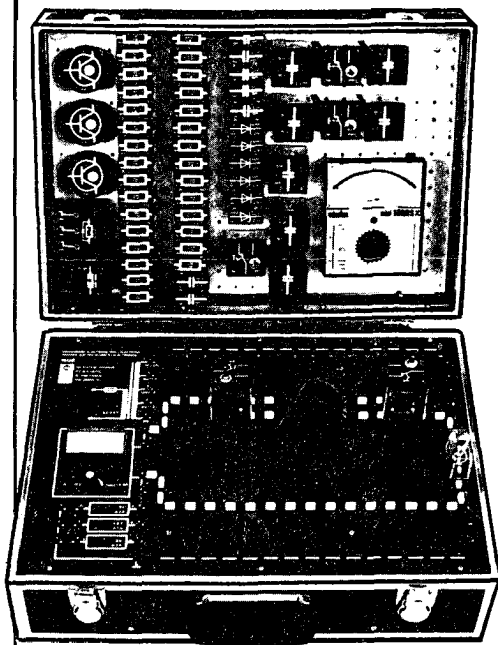


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
	<ul style="list-style-type: none">- connection in series of ohmic and capacitive resistances- connection in series of ohmic, capacitive and inductive resistances; resonance- determination of power; active power, full power, apparent power, power factor- principles of transformers- transformers under load and no-load condition; voltage-current-power characteristics. <p>The trainer may consist of a frame on which all passive and active elements, plug-in type, for example, may be placed. It is preferable to have all the necessary components in transparent, fully enclosed housings with component symbols imprinted on the top for fulfilling the above experiments. However, other arrangements with same didactical level may be acceptable.</p> <p>Complete with:</p> <ul style="list-style-type: none">- all passive and active components necessary for all above listed experiments- complete teachware (description of experiments and tests), laboratory exercises- variable DC and AC supplies- basic and additional measuring equipment (voltmeters, ammeters, ohmmeters, oscilloscopes, power, energy and frequency meters, generators, Wheatstone Bridge etc.) with instruction and service manuals- connecting cables, plugs and sockets- storage trays specially moulded for storage of the electronic components and accessories- special furniture for experiments and storage of components (bench(es) cupboard(s) console(s) etc.)- set of recommended consumable material and spares for 3 years operations.			
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 7</p>

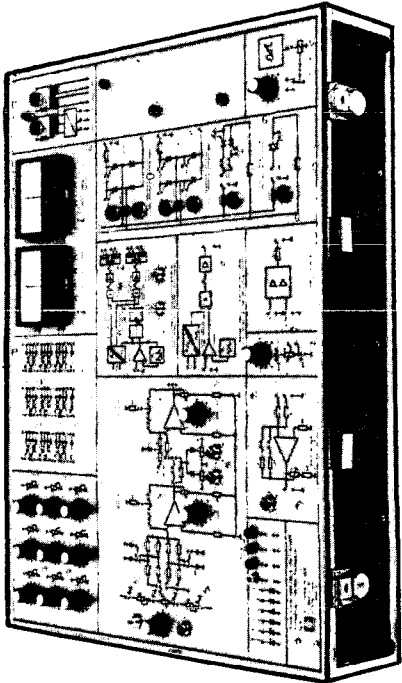


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.2	<p>POWER ELECTRONICS TRAINER</p> <p>for exploration of power electronics; modular design, plug-in type modules specifically designed for student use. The trainer must confirm to international standards of safety in schools workshops and laboratories. Manuals are required for all the topics detailing circuit diagrams and instructions aimed to aid the student in setting up the experiments and tests.</p> <p>The trainer shall cover at least the following:</p> <ul style="list-style-type: none">- SCR's and power diodes- analog to digital conversion- control of single-phase and three-phase SCR converter circuits. <p>Complete with:</p> <ul style="list-style-type: none">- power supply- power SCR- power diodes- SCR controller- analog/digital converter- isolating and smoothing modules- short-circuit protection- measuring instruments (Volt-Ammeter, Three-Phase Watt-Varmeter Function Generator, Dual Trace Triggered Oscilloscope etc)- experiments manual(s).	8	F M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		Page 8

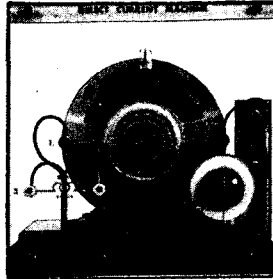
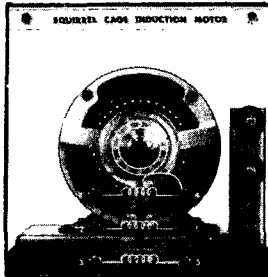


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.3	<p>DIRECT CURRENT MACHINE</p> <p>for demonstration and for studying all types of DC motors and generators: shunt type, series type and compound type. Stator windings shunt and series must be present and have separate terminals on the faceplate to insure necessary interconnections: brushes must be visible for study purpose.</p> <p>Approx. power rating:</p> <ul style="list-style-type: none">- as a motor: 150 - 200 W- as a generator: 100 - 150 W <p>Complete with:</p> <ul style="list-style-type: none">- starting gears- textbook explaining theory and practice of DC machines- operation and laboratory experiments manual- special furniture.	2	F M I *	
109.1.4	<p>SQUIRREL - CAGE INDUCTION MOTOR</p> <p>for demonstration and studying AC motors. Each phase of the stator of this machine must have separate terminals and identifications to enable delta and star connections.</p> <p>Approx. power rating: 150 - 200 W</p> <p>Complete with:</p> <ul style="list-style-type: none">- starting gears- textbook explaining theory of squirrel-cage motors- laboratory experiments manual- special furniture.	2	F M I *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

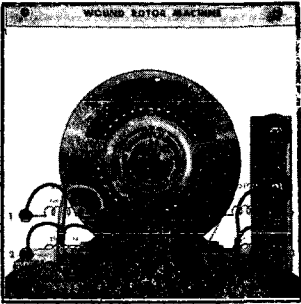


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.5	<p>WOUND ROTOR MACHINE</p> <p>for demonstration and studying AC machines. Each phase of the stator windings must have independent terminals and be identified on the faceplate to permit connexion in either delta or star configurations. The rotor windings must be brought out via external brushes to allow this machine to be used as a wound-rotor induction motor, phase shifter, single phase variable coupling transformer, three phase transformer, selsyn control, frequency converter or asynchronous induction generator.</p> <p>Approx. power rating:</p> <ul style="list-style-type: none">- as a motor: 150 - 200 W- as a generator: 100 - 150 W <p>Complete with:</p> <ul style="list-style-type: none">- starting and control gears- textbook explaining theory and practice of AC rotating electrical machines- laboratory experiments manual- special furniture.	2	F M I	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		
				Page 10

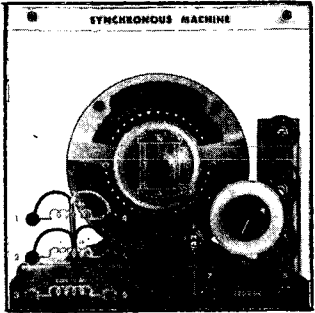


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.6	<p>SYNCHRONOUS MACHINE</p> <p>for demonstration and studying AC machines. Each phase of the stator windings must have independent terminals and be identified on the faceplate to permit connexion in either delta or star configurations. The rotor of this machine must be equipped with a squirrel cage damper, salient pole construction and salient pole windings to exhibit properties of industrial high power synchronous machines.</p> <p>It must be possible to operate this machine as a three phase synchronous alternator or condenser. Variable DC excitation to be delivered to the salient pole via externally mounted slip rings and brushes which must be wired to a variable rheostat and control switch.</p> <p>Approx. power rating:</p> <ul style="list-style-type: none">- as a motor: 150 - 200 W- as a generator: 100 - 150 W <p>Complete with:</p> <ul style="list-style-type: none">- starting and control gears- textbook explaining theory and practice of AC rotating electrical machines- laboratory experiments manual- special furniture.	2	F M I *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item		
				Page 11

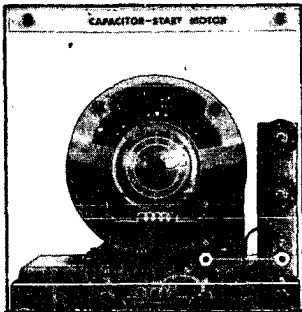


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.7	<p>CAPACITOR-START MOTOR</p> <p>for demonstration and studying special types of AC motors. The switch, starter winding and main running winding must have independent terminals and be identified on the faceplate to facilitate experimentation of various machine connections including open circuit and short circuit fault conditions. The starter winding must be protected against overloads.</p> <p>The construction of the machine</p> <ul style="list-style-type: none">- recommended quantity of needles relative size, position and turns of the starter winding and the main running winding. <p>The external starter capacitor must have also independent terminals and be identified on the faceplate to permit experimentation for capacitor start of a single phase induction motor.</p> <p>Approx. power rating: 150 - 200 W.</p> <p>Complete with:</p> <ul style="list-style-type: none">- starting gears- textbook covering special types of AC machines including condenser start motors- laboratory experiments manual- special furniture.	1	F M I	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		
				Page 12

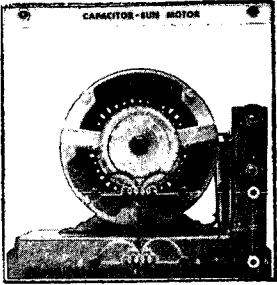
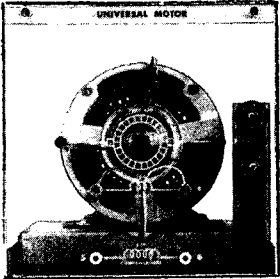


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.8	<p>CAPACITOR-RUN MOTOR</p> <p>for demonstration and studying special types of AC motors. Both the main running windings and the running capacitor must have independent terminals so that this machine can be externally wired to run from a single phase or two phase source of power.</p> <p>Approx. power rating: 150 - 200 W.</p> <p>Complete with:</p> <ul style="list-style-type: none">- starting gears- textbook covering special types of AC machines- laboratory experiments manual- special furniture.	1	F M I	
109.1.9	<p>UNIVERSAL MOTOR AC/DC</p> <p>for demonstration and studying special electrical machines. The machine must have exposed commutator bars and adjustable brushes to allow students to study the effect of armature reaction and commutation while the machine is under load. The machine must have armature series field windings and compensation winding terminated independently so as to study both inductive and conductive compensation for both AC and DC.</p> <p>It should be possible to observe the effects of cumulative and differential compensation on motor speed and torque.</p> <p>Approx. power rating: 150 - 200 W.</p> <p>Complete with:</p> <ul style="list-style-type: none">- starting gears- textbook covering special types of AC/DC machines- laboratory experiments manual- special furniture.	2	F M I *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 13</p>

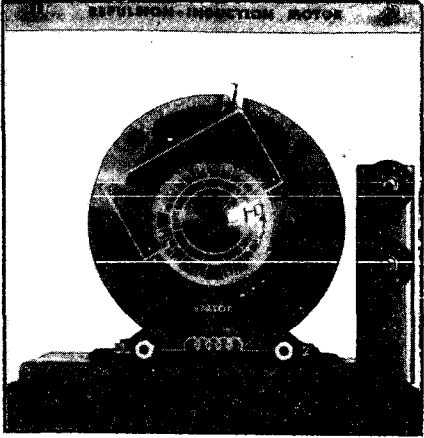


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.10	<p>REPULSION INDUCTION MOTOR</p> <p>for demonstration and studying special types of AC machines. The machine must have exposed commutator bars, centrifugal switch and adjustable brushes to allow students to perform zero speed, forward, reverse and speed control experiments while the machine is operating with full voltage applied (without rewiring). The components of the machine must have independent terminals and be identified on the faceplate.</p> <p>Approx. power rating: 150-200 W.</p> <p>Complete with:</p> <ul style="list-style-type: none">- starting gears- textbook covering special types of electrical rotating machines- laboratory experiments manual- special furniture.	1	F M	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

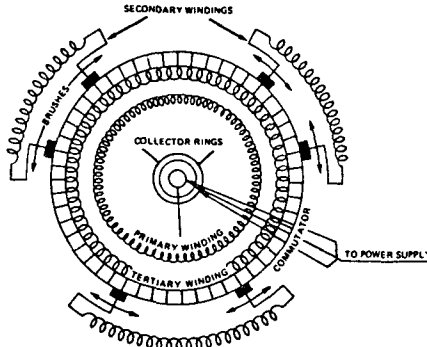
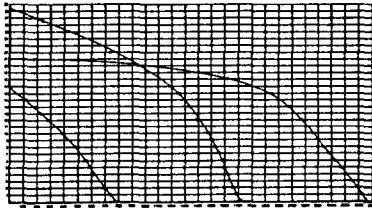


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.11	<p>VARIABLE SPEED MOTOR</p> <p>for demonstration and studying a variable-speed poly-phase AC motor with both high torque and efficiency. The motor must be basically of a special wound-rotor in which a built-in variable-frequency source is connected to one winding, while the network voltage is applied to the other winding. The speed of this motor is controlled by variable frequency source settings. All components of the motor must have independent terminals and be identified on the faceplate.</p> <p>The machine may have a cutaway bell housing (front and rear) to permit visual inspection of the internal construction and observation of the machine during operation. The motor must be equipped with double shafts with one concave and one slotted end to facilitate connections of tachometers, holding brakes, plugging switches, and inertia wheels, as well as geared pulleys to use non-slip timing belts for mechanical couplings with other rotating machines. Approx. power rating: 150-200 W.</p> <p>Complete with:</p> <ul style="list-style-type: none">- starting gears- textbook explaining theory and practical applications of variable speed motors in industry- laboratory experiments manual- special furniture.	1	F M I	 <p><i>Circuit Diagram</i></p>  <p><i>Performance Characteristics</i></p>
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 15

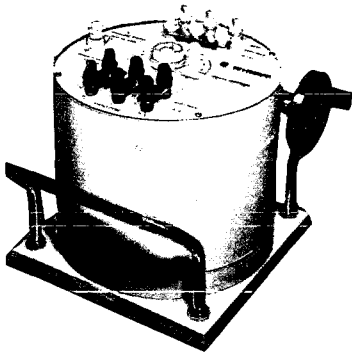


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.12	<p>VOLTAGE PHASE SHIFT REGULATOR</p> <p>stand alone, three-phase regulating autotransformer model for increasing or decreasing independently the output voltage and its phase. The regulator must be specifically adapted for student use, equipped with terminals and controls on the faceplate (board).</p> <p>Approximate data:</p> <ul style="list-style-type: none">- voltage regulation: +/- 15 percent of the nominal- phase shift regulation: +/- 15 degrees of the nominal- power rating: 100 - 150 VA <p>Equipped with phase sequence lamps</p> <p>Complete with:</p> <ul style="list-style-type: none">- explanatory material on phase regulation- experiments manual.	1	F M *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 16

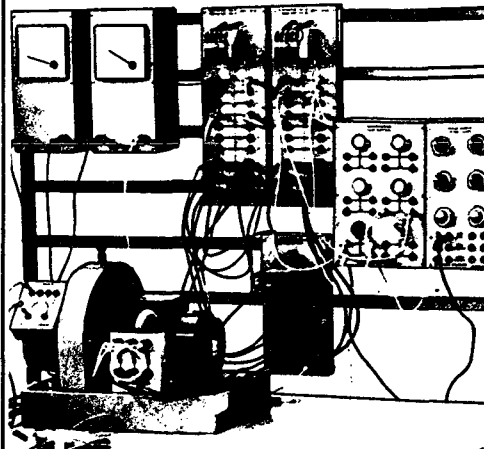


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.13	<p>MOTOR CONTROL AND PROTECTION TRAINER</p> <p>for fundamental experiments with controlling contactors, motor protective circuits and fault finding in motor power range of about 3 kW. The equipment should be of industrial design but specifically adapted for student use, equipped with terminals, boards, fastening accessories etc. The equipment shall be safe to use conforming to international standards of safety in schools, workshops and laboratories.</p> <p>Manuals are required for all the topics detailing circuit diagrams and instructions specifically aimed to aid the student in setting up the experiments and tests.</p> <p>Approx. specifications: The trainer should cover the following topics:</p> <ul style="list-style-type: none"> - thermal protection - contactor control of electrical motor - fault finding in contactor control system - construction of motor control circuits. <p>Complete with:</p> <ul style="list-style-type: none"> - all components and modules with connecting wires, plugs, etc, necessary to run experiments and tests - two sets of complete teachware (description of experiments and tests, tables and summary of results) - DC and AC power supplies to run the equipment - measuring equipment with operation and service manuals - special furniture for experiments and storage of components (benche(s), cupboard(s), console(s) etc.) - set of recommended spares for two years of operation. 	2	F M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 17</p>

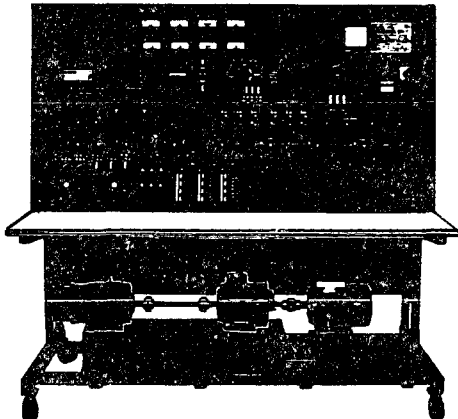


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.14	<p>ELECTRICAL MACHINES TEST UNIT</p> <p>self-contained, for comprehensive study of DC generators and AC synchronous motors and alternators in shall be safe to use conforming to international standards of safety in schools, workshops and laboratories. Manuals are required for all the topics detailing circuit diagrams and instructions specifically aimed to aid the student in setting up the experiments and tests.</p> <p>Approx. specifications: The test unit shall provide:</p> <ul style="list-style-type: none">- tests on DC generators (tracing of magnetizing curve, external curve with manual or automatic excitation, tracing of regulation curve for parallel operation of two DC generators, study of load distribution- tests on synchronous motors (starting the synchronous motor with help of auxiliary motor, plotting V-curve)- tests on three phase alternators (manual excitation, current feed-back, voltage balance, parallel operation with a three-phase network, adjustment of active and reactive power outputs). <p>The test unit shall basically consist of:</p> <ul style="list-style-type: none">- AC/DC converter set (three-phase asynchronous motor coupled to compound generator- test set: independent excitation DC generator coupled to three-phase alternator operating with different types of excitation- control panel with all equipment required for test unit operation. <p>Complete with:</p> <ul style="list-style-type: none">- all components and modules with connecting wires plugs etc.- operation and service manuals for all main items	1	F M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 18</p>



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
	<ul style="list-style-type: none">- two sets of a complete teachware- two sets of laboratory manuals necessary to run the experiments and tests- DC and AC power supplies to run the equipment- basic and additional measuring equipment with operation and service manuals.- special furniture for experiments and storage of components- set of recommended spares for two years of operation.			

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

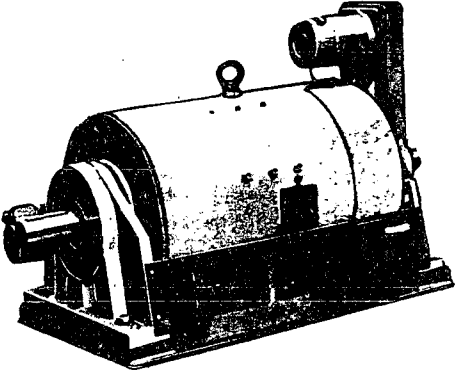
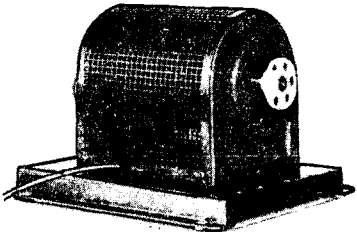
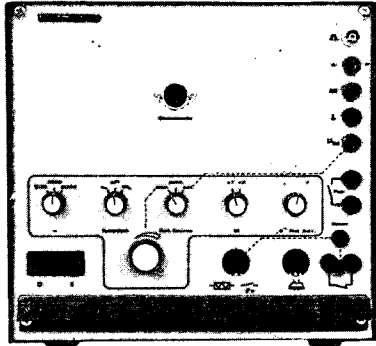
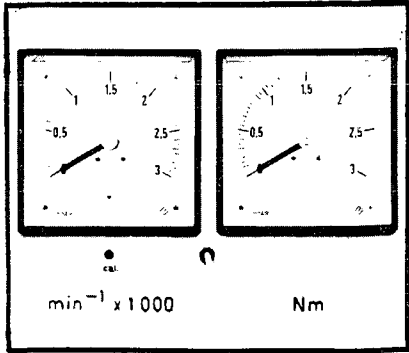


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.15	<p>ELECTRODYNAMOMETER</p> <p>for measuring, starting, running and overload torques of electrical machines. The unit must have possibility for mechanical coupling with the electrical machines directly or through the use of a non-slip timing belt.</p> <p>Approx. measuring range: 0 - 3 N Approx. max. speed: 5000 rpm.</p> <p>Complete with:</p> <ul style="list-style-type: none">- operation manual- experiments manual.	1	F M	
109.1.16	<p>MAGNETIC POWDER BRAKE</p> <p>for measuring characteristics of electrical machines under test. The unit must be specifically adapted for training purposes.</p> <p>Approx. power range: 300 W.</p> <p>Complete with:</p> <ul style="list-style-type: none">- instruction manual- experiments manual- electrical machine(s) for demonstrations and exercises- recommended measuring instruments. <p>Note: The project should design the configuration of magnetic powder brake system and list required machine(s)</p>	1	F M	  
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 20</p>

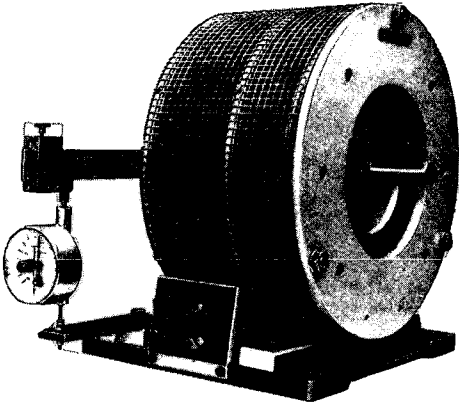


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.17	<p>EDDY-CURRENT BRAKE</p> <p>for measuring the torque in both directions of rotations and indirectly the output of electrical machine.</p> <p>Approx. rating of eddy-current brake of about 1 kW.</p> <p>Complete with:</p> <ul style="list-style-type: none">- power supply unit- mounting frame- electronic torque measuring/recording unit- two complete sets of teachware on this subject- operating manual- experiments manual.	1	F M	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 21</p>

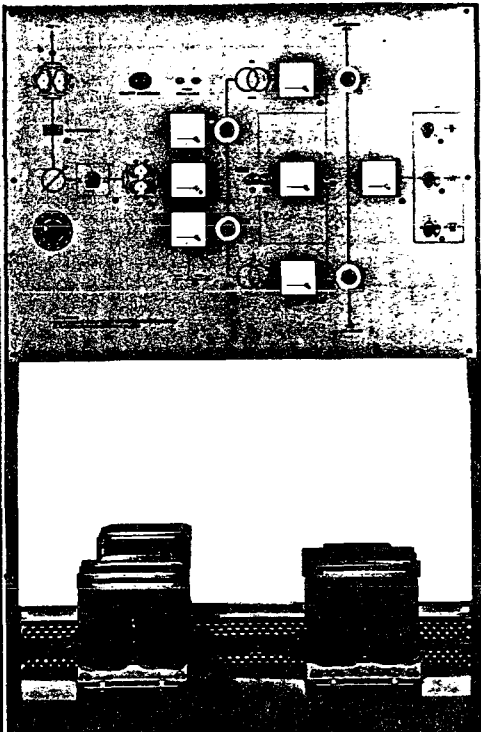


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.18	<p>TRANSFORMERS TEST UNIT</p> <p>for comprehensive study of single-phase and three-phase transformers under different load conditions including no-load and short-circuit, parallel operation, determination of losses, etc., plotting external characteristics.</p> <p>The equipment should be of industrial design but specifically adapted for student use, equipped with terminals, boards, fastening accessories, etc.,. The equipment shall be safe to use conforming to international standards of safety in schools, workshops and laboratories. Manuals are required for all the topics detailing circuit diagrams and instructions specifically aimed to aid the student in setting up the experiments and tests.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- single-phase section should consist of two single-phase transformers of different power along with a set of load inductors, capacitors and resistors.- three-phase section should consist of two three-phase transformers of different power along with a set of load inductors, capacitors and resistors- the unit should be equipped with control, measurement and regulation panels having symbolical diagram(s) of transformer test unit circuits. <p>Complete with:</p> <ul style="list-style-type: none">- all components and modules with connecting wires, plugs, etc, necessary to run experiments and tests- two sets of complete teachware- storage cupboard(s) and experiment furniture, benches, mount(s) etc.- set of recommended spares for two years operation.	2	F M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 22</p>

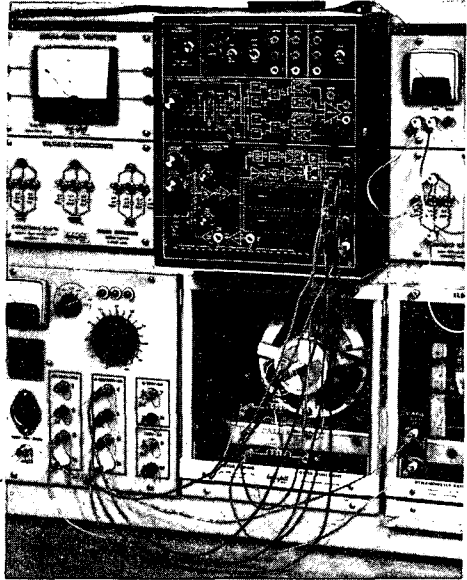
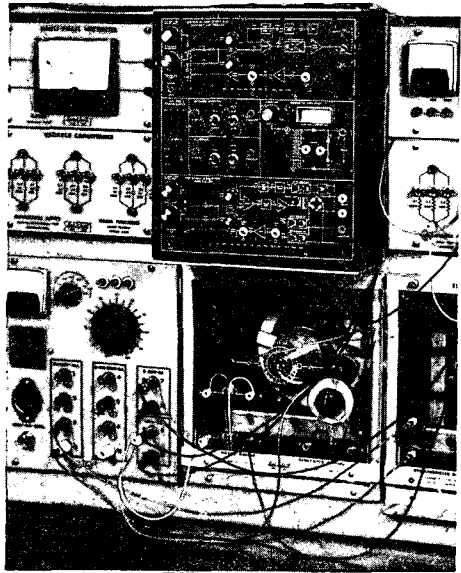


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.19	<p>INDUSTRIAL CONTROLS TRAINER</p> <p>of modular design for comprehensive training in electronic control of industrial motors.</p> <p>The trainer shall consist of different types of control devices and components including motors and lab manual on control of industrial motors to enable approx. the following:</p> <ul style="list-style-type: none"> - single, two and three phase motor control - three-phase across the line magnetic starter - delayed start control of three phase induction motor - start-stop control of three-phase of induction motor - definite time control with magnetic brake - forward and reverse control with mechanical interlock - forward and reverse control with electrical interlock - forward and reverse control with double mechanical and mechanical interlocks - primary resistor starting control of a three phase induction motor - autotransformer starting control of a three-phase induction motor - three-phase wound rotor starting and speed control - cam switch control for a DC motor - counter EMF starter for a DC motor - definite time DC motor starter - DC plug-stop motor control - DC plug-stop motor control with magnetic brake - DC brake control for three-phase induction motor - definite time three-phase synchronous motor control - three-phase loss of synchronism motor control - sequence time control. <p>Complete with special furniture for assembling modules and for storage.</p>	2	F M I *	 
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 23</p>

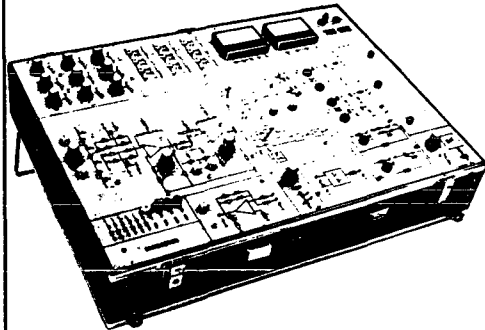


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.20	<p>THYRISTOR CONTROL TRAINER</p> <p>for practical instruction in field of conversion, instrumentation, closed and open-loop control technology; consisting, for example, of a panel with sockets (input, output, test) connected with internally fitted components (symbolically represented on the front panel). Other arrangements may be considered. The trainer shall permit different circuit configurations.</p> <p>The trainer should ensure at least such experiments as:</p> <ul style="list-style-type: none">- variable speed control of AC and DC motors- position control of an actuator- constant temperature control- constant temperature control with phase angle control- lighting control. <p>Complete with:</p> <ul style="list-style-type: none">- power supply- internally installed groups of thyristors and other circuits- set of necessary measuring instruments- accessory kit with connecting leads and components for two years of operation, including those which are subject to possible damage during experiments- set of units consisting of: electrical machine set (motor-generator and tachometer), servo-drive, temperature controlled loop, lighting control- two sets of manuals (handbooks) in thyristor control technology with laboratory exercises- operation and service manuals. <p>The trainer may also include special furniture.</p>	2	M *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 24</p>

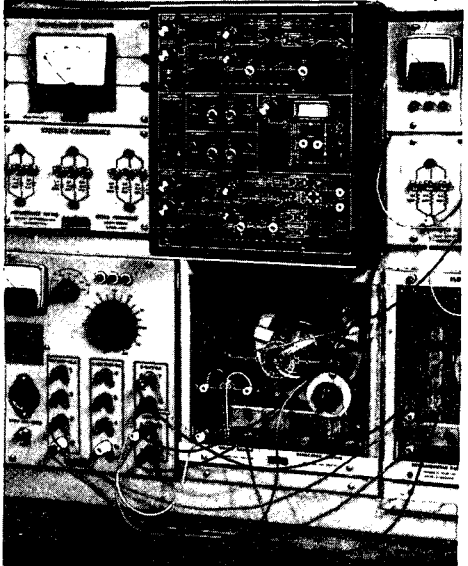


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.21	<p>DC MOTOR SPEED CONTROL UNIT</p> <p>self-contained, trainee-oriented. The unit may consist of DC motor generator set with tachometer or DC motor with tachometric unit both with electronic speed control circuitry. The unit may include panel(s) with components fitted internally and represented symbolically on panel(s). It may also include special furniture such as trolley, support(s), frame(s) etc.</p> <p>Complete with:</p> <ul style="list-style-type: none">- control board- two sets of educational handbooks covering DC motor speed control subject- measuring instruments- set of connecting cables and leads- power supply- recommended accessories and spares for two years of operation including those which are subject to possible damage during exercises- two sets of experiment manuals- operation and service manuals.	2	F M *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 25</p>



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.22	<p>AC MOTOR SPEED CONTROL UNIT</p> <p>self-contained, trainee-orientated. The operation of the unit may be based on simultaneous frequency and voltage vary principles to affect speed and maintain power or to change both of them in a desired range. The unit may consist of a motor, tachometer and electronic control circuits. The unit may include panel(s) with components fitted internally and represented symbolically on panel(s).</p> <p>It may also include special furniture such as trolley, support, frame, etc.</p> <p>Complete with:</p> <ul style="list-style-type: none">- control board- two sets of educational handbooks covering AC motor speed control subject- measuring instruments- set of connecting cables and leads- power supply- recommended accessories and spares for two years of operation including those which are subject to possible damage during experiments- two sets of experiment manuals- operation and maintenance manuals.	2	F M *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		Page 26



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.23	<p>MAGNETIC AMPLIFIER MODULE</p> <p>for use as either an amplifier or as a saturable reactor in AC power circuits in experiments. All components must be identified by schematic symbols and a terminal number to enable wiring and observation of voltage and current characteristics.</p> <p>Power rating: 100-150 VA. Approx. max. gain: 3000.</p> <p>Complete with:</p> <ul style="list-style-type: none">- operation manual- experiment manual.	1	F M	
109.1.24	<p>SYNCHRONIZING MODULE</p> <p>for:</p> <ul style="list-style-type: none">- indication of synchronism between two three-phase systems (for example two alternators)- electrical interconnection of the two systems for the parallel operation- determination of phase sequence in a three phase circuit. <p>The module shall consist of:</p> <ul style="list-style-type: none">- three indicator lamps- three magnetic circuit breakers- one triple-pole, single-throw switch- two sets of input terminals. <p>Complete with experiment manual.</p>	16	F M I *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

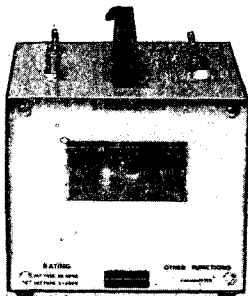
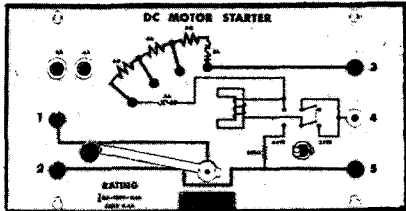


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.25	<p>STROBOSCOPE</p> <p>to accurately measure, for example, rotor pole shift and slip speed on non-synchronous machinery. The stroboscope must have two modes of operation, an external (for signals ranging from 10 V to 250 V AC) and an internal mode.</p> <p>Min. frequency range : from 10 Hz to 100 Hz.</p> <p>Equipped with one cycle delay button to rotate the observation point for 180 degrees.</p> <p>Complete with operation manual.</p>	16	F M I *	
109.1.26	<p>RESISTIVE DC MOTOR STARTER</p> <p>for starting DC motors up to 200 W. Manually operated to vary resistance from maximum at starting to zero as soon as the motor is in the full run position. Complete with electrical diagram.</p>	2	F M I	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.27	<p>THREE-PHASE STARTER (RESISTOR)</p> <p>non-reversing reduced voltage starter, consisting of resistors, time delay and accelerating relay to reduce the voltage resistively for starting motors and then apply full voltage after the machine has reached the appropriate speed. The equipment must be of an industrial design but specifically adapted for student use, equipped with terminals and controls on the faceplate as well as with visual possibility to identify items and their functions.</p> <p>For motors up to 200 VA. Complete with schematic diagram.</p>	2	F M I	
109.1.28	<p>THREE-PHASE STARTER (TRANSFORMER)</p> <p>non-reversing reduced voltage starter, consisting of autotransformers, time delay relay and accelerating relay to reduce the line voltage via autotransformers for starting motors and then apply full voltage when the machine has reached the appropriate speed. The equipment must be of an industrial design but specifically adapted for student use. Equipped with terminals and controls on the faceplate as well as with visual possibility to identify items and their functions.</p> <p>For motors up to 200 VA. Complete with schematic diagram.</p>	2	F M I	
109.1.29	<p>THREE-PHASE MAGNETIC STARTER</p> <p>non-reversible magnetic contactor, equipped with variable overload relay, input and output terminals and pushbuttons. For motors up to 200W. Complete with schematic diagram.</p>	2	F M I	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

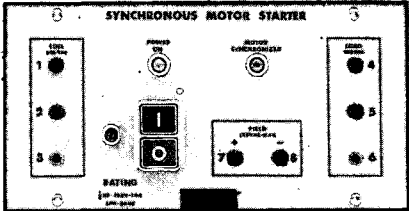
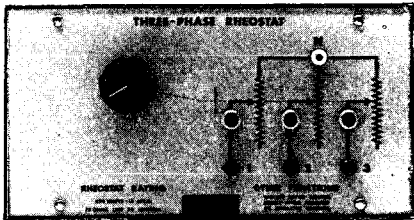


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.30	<p>AUTOMATIC SYNCHRONOUS MOTOR STARTER</p> <p>Three phase, with a built-in DC power source which supplies DC to the salient pole windings when the motor achieves 90% of full speed. Equipped with indication when motor is synchronized with the power line. For motors up to 200 VA.</p> <p>The starter must be of an industrial design but specifically adapted for student use, equipped with three-phase input (line) output (load) terminals, variable overload relay (which may be preset to nominal current levels) and pushbutton controls on the face-plate.</p> <p>Complete with electrical diagram.</p>	2	F M I	
109.1.31	<p>THREE-PHASE RHEOSTAT</p> <p>star connection, four terminal configuration, for use with rotor wound machines.</p> <p>The module shall consist of three rheostats (0-75 Ohm) mounted on a common shaft and controlled by a single knob.</p> <p>The module may also be used for other applications where variable resistance is needed from 0 to 150 Ohm.</p> <p>The knob and terminals shall be on the faceplate.</p> <p>Complete with wiring diagram.</p>	2	F M I	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page
30

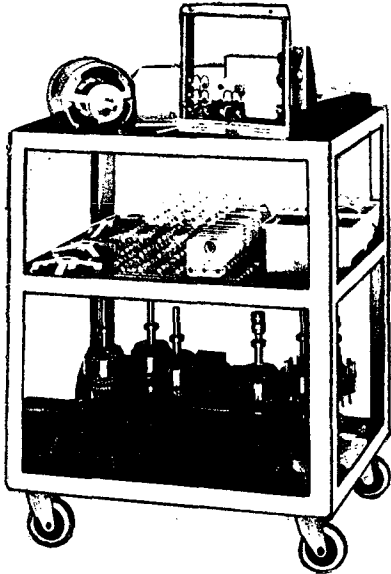


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.32	<p>MACHINES ASSEMBLING TRAINER</p> <p>for experience in the construction and operation of rotating electrical machines on the level of ready made components (stators, rotors, windings etc. and external accessories.</p> <p>The trainer shall ensure operation and tests of assembled machines for which all necessary mechanical and electrical modules must form a part of the trainer.</p> <p>The trainer shall allow assembly of at least two different machines at the same time and a total of about 15 different types such as:</p> <ul style="list-style-type: none"> - DC motor/generator - squirrel-cage induction motor - two-speed motor - two-speed variable torque motor - two-speed constant torque motor - wound rotor 3-phase induction motor - wound rotor 2-phase inductor motor - synchronous motor/generator - synchronous reluctance motor - split-phase, capacitor start motor - capacitor run motor - universal motor - repulsion starting, inductor run motor - two capacitor motor - triple rate motor <p>Other configuration of types of machines may be considered.</p> <p>The trainer shall utilize as much as practically possible the interchangeable compatible components.</p> <p>The parts and characteristics of machines shall be similar to industrial equipment.</p> <p>The power range of machines may be within 0.15 kW to 1 kW.</p> <p>The set shall include a comprehensive laboratory assembly procedure guide and a laboratory manual to perform exercises and experiments.</p>	8	F M I *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page
31

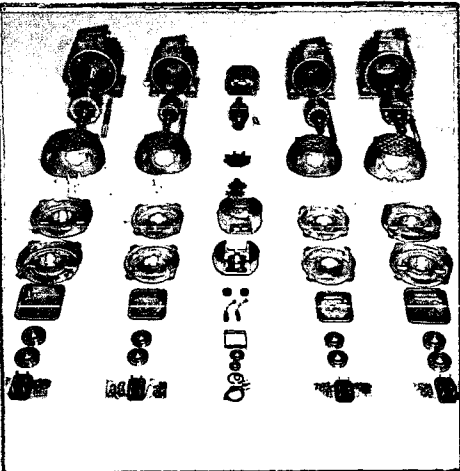


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.33	<p>AC MOTOR CONSTRUCTION KIT</p> <p>for instructions in design and assembly of three-phase synchronous induction motor in three versions depending upon the kind of statoric winding that has been used.</p> <p>The kit shall comprise all necessary parts:</p> <ul style="list-style-type: none">- one stator casing- one squirrel cage rotor with shaft and bearings- two shields- one fan with housing- one terminal block with terminals related cover and fixtures- three sets of statoric windings of three different kinds; the winding sets should suit multiple assembling and disassembling- two sets of training manual and assembling instructions. <p>Approximate power rating of the motor: 0.5 - 1 kW.</p> <p>Complete with storage box with compartments for all parts.</p>	8	F M I *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		
				Page 32

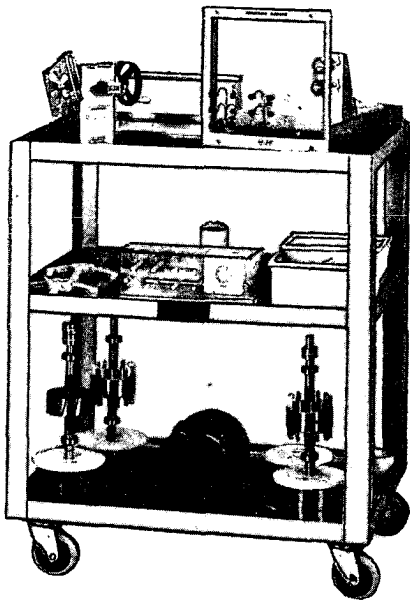


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.34	<p>WINDING KIT-TRAINER</p> <p>for teaching winding and construction technique for electrical machines, starting from laminations.</p> <p>The kit must consist of:</p> <ul style="list-style-type: none">- hand operated coil winder with adjustable mandrel and a turn counter facilities- components set for, at least, four different types of AC machines (for example: squirrel cage induction motor, wound rotor induction machine, three-phase synchronous machine, split-phase capacitor start motor. <p>The stator laminations punchings may be of two types allowing winding of a three-phase and a single-phase stator.</p> <p>The rotor laminations may be of different types suitable for squirrel cage rotor, open slot lamination for wound rotor machine and cruciform with damper winding assembly for the construction of the rotor of the 4-pole synchronous machine.</p> <p>The kit shall include:</p> <ul style="list-style-type: none">- winding material (insulated magnet wire, wood wedges, insulating material, slot insulators, lacing cord etc.) enough for re-winding of each machine 20 times.- tools set specifically used for rewinding such as plastic mallet, scissors, wire stripper, soldering iron and compass- five sets of comprehensive student instruction manual with winding data for each machine, describing winding process in details- test module to test all four types of machines- work bench, preferably movable, on castors, to serve as a storage facility as well.	2	F M *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 33</p>

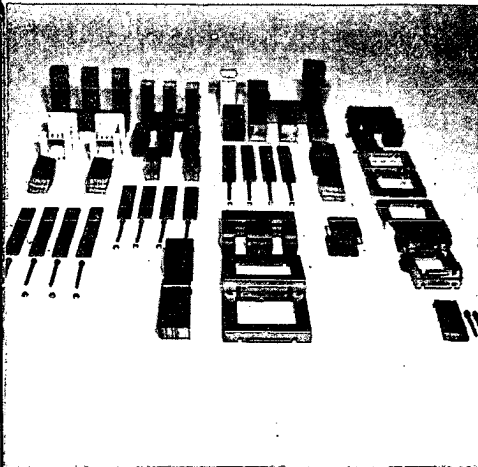


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.35	<p>TRANSFORMER CONSTRUCTION KIT</p> <p>for instructions in design and assembly of single-phase and three-phase transformers. The kit should consist of two sets of transformers:</p> <ul style="list-style-type: none">- one set of single-phase shell type, comprising a laminations set two terminal blocks, one insulating card, two iron covers, one primary coil and two secondary coils (one for step-down version and one for step-up version)- one set of three-phase core type comprising a laminations set, two terminal blocks, three insulating cards- one set of primary windings and two sets of secondary windings (one for step-down version and one for step-up version). <p>Primary windings should suit the power system of the project.</p> <p>Approx. power ratings between 300 and 1000 W.</p> <p>Complete with:</p> <ul style="list-style-type: none">- two training manuals- necessary fixtures- two storage boxes with compartments for all parts.	8	F M I *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		
				Page 34

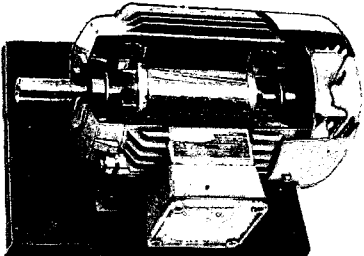
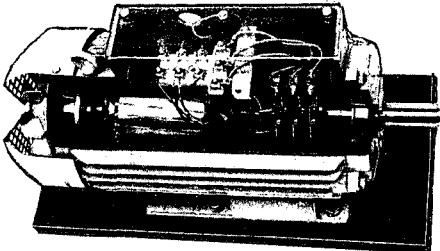
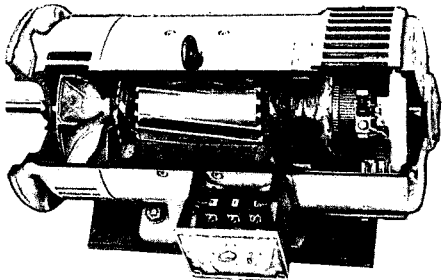
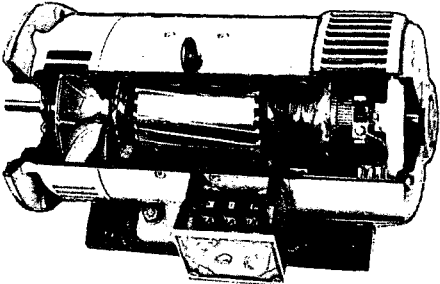


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.36A	<p>CUTAWAY MODEL OF INDUCTION MOTOR</p> <p>three-phase, with squirrel cage rotor, for demonstration purposes. Only the stator should be cut over its entire length. Cut surfaces have to be painted. The model should be installed on a board, terminal box with transparent cover.</p>	1	F M I C	
109.1.36B	<p>CUTAWAY MODEL OF SLIP-RING MOTOR</p> <p>three-phase, with rotor windings, for demonstration purposes. Only the stator should be cut over its entire length. Cut surfaces have to be painted. The model should be installed on a board; terminal box with transparent cover.</p>	1	F M I C	
109.1.36C	<p>CUTAWAY MODEL OF SYNCHRONOUS MACHINE</p> <p>three-phase, for demonstration purposes. Only the stator should be cut over its entire length. Cut surfaces have to be painted. The model should be installed on a board; terminal box with transparent cover.</p>	1	F M I C	
109.1.36D	<p>CUTAWAY MODEL OF DC MACHINE</p> <p>of compound type, for demonstration purposes only the stator should be cut over its entire length. Cut surfaces have to be painted. The model should be installed on a board; terminal box with transparent cover.</p>	1	F M I C	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 35</p>

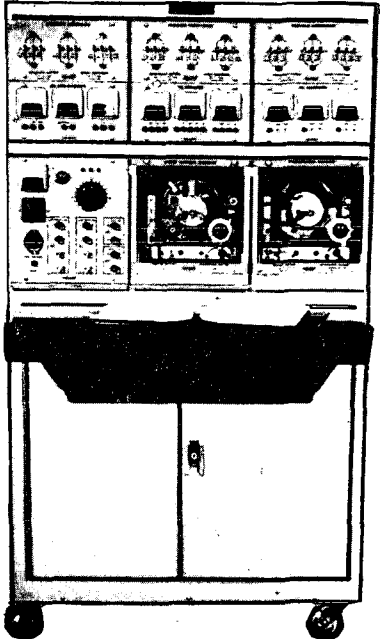


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.37	<p>ELECTRICAL MACHINES, LABORATORY, 0.5 KVA</p> <p>to ensure fundamental experiments with electrical machines of 0.15 - 0.5 kVA power range. The equipment shall be of industrial design but specifically equipped with terminals, boards, fastening accessories etc. For student use. The equipment shall be safe to use, conforming to international standards of safety in schools, workshops and laboratories.</p> <p>Manuals are required for all the topics detailing circuit diagrams and instructions specifically aimed to aid the student in setting up the experiments and tests.</p> <p>The laboratory shall include:</p> <ul style="list-style-type: none">- single and three-phase transformer modules, each one- rotating electrical machines, one set of each: DC motors and generators, single, three-phase generators and synchronous motors, single and three phase asynchronous motors, special type motors (universal, repulsion, induction, capacitor-start, capacitor-run; all machines should be equipped with control devices, starters and with synchronizing module(s)- measuring modules (AC/DC Volt-Ammeter modules, phase angle meter module)- electrodynameometer, which can be mechanically coupled to any machine and which may display starting, running and overload torque of all machines- electric tachometer (tachogenerator and meter)- mechanical torque angle meter- stroboscope- three phase variable capacitance module (approx. 250 VA)- three phase variable inductance module (approx. 250 VA)- three phase variable resistance module (approx. 250 W).	1	F M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		Page 36



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
	<p>The laboratory should be complete with:</p> <ul style="list-style-type: none">- all components and modules with connecting wires, plugs etc, necessary to run the experiments and tests; operation and service manuals should be attached to all main items- two sets of complete teaching ware (description of experiments and tests, tables and summary of results)- DC and AC power supplies to run the equipment- basic and additional measuring equipment with operation and service manuals- special furniture for experiments and storage of components (benche(s), cupboard(s), console(s) etc.)- set of recommended spares for two years operation. <p>Note: Depending upon objectives of the project either 0.5 kVA or 1-3 kVA electrical machines laboratory may be ordered.</p>			
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		
				<p>Page 37</p>

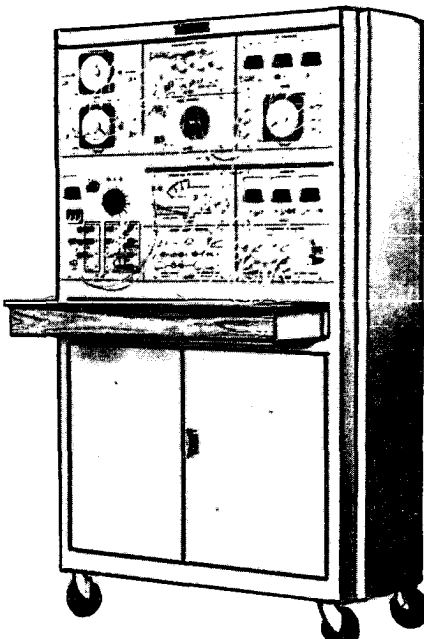
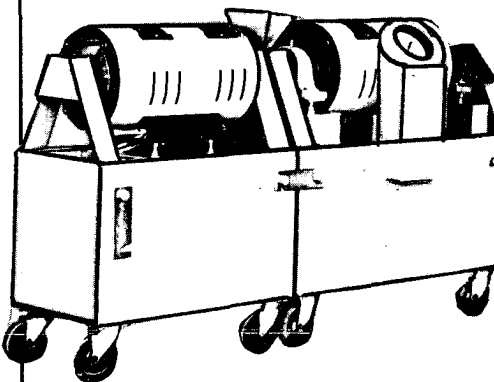


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.38	<p>ELECTRICAL MACHINES LABORATORY, 1-3 KVA</p> <p>to ensure experiments with electrical machines of 1.0-3.0 kVA range. The equipment shall be of industrial design but specifically adapted for student use, equipped with terminals, boards, fastening accessories etc. The equipment shall be safe to use conforming to international standards of safety in schools, workshops and laboratories. Manuals are required for all the topics detailing circuit diagrams and instructions specifically aimed to aid the student in setting up the experiments and tests.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- single and three-phase transformer modules, each one- rotating electrical machines, one set of each; DC motors and synchronous motors, single and three phase asynchronous motors, special type motors (universal, repulsion induction, capacitor-start, capacitor-start and run); all machines should be equipped with control devices, starters and with synchronizing module(s)- measuring modules (AC/DC volt-ammeter modules, phase angle meter module)- electrodynameometer, which can be mechanically coupled to any machine and which may display starting, running and overload torque of all machines.- electric tachometer (tachogenerator and meter)- mechanical torque angle meters- stroboscope- three phase capacitance module load capacitor (approx. 3 kVA)- three phase inductance module load reactor (approx. 3 kVA)- three phase resistance module load resistor (approx. 3 kW).	1	F M I C	 
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		Page 38

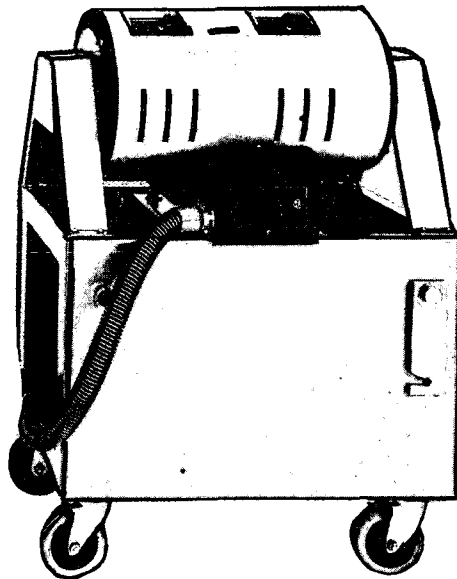


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
	<p>The laboratory should be complete with:</p> <ul style="list-style-type: none">- all components and modules with connecting wires, plugs etc. necessary to run the experiments and tests; operation and service manuals should be attached to all main items- two sets of complete teaching ware (description of experiments and tests, tables and summary of results)- DC and AC power supplies to run the equipment- basic and additional measuring equipment with operation and service manuals- special furniture for experiments and storage of components (bench(s), cupboard(s), console(s) etc.)- set of recommended spares for two years operation. <p>Note: Depending upon objectives of the project either 0.5 kVA or 1-3 kVA electrical machines laboratory may be ordered.</p>			
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 39</p>

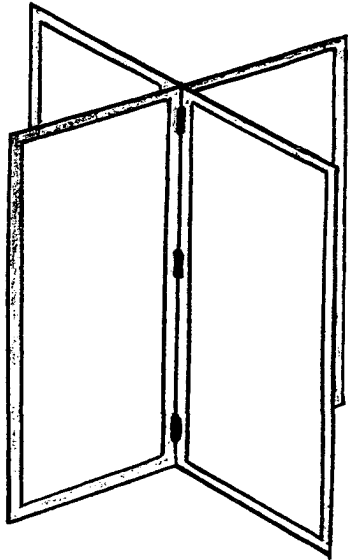


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.39	<p>WIRING ASSEMBLY FRAME</p> <p>metallic, for fitting woodboard, chipboard or plaster boards on which installation exercises will be performed for developing skills in wiring of full size electrical components. The frame may consist of three or four parts, each to accept a board of area approximately 1200 x 2200 mm and up to 30 mm of thickness.</p> <p>The frame may be of free standing type or may be fixed to floor. Other configurations may be considered.</p> <p>The assembly frame should be of a foldable or dismantable type for storage purposes.</p> <p>Complete with three or four boards depending upon configuration of the assembly frame.</p> <p>Note: The project should order necessary installation kit(s) for an assembly frame, if such material cannot be procured locally.</p>	4	I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 40

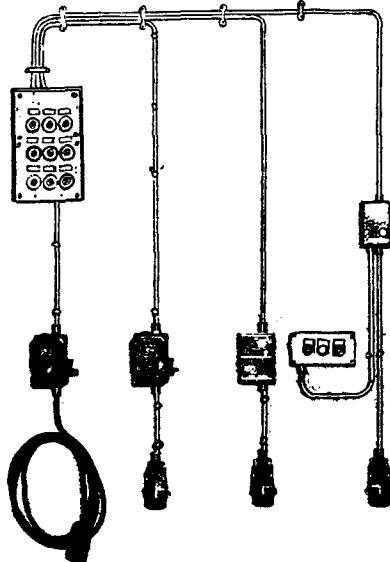


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.39A	<p>INSTALLATION KIT FOR SURFACE WIRING</p> <p>for developing skills in clipping, bending and setting of surface mounted wires and cables, making circuit connections from a fuse board to single and three phase outlets, circuit breakers, controllers, etc.</p> <p>The kit may consist approx. of:</p> <ul style="list-style-type: none">- cables:<ul style="list-style-type: none">5 x 1.5 mm - 25 m,5 x 1.5 mm sq. - 25 m,4 x 1.5 mm - 100 m- clips: 150 pcs- wood screws: 1 pack (about 100pcs)- cable glands : 20 pcs- one fuse board for mine fuses with 10 A fuses (12 pcs), fuse caps (12 pcs), fuse keys (12 pcs)- one contactor- single phase outlets (3 pcs) and three phase outlets (3pcs)- three measuring plugs- one motor protection switch and one safety switch- pushbutton box <p>Other configurations of the kit intended to suit similar aim may be considered.</p> <p>Complete with:</p> <ul style="list-style-type: none">- installation plan with wiring diagram- installation/instruction manual- instrument and material box. <p>Note: The installation kit (109.1.39A) is intended for use on wiring an assembly frame (109.1.39). Quantity of kits to be decided by the project.</p>		I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		
				Page 41

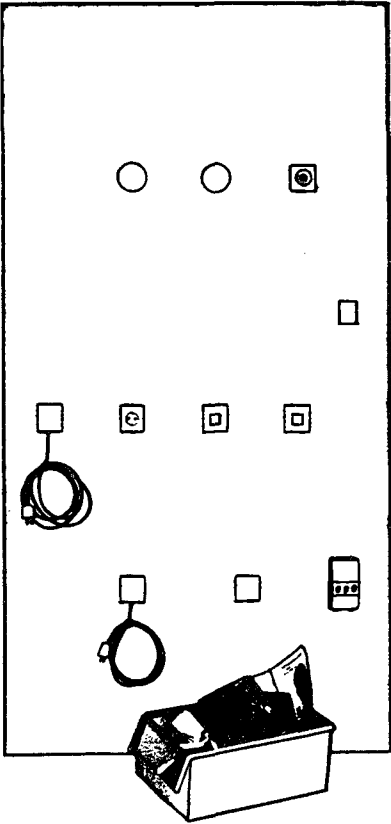


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.39B	<p>INSTALLATION KIT FOR CONDUIT WIRING</p> <p>for practising installation using PVC conduits in concealed conditions with different wiring circuits.</p> <p>The kit may consist approx. of:</p> <ul style="list-style-type: none">- PVC tubing approx. 15mm dia.: 10m- jointing sleeve for PVC tubing 15 mm dia: 10 pcs- 90 deg. bents: 5 pcs- cables:<ul style="list-style-type: none">2 x 0.7 mm sq. - 10 m3 x 1 mm sq. - 10 m3 x 1.5 mm sq. - 10 m1 x 1.5 mm sq. (y/g) - 100 m1 x 1.5 mm sq. (blue) - 100 m1 x 1.5 mm sq. (black) - 100 m1 x 1.5 mm sq. (white) - 100 m- cable connectors: 25 pcs- mains connector- plastic connection - distribution box : 5 pcs- two plugs with earthing- two mains switches one-way- two mains switches two-ways- two staircase switches- one intermediate mains switch- one lamp socket- one buzzer- one step-down transformer, secondary voltage 24 V. <p>Other configurations of the kit intended to suit similar aim may be considered.</p> <p>Complete with:</p> <ul style="list-style-type: none">- installation plan with wiring diagram- installation instruction manual- instrument and material box. <p>Note: The installation kit (109.1.39B) is intended for use on wiring an assembly frame (109.1.39). Quantity of kits to be decided by the project.</p>		I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 42</p>

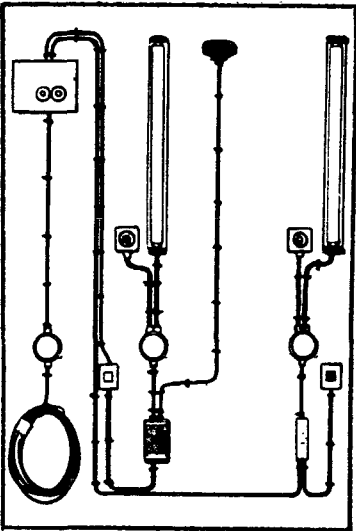
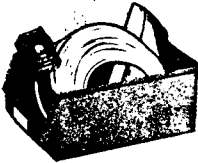


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.39C	<p>INSTALLATION KIT FOR LIGHTING WIRING</p> <p>for practising in wiring of lighting control circuits with fluorescent and incandescent lamps.</p> <p>The kit may consist approx. of:</p> <ul style="list-style-type: none">- cables: 5 x 1.5 mm sq. - 25 m 3 x 1.5 mm sq. - 100 m- cable glands (10 pcs) and clips (500 pcs)- one packet of wood screws (100 pcs)- one plastic connection - distribution box- incandescent lamps (4 pcs) and fluorescent lamps (4 pcs)- incandescent lamp holders (2 pcs) and fluorescent lamp holders with chokes and starters (2pcs)- one fuseboard with 10 A fuses (5 pcs)- one pushbutton- one staircase relay- one switch- one photocell operated relay <p>Other configurations of the kit intended to suit similar aims may be considered.</p> <p>Complete with:</p> <ul style="list-style-type: none">- installation plan with wiring diagram- installation instruction manual- instrument/material box. <p>Note: The installation kit 109.1.39C is intended for use on wiring an assembly frame (109.1.39). Quantity of kits to be decided by the project.</p>		I C *	 
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 43



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.39D	<p>SINGLE PHASE MOTOR WIRING KIT</p> <p>for practical exercise in realistic full size wiring of industrial type of motor controls in accordance with wiring standards and norms.</p> <p>The kit may approximately consist of</p> <ul style="list-style-type: none">- single phase AC motor- kWh meter, 1 phase, 10A with board- direct on-line starter- cables:<ul style="list-style-type: none">three-core 3 x 1.5 mm sq. - 50 m;two-core 2 x 6 mm sq. m - 5 m- insulated wires: 1.5 mm sq. (black, blue and yellow/green) 100 m of each colour; 6 m sq. (black, blue and yellow/green) 5 m of each colour- flexible conduit with glands: 25 m- two four-way distribution boxes- one fuse board with three fuse holders, three fuse base keys and five 10A fuses- 20 cable glands, 100 clips and one pack of screws for wood 5 x 12 mm (about 100 pcs). <p>Complete with:</p> <ul style="list-style-type: none">- installation plan with wiring diagram- installation instruction manual- instrument/material boxes. <p>Note: The single phase motor wiring kit (109.1.39D) is intended for use on wiring an assembly frame (109.1.39). Quantity of kits to be decided by the project.</p>		M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page
44

Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.39E	<p>THREE PHASE MOTOR WIRING KIT</p> <p>for practical exercise in realistic full size wiring of industrial type of motor controls in accordance with wiring standards and normes.</p> <p>The kit may approximately consist of</p> <ul style="list-style-type: none"> - one/three phase AC motor - one three phase kWh meter, 10 A with board - automatic star/delta starter - manual star/delta starter - direct on-line starter - pushbutton box - earth leakage protection device - fuse board with fuse holders, keys and fuses - cables : <ul style="list-style-type: none"> five-core 1.5 mm sq. - 50 m four-core 1.5 mm sq. - 50 m; four-core 6 mm sq. - 5m single cables 6 mm sq. (black, blue and green yellow): 15 m of each colour - 25 m of flexible conduit - installation accessories: 100 pcs of saddles, 500 pcs of clips, 100 pcs of screw for wood, 10 pcs of cable glands. - two distribution boxes. <p>Complete with:</p> <ul style="list-style-type: none"> - installation plan with wiring diagram - installation instruction manual - instrument/material box. <p>Note: The three-phase motor wiring kit (109.1.39E) is intended for use on wiring an assembly frame (109.1.39). Quantity of kits to be decided by the project.</p>		M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page
45

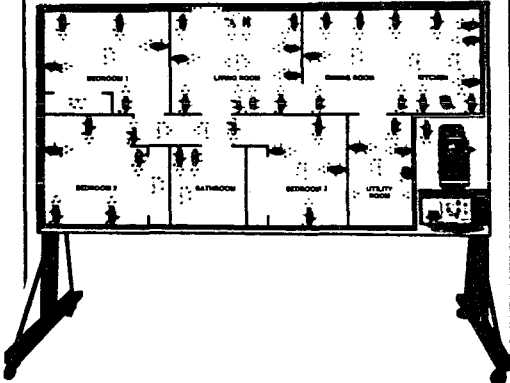


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.40	<p>RESIDENTIAL WIRING TRAINER</p> <p>for instruction in principles and schematic diagrams of electric wiring in apartments. The trainer may consist of a frame, complete with modules, representing a typical floor plan of an apartment. The trainer shall utilize (as much as technically possible, full size electrical components (switches, circuit breakers, receptacles, light fixtures and lamps).</p> <p>Supply voltage: 24 VAC, 3 phase system from an overload protected power supply, simulating 220-240 V 3 phase system, The trainer may be equipped with an energy meter.</p> <p>Complete with:</p> <ul style="list-style-type: none">- set of components to meet residential wiring curriculum requirements- wire package set- hand tool set necessary for wiring- two sets of laboratory manuals describing residential wiring fundamentals such as: wiring material components and equipment conductors and overload protection wiring circuits, designing and wiring of a complete electrical system, installation of cables, raceways and trouble-shooting- 16 student workbooks- power supply- energy meter.	2	I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.41	<p>POWER SYSTEM SIMULATION LABORATORY</p> <p>for training in power systems operation and control. The laboratory shall employ real size industrial equipment mounted in cubicles. Approximate simulated voltage range: 30 kV to 220 kV. Simulated power range: 5 MVA to 200 MVA.</p> <p>The laboratory shall consist of the following functional groups of equipment:</p> <ul style="list-style-type: none">- power station simulator shall consist of a generating section, control room section and accessories. The generating section shall include simulated (by a motor-generator) the turbine-generator of about 2kVa output power, three phase, main step-up transformer, high voltage switchgear with circuit breakers, isolators and outgoing line(s). The control room section shall be equipped with: voltage, power and frequency control & monitoring equipment, switches to operate circuit breakers and isolators, synchronizing unit, protection facilities with indication and test gear, fault simulation panel, fault annunciator and accessories to carry out experiments on the high tension side of the power station. The accessories shall include: three-phase load capacitor, load reactor, current limiting reactor, load resistor, phase sequence indicator, power supply unit, measuring instruments, power switches, etc.- sub-station simulator with one incoming high tension side connected to busbars, a transformer, low voltage busbars and two outgoing feeders. The sub-station simulator should be equipped with a control system for circuit breakers and isolators, relay protection, indication, test facilities and auto reclosing equipment	1	M I	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 47</p>



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
	<ul style="list-style-type: none">- distribution transformer of oil-immersed type of about 10 kV power should be accompanied by low voltage switchgear, relay protection, cables, tests meters and tools to insure a complete set of experiments in this section of the power system.- transmission line model, three phase, high voltage, for measurements of characteristic data, resistance, reactance and capacitance, voltage drop and losses for different loads and for different (two- and three-phase) short circuit measurements, earth fault measurements. The technical data of the transmission line shall match simulated voltage and power of the power systems laboratory or to be equipped with separate power packs, load resistor(s), reactor(s), capacitor(s), 3-phase transformer, switchgear and measuring instruments. <p>Other configurations of power systems laboratory with similar didactical aims may be considered.</p> <p>Complete with:</p> <ul style="list-style-type: none">- service manuals for each item of the system- comprehensive training and experiment manuals for all possible configurations of experiments and tests.			
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		
				Page 48

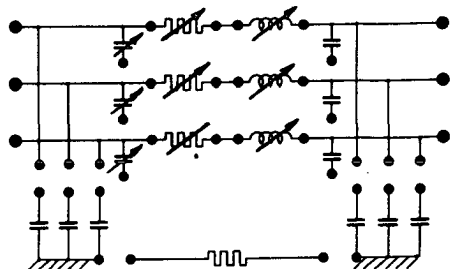
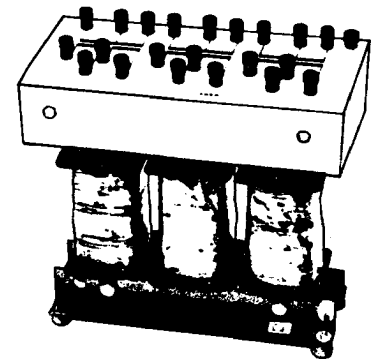
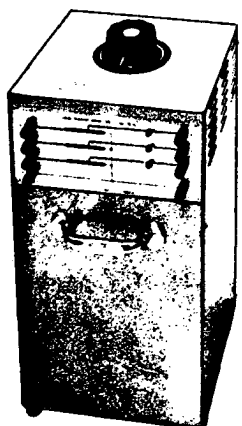


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.42	<p>TRANSMISSION LINE TRAINER</p> <p>for studying the effects of voltage transients, power oscillations, voltage regulation, real and reactive power flow control and system stability. The equipment may be of a modular special design; must conform to international standards of safety at schools, workshops and laboratories. Manuals are required for all the topics detailing circuit diagrams and instructions aimed to aid the student in setting up the experiments and tests.</p> <p>The trainer may consist of:</p> <ul style="list-style-type: none">- three-phase transmission line module(s)- three-phase transformer module(s)- regulating autotransformer (three-phase) module- AC ammeter module- AC voltmeter module- three-phase watt/varmeter module(s)- phase angle meter module- three-phase variable power supply- variable resistance module- variable inductance module- variable capacitance module- set(s) of connection leads- manual for electric power transmission system- instructor's manual <p>All units must be properly matched as a system.</p> <p>Samples of approximate extended specifications for some separate units, forming the transmission line trainer:</p> <ol style="list-style-type: none">1. Three-phase Transmission Line Module:<ul style="list-style-type: none">- four calculated steps of variable impedance- possibility to induce transients by momentary power flow interruptions- line impedances: 200, 400 and 600 Ohm- current rating: 0.15 - 0.2 A2. Variable Resistance Module for use as a single and three-	1	M I C	  

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

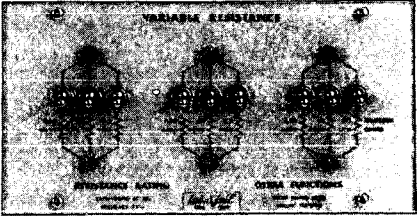

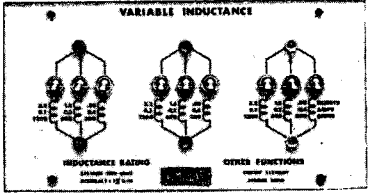


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
	<p>phase balanced or unbalanced loading.</p> <p>The module shall consist at least of nine resistors arranged in three identical groups to enable delta or star load diagrams. Each of nine resistors shall be equipped with a switch. Each resistor in a group (phase) must have a different value to enable setting of seven values, making total number of settings 21. Accuracy: +/- 5% Approx. max. power dissipation: 230 W</p> <p>The resistors shall be symbolically represented on the faceplate.</p> <p>3. Variable Capacitance Module for use as a single and three-phase balanced or unbalanced loading.</p> <p>The module shall consist at least of nine capacitors arranged in three identical groups to enable delta or star load diagrams. Each of nine capacitors shall be equipped with a switch. Each capacitor in a group (phase) must have a different value to enable setting of seven values, making total number of settings 21. Accuracy: +/- 5% Approx. max. reactive power: 230 VAR</p> <p>The inductors shall be symbolically represented on the faceplate.</p> <p>4. Variable Inductance Module for use as a single and three phase balanced or unbalanced loading.</p> <p>The module shall consist at least of nine inductors arranged in three identical groups to enable delta or star load diagrams. Each of nine indicators shall be equipped with a switch. Each inductor in a group (phase) must have a different value to enable setting of seven values, making total number of settings 21. Accuracy: +/- 5% Approx. max. reactive power: 230 VAR</p> <p>The inductors shall be symbolically represented on the faceplate.</p>			  

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

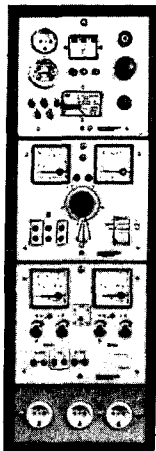
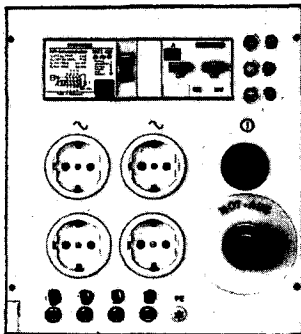


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.43	<p>POWER SUPPLY DISTRIBUTION BOARD</p> <p>For feeding laboratory workshop benches with three-phase voltage; made of sheet steel.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- incoming supply: three-phase, not less than 60 A fuse via protective circuit breaker with undervoltage release- number of feeders; 12 (for 12 benches) each equipped with 25 A fuses and a triple-pole on/off switch- key-operated switch for energizing feeders, switching state indicated by pilot lamp- central emergency shut-off button and a special output for emergency switches at the benches connected in series. <p>Complete with:</p> <ul style="list-style-type: none">- all components including fuses- wiring and schematic diagrams- user's manual.		F M I	
109.1.44	<p>SINGLE-PHASE BENCH POWER BOARD</p> <p>for power distribution, comprising:</p> <ul style="list-style-type: none">- on/off illuminated switch- emergency off pushbutton- four socket outlets- protective earthing terminal.		F M I	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 51</p>

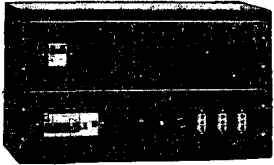
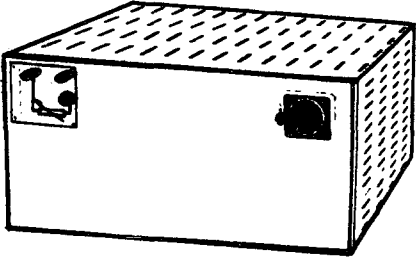
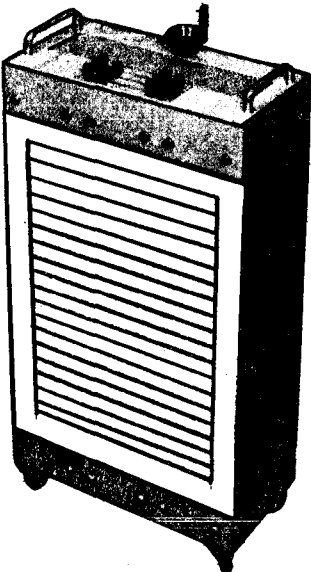


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.45	<p>THREE-PHASE BENCH POWER BOARD</p> <p>for power distribution, comprising:</p> <ul style="list-style-type: none">- key operated switch with indicator light- emergency off pushbutton- triple-pole 16 A circuit breaker- two socket outlets- five laboratory terminals (three-phase four wire system with protective earthing terminal).		F M I	
109.1.46	<p>DC RESISTIVE LOADING UNIT</p> <p>for DC and single phase AC.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- rated output: 2.5 kW- load resistance steplessly adjustable from 20 to approx. 450 Ohm.	2	F M	
109.1.47	<p>AC RESISTIVE LOADING UNIT</p> <p>for three-phase with open star point; also suitable for DC and single phase AC for series and parallel connections.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- rated output: 2.5 kW- loading resistance steplessly adjustable.	2	F M *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 52</p>

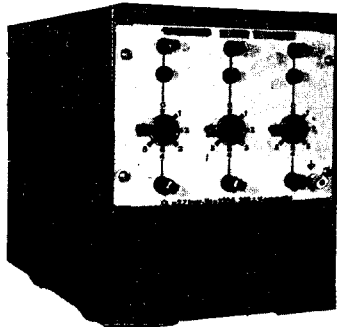
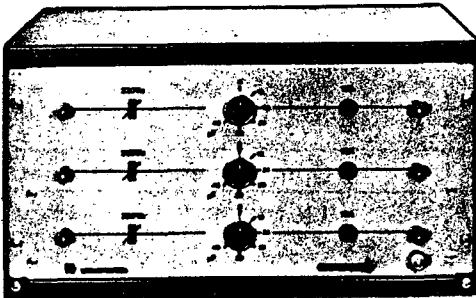
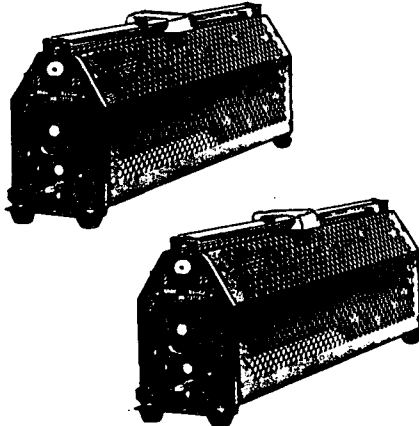


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.48	<p>INDUCTIVE LOADING UNIT</p> <p>for three-phase.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- rated output: 2.5 kVAr- steplessly adjustable.	2	F M *	
109.1.49	<p>CAPACITIVE LOADING UNIT</p> <p>for three phase.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- rated output: 2.5 kVAr- steplessly adjustable.	2	F M *	
109.1.50	<p>VARIABLE RESISTOR SET</p> <p>consisting of 21 variable resistors (rheostats).</p> <p>Approx. max. resistance values: 1800, 1150, 700, 500, 375, 260, 190, 145, 100, 61, 32, 19, 15, 11, 9.5, 7.7, 5.3, 4, 2.4, 1.5 and 1 Ohm.</p> <p>Approx. max. current rating from 0.13 A (1800 Ohm) to 6 A (1 Ohm).</p>	4	F M *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page

53

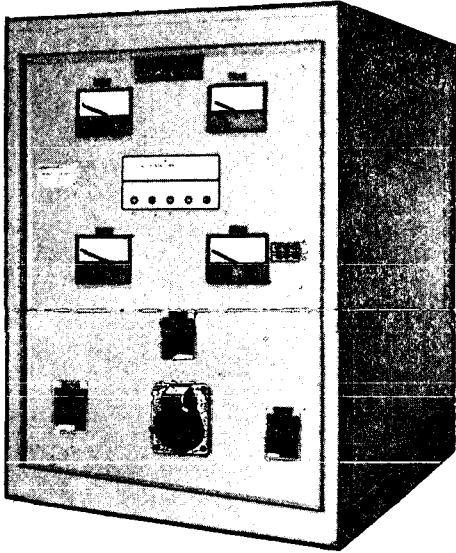



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.51	<p>AC POWER SUPPLY, THREE-PHASE</p> <p>for experiments with AC motors; steplessly adjustable between 0 and rated value. Current rating 10 A.</p> <p>Fitted with:</p> <ul style="list-style-type: none">- three ammeters (one for each phase)- one voltmeter with selector switch- motor protection circuit breaker- one three-phase socket outlet- min. three sets of laboratory terminals. <p>Complete with user's manual and service manual.</p>	2	F M *	
109.1.52	<p>DC POWER SUPPLY, 250 V, 10 A</p> <p>for experiments involving DC high current rating.</p> <p>Steplessly adjustable from 0 to 250 V.</p> <p>Maximum current rating 10 A.</p> <p>Equipped with :</p> <ul style="list-style-type: none">- filter (residual ripple 5 percent)- two socket outlets- measuring instruments (voltmeter and ammeter). <p>Complete with user's manual and services manual.</p>	2	F M *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.53	<p>REGULATED DC POWER SUPPLY, 60 V</p> <p>adjustable stabilized voltage and current source aimed for use with telephone equipment and for laboratory experiments; equipped with ammeter and voltmeter.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- output voltage: 0-60 V- output current: 0-15 A- stability against +/- 10% mains variation: better than 0.1%- overload protection. <p>Complete with:</p> <ul style="list-style-type: none">- standard supplied accessories (e.g. fuses, etc.)- operation manual- service manual.	1	F M I	
109.1.54	<p>PROGRAMMABLE POWER SUPPLY 0-40V, 3A</p> <p>for laboratory experiments and for different projects, utilizing semiconductors and integrated circuits.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- one voltage and current programmable output 1 A and 3 A; programming steps 10 mV and 10 mA (1mA in 1 A range)- maximum voltage output: 39.99 V- maximum constant current output: 0.999 A and 2.99 A- stability against +/- 10 % mains variation: better than 0.1 %- ripple voltage: less than 2 mV rms- ripple current: less than 0.5 mA rms. <p>The unit should be equipped with a digital or analog voltmeter and ammeter.</p> <p>Complete with operation and service manuals.</p>	1	F M I	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page
55

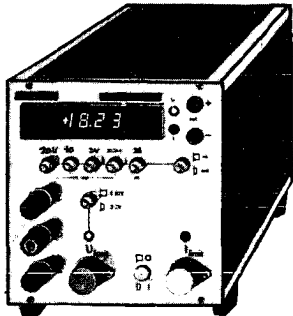
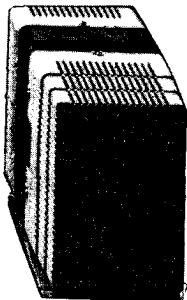


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.55	<p>ADJUSTABLE DC POWER SUPPLY, 0-20 V</p> <p>for laboratory experiments and for different projects, utilizing semiconductors and integrated circuits. Output should have constant current operation mode.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- stability against +/- 10 % mains variation: better than 0.05%- ripple voltage: less than 1.5 mV rms- ripple current: less than 0.5 mA rms- output ranges: 0-20 V, 0-2 A. <p>The unit should be equipped with a voltmeter and ammeter to enable continuous monitoring of voltage and current.</p> <p>Complete with operation and service manuals.</p>	16	F M *	
109.1.56	<p>AC VOLTAGE STABILIZER, 1 KVA</p> <p>to suit supply requirements of sensitive electronic equipment (stabilized sinewave output).</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- output power: 1 kVA- input voltage variation: +/- 10%- output voltage variation: +/- 0.1%- overvoltage and overload protection- output voltage adjustment range: about +/- 5%- output sinewave distortion: less than 3%- galvanic separation between input and output. <p>Complete with:</p> <ul style="list-style-type: none">- standard supplied accessories- operation manual- service manual.		F M	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		Page 56

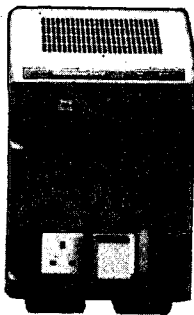



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.57	<p>AC VOLTAGE STABILIZER, 2 KVA</p> <p>to suit supply requirements of sensitive electronic equipment (stabilized sinewave output).</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- output power: 2 kVA- input voltage variation: +/- 10%- output voltage variation: +/- 0.1%- overvoltage and overload protection- output voltage adjustment range: about +/- 5%- output sinewave distortion: less than 3%- galvanic separation between input and output. <p>Complete with:</p> <ul style="list-style-type: none">- standard supplied accessories- operation manual- service manual.		F M	
109.1.58	<p>AC VOLTAGE STABILIZER, 4 KVA</p> <p>to suit supply requirements of sensitive electronic equipment (stabilized sinewave output).</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- output power: 4 kVA- input voltage variation: +/- 10%- output voltage variation: +/- 0.1%- overvoltage and overload protection- output voltage adjustment range: about +/- 5%- output sinewave distortion: less than 3%- galvanic separation between input and output. <p>Complete with:</p> <ul style="list-style-type: none">- standard supplied accessories- operation manual- service manual. <p>Note: The project determines the need, appropriate power and quantities of AC voltage stabilisers (items 56, 57 and 58).</p>		F M	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 57</p>

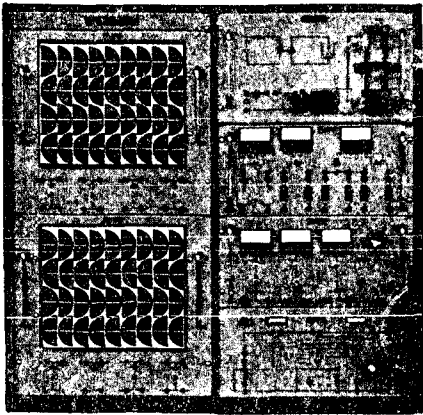


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.1.59	<p>SOLAR POWER UNIT</p> <p>for demonstration of electric energy generation, storage and utilization.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- solar cell panel 12 V - 3 A- rechargable, sealed lead/acid battery 12 V, 30 Ahr (approx.) with protection from overcharging- control panel- power inverter (12 VDC to 220 V AC)- load (for example, resistors, lamps, etc) <p>Complete with :</p> <ul style="list-style-type: none">- solar energy conversion teaching ware- instruction manual.	1	F M	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 58



SECTION 2 TEST AND MEASUREMENT INSTRUMENTS

This section describes the specifications for test and measurement instruments used in electrical occupations.

This extensive list of instruments reflects the expansion and sophistication which has taken place in recent years in the electrical industry.

Although the list is extensive, the USE column indicates the appropriate equipment. The reader will also notice that many items have more than one application. This dual or multi-purpose nature of the equipment can help in keeping purchases in line with available budgets.

Furthermore, some items of measuring equipment are common to electrical, electronic and telecommunication specialities. User should therefore ensure that costly equipment is not unnecessarily duplicated at one location.

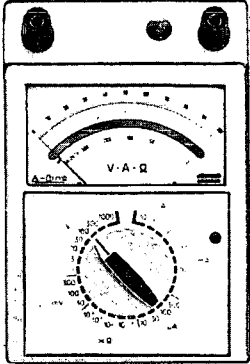
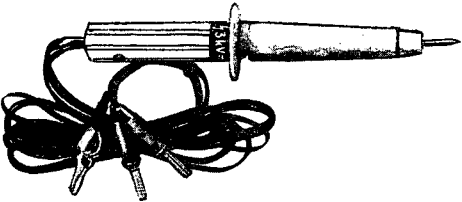
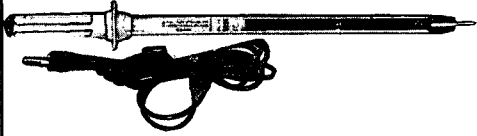
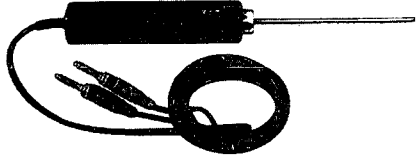


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.1	<p>MULTIMETER, CLASS 1-1.5</p> <p>portable, moving coil system with amplifier. Input impedance (min.) 1 MΩ/V. DC measurements-class 1.0. AC measurements-class 1.5 (within Frequency range 40 to 400 Hz).</p> <p>Approx. measuring ranges:</p> <ul style="list-style-type: none">- DC voltage: 30 mV to 1000 V- DC current: 10 micro A to 10 A- AC voltage: 100 mV to 1000 V- AC current: 10 micro A to 10 A- resistance: up to 10 M Ω <p>Extended frequency range: 15 Hz to 20 kHz. Overload protection. Display: mirror-backed scale. Temperature of use: 0 to 50 deg. C. Power supply: battery.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- set of batteries- test leads with prods- user's manual- service manual.	16	F M I C *	
109.2.1A	<p>HIGH VOLTAGE PROBE - 3 kV</p> <p>for 109.2.1</p>		F M I C	
109.2.1B	<p>HIGH VOLTAGE PROBE - 30 kV</p> <p>for 109.2.1</p>		F M I C	
109.2.1C	<p>TEMPERATURE SENSOR</p> <p>for temperatures from -20 deg. C to + 600 deg. C (for 109.2.1).</p>		F M I C	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 60

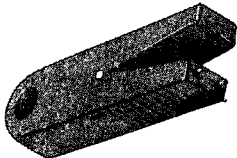



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.1D	<p>CLIP-ON CURRENT TRANSFORMER</p> <p>Approx. max. current 150A, max. conductor dia 15 mm (for 109.2.1).</p>		F M I	
109.2.2	<p>PORTABLE DIGITAL AVOMETER</p> <p>for RMS value measurements, resistance measurements and continuity tests; battery operation.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- DC voltage ranges: 0-0.2V to 1000 V- DC current ranges: 0-0.2 mA to 10 A- AC voltage ranges: 0-0.2 V to 750 V- AC current ranges: 0-0.2 mA to 10A- resistance: 0-200 Ohm to 20 MOhm- continuity test: acoustic signal- display: LCD, 4 1/2 digits, automatic decimal point, automatic polarity indication. <p>Complete with:</p> <ul style="list-style-type: none">- test leads and prods- carrying case- battery- user's manual- service manual.	16	F M I	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 61</p>

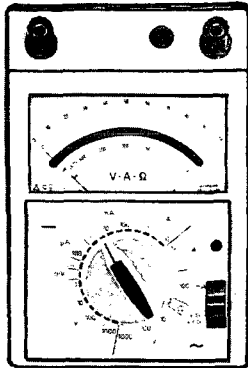


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.3	<p>MULTIMETER, CLASS 1-1.5</p> <p>portable, moving coil system.</p> <p>DC measurements - class 1.0. AC measurements - class 1.5.</p> <p>Approximate measuring ranges:</p> <ul style="list-style-type: none">- DC voltage: 100 mV to 1000 V- DC current: 100 micro A to 10 A- AC voltage: 0.3 V to 1000 V- AC current: 0.3 mA to 10 A- resistance: up to 10 MOhm or more <p>Extended frequency range approx. 15 Hz to 10 kHz. Input impedance not less than 20 kOhm/V for DC and 5 kOhm/V for AC. Overload protection. Temperature range: 0-50 deg.C. Display: mirror-backed scale. Power supply: battery.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- set of batteries- test leads with prods- user's manual- service manual.	16	F M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item		Page 62

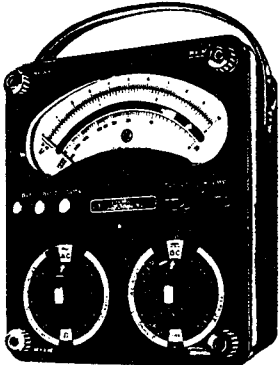


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.4	<p>MULTIMETER, CLASS 1-1.5</p> <p>portable, moving coil system.</p> <p>DC measurements - class 1.0. AC measurements - class 1.5.</p> <p>Approx. measuring ranges:</p> <ul style="list-style-type: none">- DC voltage: 30 mV to 1200 V- AC/DC current: 0.3 mA to 30 A- AC voltage: 0.6 V to 1200 V- Resistance up to 5 MOhm <p>Input impedance not less than 3 kOhm/V.</p> <p>Overload protection.</p> <p>Display: mirror-backed scale.</p> <p>Extended frequency range 15 Hz to 20 kHz.</p> <p>Temperature range: 0-50 deg.C</p> <p>Power supply: battery.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- set of batteries- test leads with prods- user's manual- service manual. <p>Note: Depending upon type of equipment to be serviced, maintained or installed, one, two or all three items 109.2.1, 109.2.3 and 109.2.4 may be needed as basic equipment.</p>	16	F M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 63

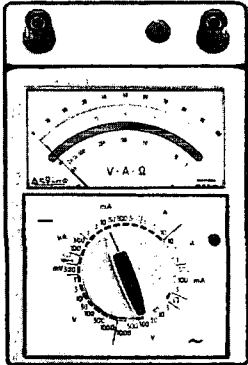


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.5	<p>MULTIMETER, CLASS 2.0-3.0</p> <p>portable, moving coil system.</p> <p>DC measurements - class 2.0 - 2.5. AC measurements - class 3.0.</p> <p>Approximate measuring ranges:</p> <ul style="list-style-type: none">- DC voltage 100 mV to 1000 V- DC current 100 micro A to 10 A- AC voltage 0.3 V to 1000 V- AC current 0.3 mA to 10 A- Resistance up to 10 MOhm or more. <p>Extended frequency range approx. 15 Hz to 20 kHz.</p> <p>Input impedance not less than 20 kOhm/V for DC and 5 kOhm/V for AC.</p> <p>Overload protection.</p> <p>Temperature range: 0-50 deg.C</p> <p>Power supply: battery.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- set of batteries- test leads with prods- user's manual- service manual.	16	F M	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 64</p>

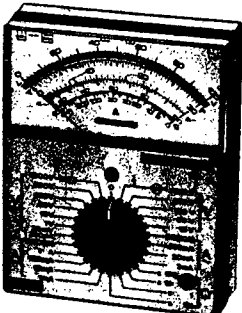


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.6	<p>MULTIMETER, CLASS 2.5-3.0</p> <p>portable, moving coil system.</p> <p>DC measurements - class 2.5. AC measurements - class 3.0.</p> <p>Approx. measuring ranges:</p> <ul style="list-style-type: none">- DC voltage: 30 mV to 1200 V- AC/DC current: 0.3 mA to 30 A- AC voltage: 0.6 V to 1200 V- resistance: up to 5 MOhm (min.). <p>Input impedance not less than 3 kOhm V.</p> <p>Overload protection.</p> <p>Extended frequency range 15 Hz to 20 kHz.</p> <p>Temperature range: 0-50 deg. C.</p> <p>Power supply: battery.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- set of batteries- test leads with prods- user's manual- service manual.	16	F M	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item


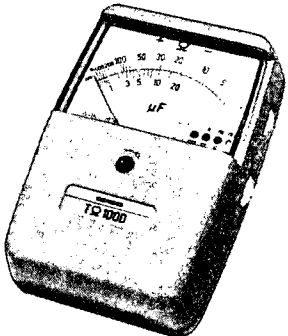


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.7	<p>POCKET VOLT-OHM METER</p> <p>For DC and AC measurements, class 2.5.</p> <p>Approx. measuring ranges: 0 to 500 V DC/AC; 0 to 100 kOhm; Overload protection. Temperature range: 0-50 deg.C Power supply: battery.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case/protective cover- set of batteries,- connecting leads,- user's manual,- service manual.	16	F M I C *	
109.2.8	<p>POCKET OHM-CAPACITANCE METER</p> <p>Class 2.5.</p> <p>Measuring ranges: 0 to 1/10/100 kOhm 1MOhm and 0 to 20/200/2000 and 20000 micro F. Power supply: battery.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case/protective cover- set of batteries- connecting leads- user's manual- service manual.	16	F M	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 66</p>

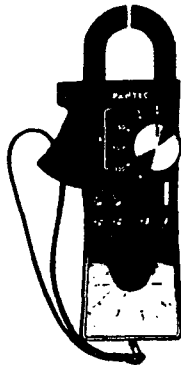
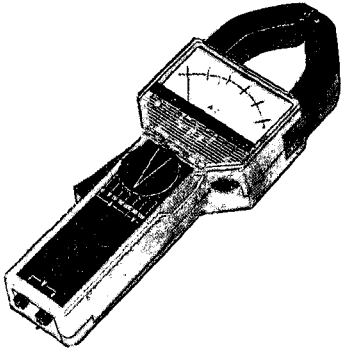
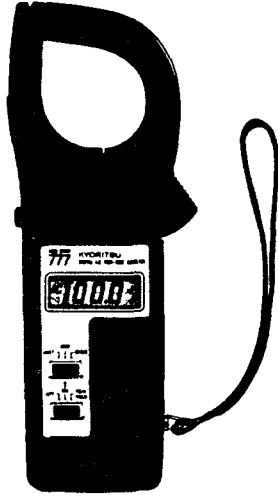


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.9	<p>CLIP-ON AMMETER AND VOLTMETER</p> <p>Class 3.0.</p> <p>Current measurements to 300A. Voltage measurement to 500 V. Opening min. 30 mm dia. for round conductor.</p> <p>Complete with : - carrying case - connecting leads, - user's manual.</p>	4	M *	
109.2.10	<p>CLIP-ON AMMETER AND VOLTMETER</p> <p>Class 3.0</p> <p>Current measurement to 1000A. Voltage measurement to 500V. Opening min. 40 mm dia. for round conductor.</p> <p>Complete with : - carrying case - connecting leads - user's manual.</p>	4	M *	
109.2.11	<p>CLIP-ON AVOMETER</p> <p>Class 3.0. Current measurements to 300 A. Voltage measurements to 500 V. Resistance measurements to 50 kOhm. Opening min. 30 mm dia for round conductors. Supply source: battery.</p> <p>Complete with: - carrying case - battery - connecting leads - user's manual.</p>	16	M *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

67

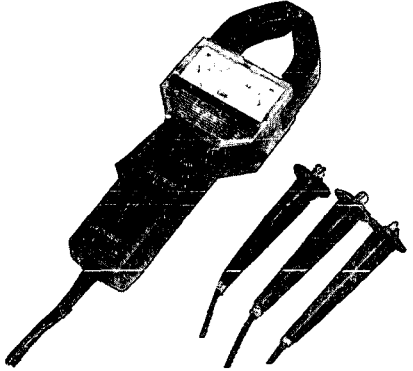
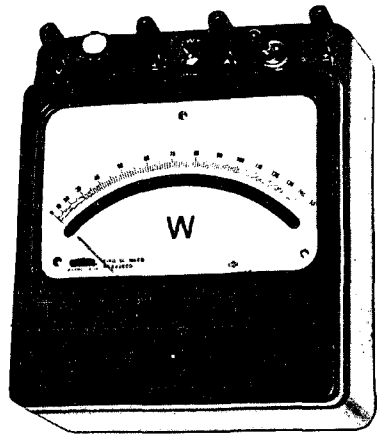


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.12	<p>CLIP-ON WATTMETER</p> <p>Class 2.5 - 3.0.</p> <p>For measurements of active and and reactive power in single phase, 3-phase three-wire and 3-phase four-wire systems, with pole changer switch, pointer locking device and overload protection.</p> <p>Approx. measuring ranges:</p> <ul style="list-style-type: none">- current: 10/30/100/300/1000 A- voltage: 30/60/100/120/200 400 V- power: 0 to 800 kW. <p>Opening min 45 mm dia for round conductors.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- set of fuses- user's manual.	2	M	
109.2.13	<p>WATTMETER, CLASS 1.5 240V</p> <p>portable, single mechanism.</p> <p>Rated voltages: 24/60/120/240 V. Rated currents: 1/5 A. Display: mirror backed scale.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- connecting leads- user's manual.	2	M *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

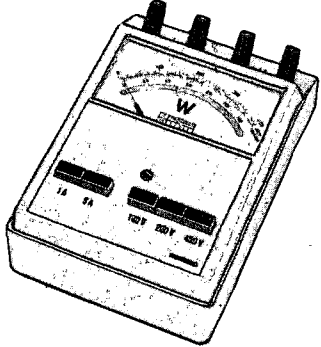
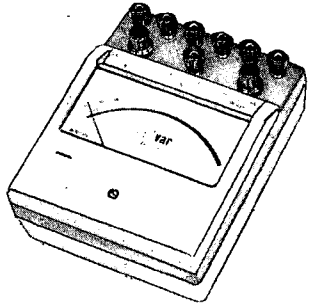


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.14	<p>WATTMETER CLASS 1.5/480V</p> <p>portable, single mechanism.</p> <p>Rated voltages: 120/240/480 V. Rated currents: 1/5 A. Display: mirror-backed scale.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- connecting leads- user's manual.	2	M *	
109.2.15	<p>VARMETER, 480 V</p> <p>portable.</p> <p>Rated voltages: 120/240/480 V. Rated currents: 1/5 A. Display: mirror - backed scale.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- connecting leads	2	M *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 69</p>

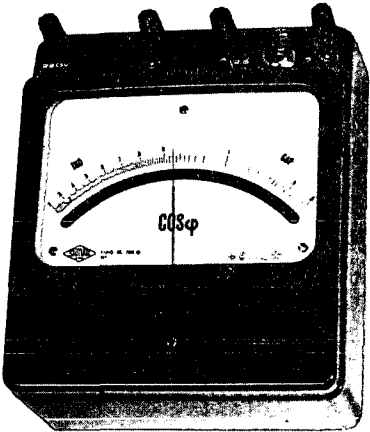
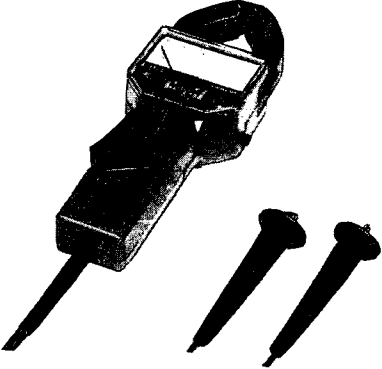


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.16	<p>PORTABLE POWER FACTOR METER</p> <p>class 2.5. Measuring range: cap. 0.5, 1, ind. 0.5. Single phase system.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- connecting leads- user's manual.	2	M *	
109.2.17	<p>CLIP-ON POWER-FACTOR METER</p> <p>for measuring power factor and for indication of energy flow direction in single phase and 3-phase 3-wire system; class 3.0.</p> <p>Measuring range: cap. 0.5, 1, ind 0.5. Rated voltages: 100/200/400 V +/-20%. Rated currents: 10 to 1000 A. Overload protection. Opening min 45 mm for round conductors.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- set of fuses- user's manual.	2	M	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

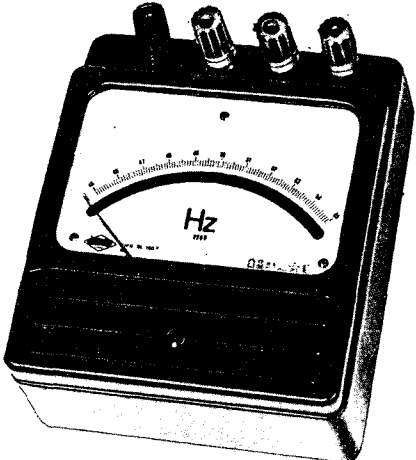
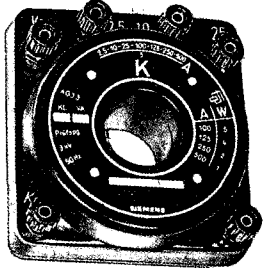


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.18	<p>FREQUENCY METER, CLASS 1.5</p> <p>portable.</p> <p>Frequency range: 45 to 55 Hz. Rated voltages: 120/240/480 V.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- connecting leads,- users's manual.	2	M *	
109.2.19	<p>CURRENT TRANSFORMER 2.5-25/5</p> <p>class 0.2.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- nominal ratios: 2.5/5, 5/5, 10/5 25/5- min. frequency range: 50-60 Hz- max. operating voltage: 660 V- opening: 30 mm dia. for round conductor.	2	M *	
109.2.19A	<p>PRIMARY CABLE, 100 A</p> <p>for extending measuring range of current transformer 2.5/5, 25/5 to 100 A.</p> <p>Approx. 2m long with screw and nut.</p>	1	M	
109.2.19B	<p>PRIMARY CABLE, 250 A</p> <p>for extending measuring range of current transformer 2.5/5, 25/5 to 250 A. Approx. 1.3 m long, ring terminal with screw and nut.</p>	1	M	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 71</p>

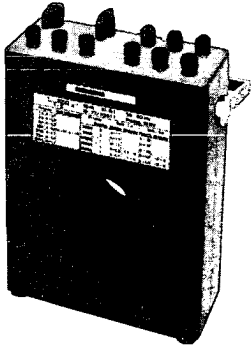
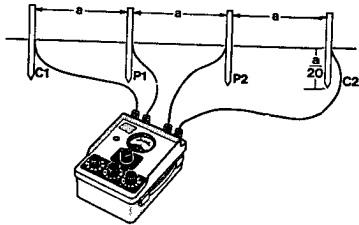
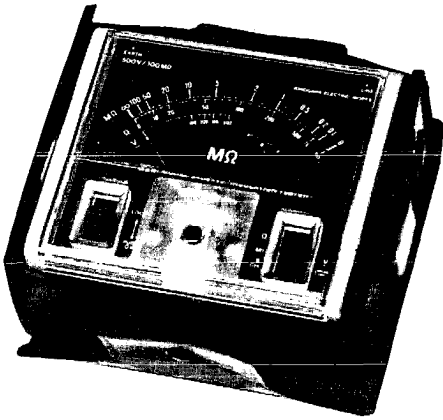


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.19C	PRIMARY BAR, 500 A for extending measuring range of current transformer 2.5/5, 25/5 to 500 A.	1	M	  
109.2.20	CURRENT TRANSFORMER 10/5 TO 1500/5 class 0.2 Approx. specifications: - nominal ratios: 10.5, 30/5, 50/5 100/5, 250/5, 300/5, 500/5, 750/5, 1500/5 - max. frequency range: 50-60 Hz - max. operating voltage: 660 V.	1	M	
109.2.21	EARTH TESTER with magneto generator or battery operation. class 1.5, for measuring earthings and specific soil resistance. Min. measuring range 0 to 1000 Ohm. Complete with: - transport/accessory box, containing hand tools, connecting cables, earth spike(s), earth drill, connecting clamps, test clips etc, necessary for arranging test circuits - user's manual.	8	F M I C *	
109.2.22	INSULATION TESTER, 0-100 MOHM magneto generator or battery type, class 1.5 - 3.0. Complete with: - carrying case - measuring leads with clips - battery (if battery operated) - user's manual.	8	F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

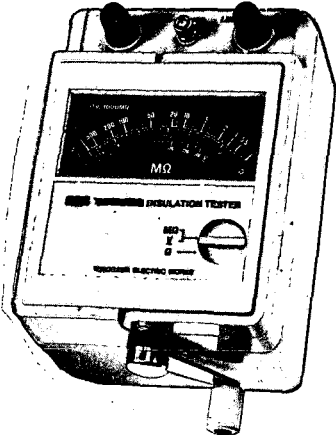
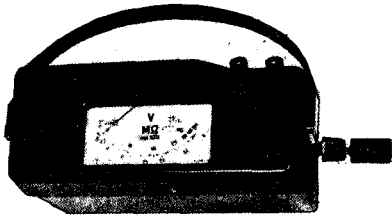
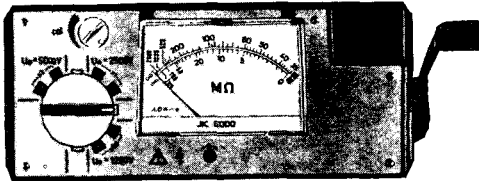


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.23	<p>INSULATION TESTER, 0-500 MOHM</p> <p>magneto generator or battery type, class 1.5-3.0.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- measuring leads with clips- battery (if battery operated)- user's manual.	2	F M I C	
109.2.24	<p>INSULATION TESTER, 0-1000 MOHM</p> <p>magneto generator or battery type, class 1.5-3.0.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case,- measuring leads with clips- battery (if battery operated)- user's manual.	2	F M I C	
109.2.25	<p>INSULATION TESTER 0-2000/5000 MOHM</p> <p>magneto generator or battery type, class 1.5-3.0.</p> <p>Complete with:</p> <ul style="list-style-type: none">- carrying case- measuring leads with clips- battery (if battery operated)- user's manual.	2	C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 73</p>

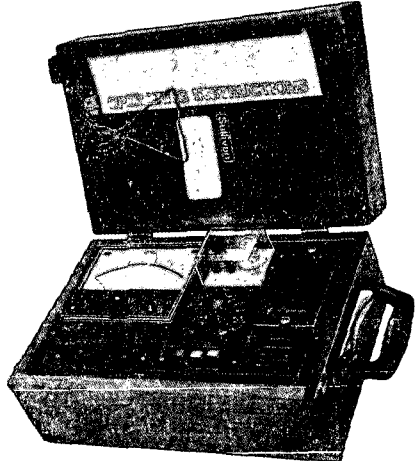
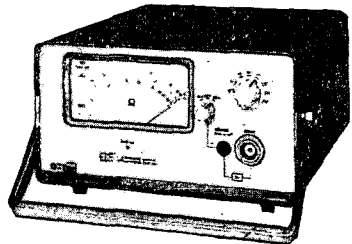
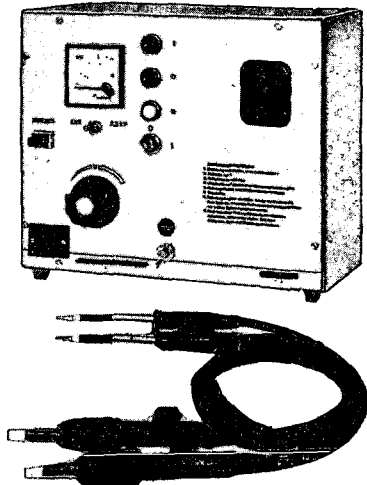


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.26	<p>INSULATION TESTER, 0-10 GOHM</p> <p>battery operation, multirange, class 1.5-3.0.</p> <p>Complete with:</p> <ul style="list-style-type: none">- set of batteries- measuring leads with clips- user's manual.	1	C *	
109.2.27	<p>TERAOHMMETER</p> <p>for measurements of high resistance up to 1×10^{16} Ohm, in several ranges; class 2.5 - 3.0, for determining leakage resistance of cables, insulating materials, oils, capacitors, etc.</p> <p>Complete with:</p> <ul style="list-style-type: none">- measuring cable- user's manual.	1	C	
109.2.28	<p>HIGH VOLTAGE INSULATION TESTER 5 KV</p> <p>for testing insulation of low voltage equipment (measuring instruments, motors, insulating materials) and for burning out concealed insulation faults. Variable voltage setting from 0 to 5000 V.</p> <p>Complete with:</p> <ul style="list-style-type: none">- test cables with prods- user's manual.	2	F M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 74</p>

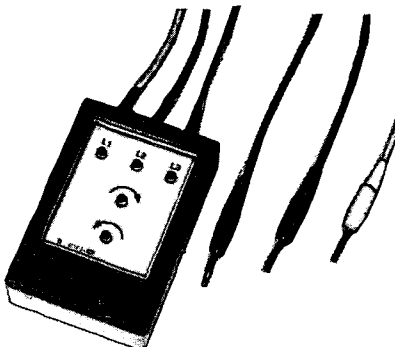

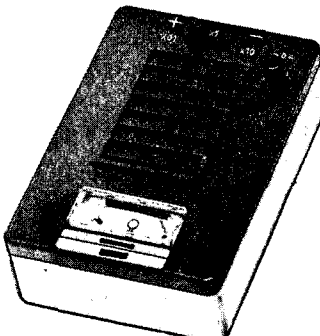


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.29	<p>PHASE SEQUENCE INDICATOR</p> <p>for determination of phase sequence in three-phase systems and for indication of phase voltages with LED's.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- voltage range: 90 to 660 V- frequency range: 45 to 100 Hz- min. test voltage: 3 kV. <p>Complete with:</p> <ul style="list-style-type: none">- connection leads- carrying case- user's manual.	16	F M I *	
109.2.30	<p>FUSE CAP WITH TERMINALS</p> <p>for measurements in fuse boxes and distributing panels for up to 25 A with short-circuit plug, thread E27.</p>	16	M I *	
109.2.31	<p>WIRING TESTER</p> <p>for cable continuity tests and for locating loose contacts, with optical or optical and acoustic indications.</p> <p>Battery operation. Measuring ranges: 0 to 1/10/100 Ohm. Response sensibility about 50 m Ohm.</p> <p>Complete with:</p> <ul style="list-style-type: none">- battery- carrying case- user's manual.	16	M I *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 75</p>

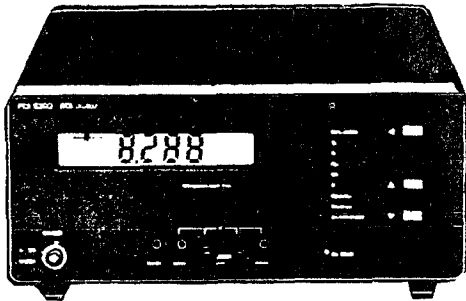


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.32	<p>RLC METER, AUTOMATIC, DIGITAL</p> <p>for rapid determination of values of passive components: resistors, inductors and capacitors including quality factor (Q) and dissipation factor (D).</p> <p>Approx. specifications :</p> <ul style="list-style-type: none">- resistance measuring range: 200 MOhm; maximum resolution 1 mOhm- capacitance measuring range: 100 micro F; maximum resolution 0.1 pF- inductance measuring range: 10 kH; maximum resolution 0.1 micro H- quality factor (Q): 0.002 to 500; maximum resolution 0.001- dissipation factor (D): 0.002 to 500; maximum resolution 0.001- measuring accuracy: +/- 0.25% +/- 1 digit- measuring frequency: 1 kHz. <p>Complete with:</p> <ul style="list-style-type: none">- standard supplied accessories- recommended optional accessories- operation manual- service manual.	2	F M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item		Page 76

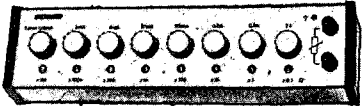




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.32A	RESISTORS BOX FOR AC AND DC consisting of 8 decades Class: 0.1 - 1.0. Setting ranges: 10 x 0.1/1/10/100 Ohm/1 kOhm/10/100/1 MOhm.	2	F M I C *	
109.2.32B	DECADE CAPACITORS class 2.0 or higher. Approximate range 0 to 1.11 micro F in several decades and in 1 nF steps. Nominal frequency range: 50 Hz to 100 kHz.	2	F M I C *	
109.2.32C	DECADE INDUCTANCE SET class 2.0 or higher, consisting of 3 decade inductances covering ranges: 0 to 11 mH in 1 mH steps, 0 to 110 mH in 10 mH steps and 0 to 1.1 H in 0.1 H steps.	2	F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page

77

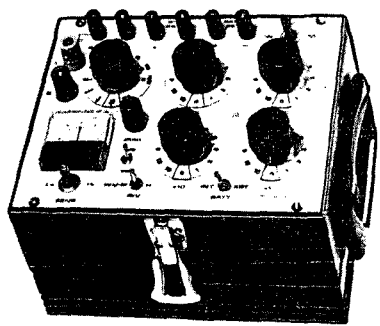


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.33	<p>CABLE MEASURING BRIDGE</p> <p>for measuring on communication cables etc; Kelvin (low resistance measurement) and Weatstone connexion.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- resistance measurement by Kelvin method: 0.4 mOhm to 500 mOhm- resistance measurement by Wheatstone method: 0.4 Ohm to 5000 Ohm- resistance measurements error: max. 1 %- capacitive measurements: 4 nF to 0.5 micro F- capacitive location of conductor breaks- loop measurements: up to 20 km lengths of telecom. cable- capacitive and loop measuring error: max. 2 %- cable fault location by Varley method- cable fault location by Murray method- fault location by three-point method- loop measurement- insulation measurements: up to 20 MOhm. <p>Complete with:</p> <ul style="list-style-type: none">- standard supplied accessories- two sets of batteries- plug-in resistors for enlarging insulation measuring ranges- operation manual- cable fault location manual- service manual.	4	M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 78</p>

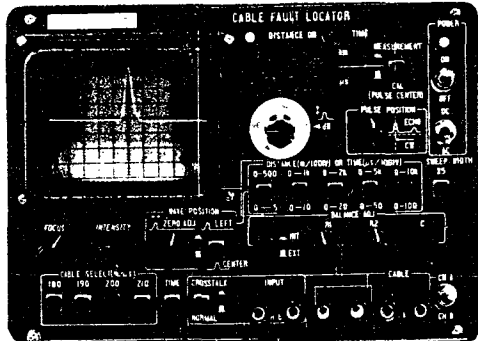
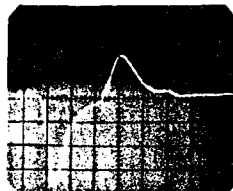
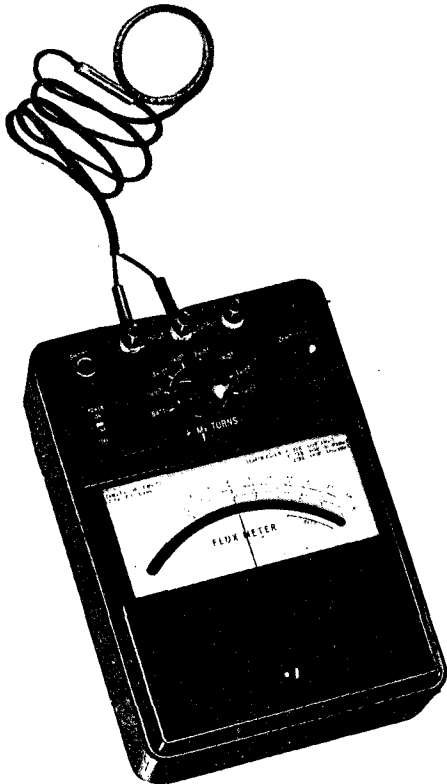


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.34	<p>CABLE FAULT LOCATOR</p> <p>self-contained unit for testing and fault-finding in power and signalling cables (shorts, breaks, lower insulation); battery supplied. The test shall be based on sending a high energy pulse and time measurement between departure of original pulse and reception of reflected pulse. The time is proportional to pulse speed propagation. The place of fault shall be observed on a CRT screen and determined proportionally to the length of the cable or calculated, using velocity of wave propagation.</p> <p>Complete with:</p> <ul style="list-style-type: none">- standard accessories- two sets of batteries- operation manual- service manual.	2	M I C *	 
109.2.35	<p>FLUXMETER</p> <p>to measure magnetic flux of permanent magnets, magnetic circuits in various types of electrical equipment (excluding alternating fields). Battery operation. Equipped with output terminals for recorder and voltmeter.</p> <p>Approximate measuring range: +/- 1 x 10 in power 2 to 1 x 10 in power 5 kilo - Maxwell - Turns in several ranges.</p> <p>Accuracy: +/- 1% - 2.5 % Hold time: 30 sec. - 1 min.</p> <p>Complete with:</p> <ul style="list-style-type: none">- standard search coils for general measurements to cover the measuring range- battery- user's manual.	1	F M	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 79

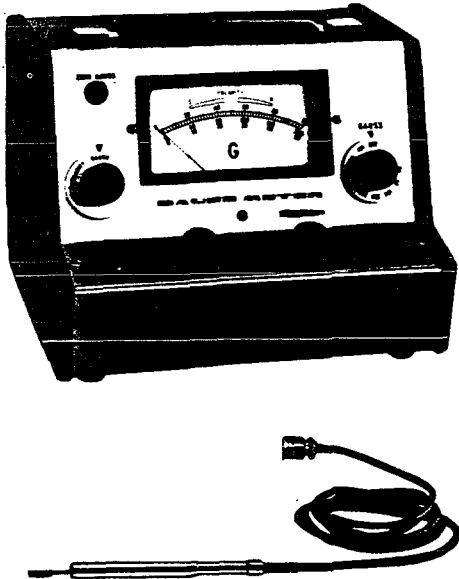


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.36	<p>FLUX DENSITY METER</p> <p>to measure flux density in permanent and alternating fields as well as polarity of magnetic poles; based on hall generator as a magnetic field detector.</p> <p>Approx. measuring range: from 20 Gauss to 20 kilo-Gauss in several sub-ranges. AC magnetic fields: up to 500 Hz, Polarity indication N and S. Accuracy: +/- 2.5% at DC and 50 Hz</p> <p>Complete with:</p> <ul style="list-style-type: none">- flat probe for measurements in narrow gaps and proximities- axial probe for measurements in solenoid coils- reference magnet for flat probe- reference magnet for axial probe- recorder and oscilloscope outputs- user's manual- service manual.	1	F M	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 80</p>

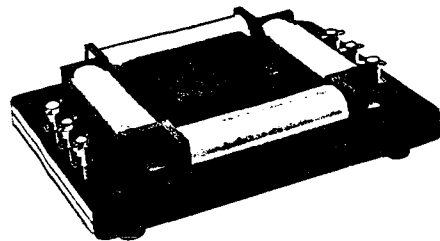


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.37	<p>IRON LOSS TEST SET</p> <p>for determination of iron loss at standard power supply frequency and magnetizing characteristics at DC.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- magnetic flux density: 15-20 kilo-Gauss- iron loss: 0.5 to 10 W/kg- magnetizing force: 1 to 100 Oe- permeability: 100 to 10000. <p>Complete with:</p> <ul style="list-style-type: none">- test frame(s)- mutual inductor(s) and matching measuring instruments as below:- single phase low power factor wattmeter(s) (*)- precision RMS AC ammeter *- precision flux voltmeter (*)- precision RMS AC voltmeter *- precision frequency meter (*)- portable precision DC ammeter * <p>Note: The project must decide whether items marked with an asterisk (*) shall be ordered. This depends upon the extent of utilisation of the iron loss test and the availability of measuring instruments marked with an asterisk (*).</p>	1	F M	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 81

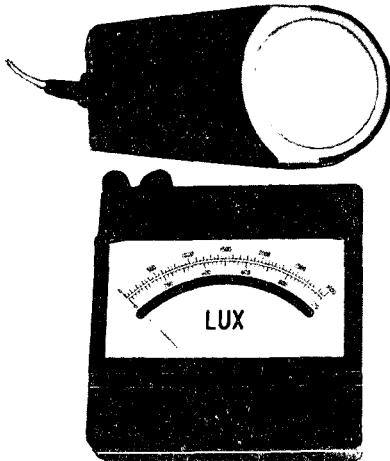
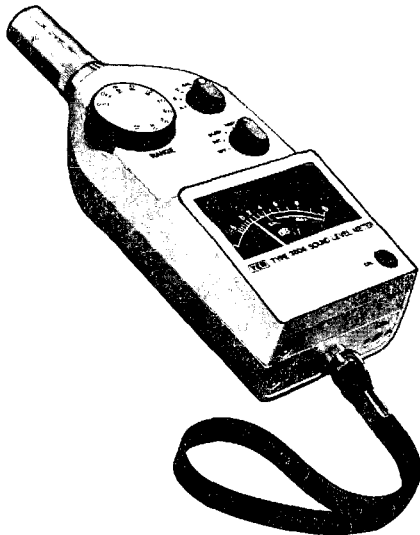


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.38	<p>ILLUMINATION METER</p> <p>comprising measuring cell and meter, lux scale; approx. min. measuring range: 0 to 3000 lx in several subranges.</p> <p>Complete with:</p> <ul style="list-style-type: none">- battery- carrying case- user's manual.	2	F M I C	
109.2.39	<p>SOUND LEVEL METER</p> <p>self-contained, portable, to measure sound level and noise level on electroacoustic systems, quality control, insulation control, as well as in industrial work areas, traffic noise, etc.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- measuring range: 40 dB to 120 dB- frequency range: 20 Hz to 16 kHz- weighting networks: A, C and linear- battery operation- meter damping: fast and slow. <p>Complete with:</p> <ul style="list-style-type: none">- microphone- standard supplied accessories- recommended accessories- operation manual- service manual.	2	F M I C	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page
82

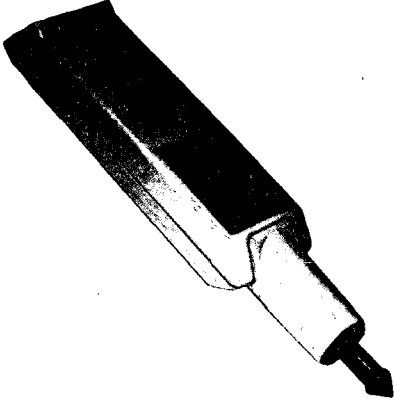
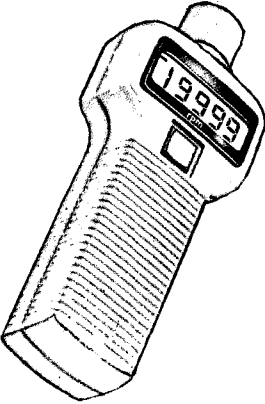
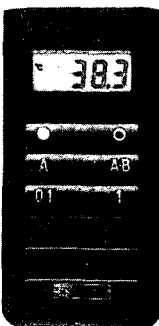


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.40	<p>TACHOMETER-CONTACT TIP</p> <p>for measuring revolutions and surface speed, analogue output.</p> <p>Min. measuring range: 0 to 10000 rpm in several sub-ranges.</p> <p>Complete with:</p> <ul style="list-style-type: none">- surface speed wheel (m/min)- surface speed wheel (mm/s)- three rubber spare tips- battery- carrying case- user's manual.	2	M I *	
109.2.41	<p>OPTICAL TACHOMETER</p> <p>for measuring rotational speeds of diesel engines, governors, drive-shafts, gears, pulleys etc. The tachometer should be able to pick-up reflected light impulses over a certain distance from the rotating part; portable type, having a clear scale for direct analog readings; supplied with 50 reflex tapes (if applicable), operation manual.</p> <p>Approx. specifications: Measuring range 0-20000 rpm.</p>	2	M I	
109.2.42	<p>SURFACE THERMOMETER</p> <p>for measuring surface temperature of electrical machines, transformers, etc. The temperature sensing element shall have ambient temperature compensation facility.</p> <p>Approx. measuring range: from - 10 deg. C to + 600 deg. C in sub-ranges.</p> <p>Complete with:</p> <ul style="list-style-type: none">- temperature probe- carrying case- user's manual.	4	F M I *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 83</p>

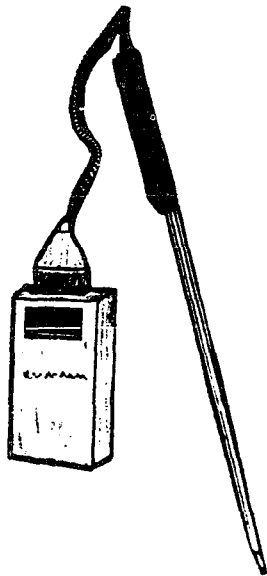
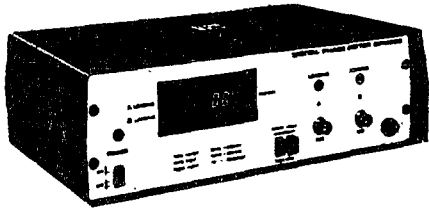


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.43	<p>TEMPERATURE METER</p> <p>for measuring surface temperatures and temperatures of liquids</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- measuring ranges: - 50 deg.C to + 200 deg.C and - 50 deg.C to + 1300 deg.C- display: 3 1/2 digits- battery supply. <p>Complete with:</p> <ul style="list-style-type: none">- standard accessories- surface temperature sensor for minus 50 deg.C to + 600 deg.C- surface temperature sensor for minus 50 deg.C to 1100 deg.C- immersion temperature sensor for minus 50 deg.C to + 1000 deg.C- carrying case with compartments for sensors- two spare batteries- silicon thermal conductor paste- operation manual.	4	C *	
109.2.44	<p>PHASE METER</p> <p>for measuring in degrees the value of the phase difference between two signals of the same frequency.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- direct reading: 0 deg.-180 deg.- lead/lag signal indication- resolution about 1 deg- approx. frequency range: 10 Hz to 100 Hz- approx. input level range from 10 mV to 10 V rms. <p>Complete with:</p> <ul style="list-style-type: none">- connecting wires- user's manual- service manual.	2	F M I *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

84

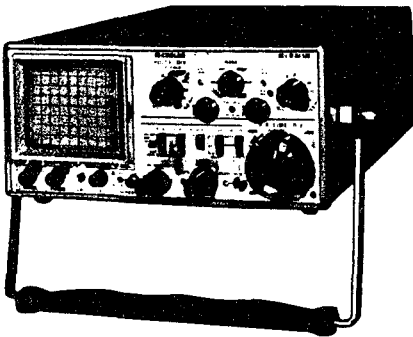
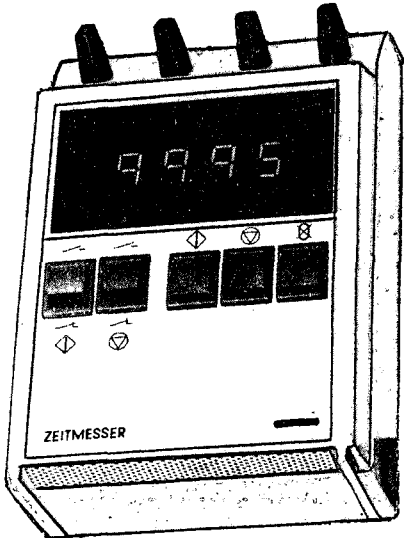


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.45	<p>PORTABLE OSCILLOSCOPE, 10 MHZ</p> <p>general purpose, dual channel, display area 8 cm x 10 cm, adjustable illumination of internal graticule. Automatic or normal triggering by channels 1, 2, mains, external source. Brightness control via Z input; beam finder.</p> <p>Y-deflection:</p> <ul style="list-style-type: none">- 2 identical channels, approx. band width DC to 10 MHz- deflection factor in several steps from approx. 2 mV/cm to 10 V/cm- Input coupling AC-0-DC <p>Time base:</p> <ul style="list-style-type: none">- free running, triggered, single sweep time scale in several steps from 0.2 micro s/cm to 2 cm/s <p>Complete with:</p> <ul style="list-style-type: none">- viewing hood- carrying case- standard set of probes and dividers- user's manual- service manual.	2	F M *	
109.2.46	<p>DIGITAL TIMER - MAINS TIMEBASE</p> <p>for measuring time intervals between 0.01 s to 100 s in electromechanical and electronic switching equipment (contact trip, pick-up, drop-away) such as relays, contactors etc. The timer must have facility for measurements on live contacts up to the mains voltage.</p> <p>Complete with:</p> <ul style="list-style-type: none">- connecting wires- user's manual- service manual.	2	F M *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item


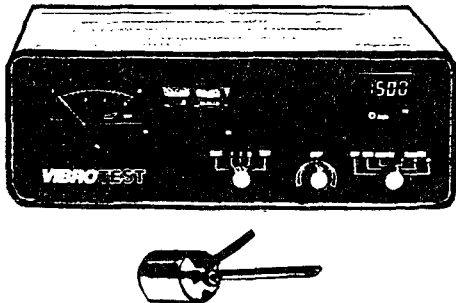
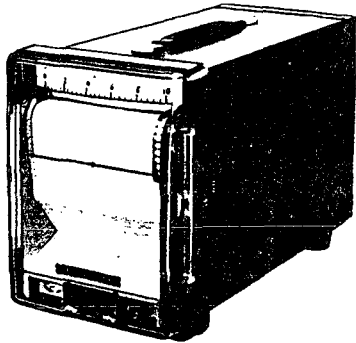


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.47	<p>DIGITAL TIMER-QUARTZ TIMEBASE</p> <p>for high accuracy measurement of contact trip, relay pick-up, drop-away from 0.0001 s to 100-1000 s in several ranges; start, stop, reset; possibility to measure on live contacts up to the mains voltage.</p> <p>Complete with:</p> <ul style="list-style-type: none"> - connecting wires - battery (if applicable) - carrying case - user's manual - service manual. 	2	F M	
109.2.48	<p>VIBROMETER</p> <p>for measuring of vibration velocity and vibration displacement of electric motors and generators, machine tools, etc; battery operation.</p> <p>Approx. operating speed range: 600 to 20000 rpm.</p> <p>Equipped with:</p> <ul style="list-style-type: none"> - filter to carry out vibration analysis - output terminals for recorder or oscilloscope. <p>Complete with:</p> <ul style="list-style-type: none"> - vibration pick-up - one set of batteries - carrying case - user's manual - service manual. 	2	M I *	
109.2.49	<p>SINGLE-PHASE RECORDING WATTMETER</p> <p>Class 2.5 - 3.0 Measuring ranges: 5 A and 10 A.</p> <p>Complete with:</p> <ul style="list-style-type: none"> - chart drive mechanism - 10 spare paper rolls - 10 drawing refils (if applicable) - user's manual. 	2	F M	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 86</p>

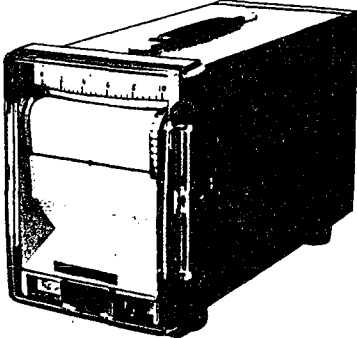
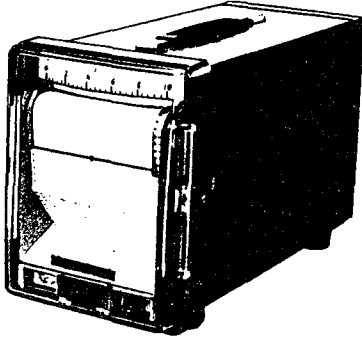


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.50	<p>THREE-PHASE RECORDING WATTMETER</p> <p>Class 2.5 - 3.0 Measuring ranges: 5 A and 10 A.</p> <p>Complete with:</p> <ul style="list-style-type: none">- chart drive mechanism- 10 spare paper rolls- 10 drawing refils (if applicable)- user's manual.	2	F M	
109.2.51	<p>THREE-PHASE RECORDING VARMETER</p> <p>Class 2.5 - 3.0 Measuring ranges: 5 A and 10 A.</p> <p>Complete with:</p> <ul style="list-style-type: none">- chart drive mechanism- 10 spare paper rolls- 10 drawing refils (if applicable)- user's manual.	2	F M	
109.2.52A	<p>RECORDING PAPER ROLL</p> <p>for recording electrical measuring instruments.</p>		F M	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

87

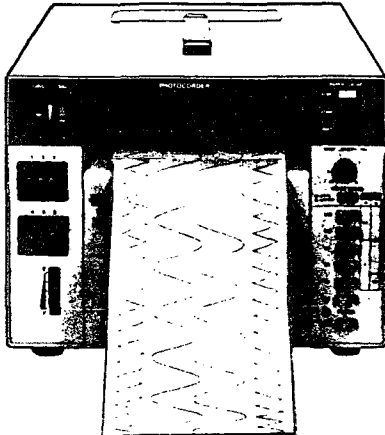


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration	
109.2.52B	DRAWING REFIL for recording electrical measuring instruments.		F M		
109.2.53	LIGHT-BEAM OSCILLOGRAPH for multichannel recording on ultra-violet sensitive recording paper of analog signals, usually of fast changing (transient) variables. Chart speed range approx. 10 to 400-500 cm/min and 10 to 400-500 cm/s, selectable. Complete with: - plug in galvanometer(s) - DC amplifier (continuously adjustable gain for intermediate ranges) - time ordinate marker - amplitude reference lines facility (preferable) - input signal multipliers and shunts - remote control - five mercury vapour lamps - five time ordinate markers lamps - set of measuring leads - 10 recording paper rolls. Note: Project must specify : - number of channels - max. and min. voltage, current and frequency ranges.	1	F M		
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item			Page 88


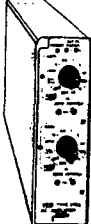


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.53A	UV RECORDING PAPER ROLL for light-beam oscillograph (109.2.53).		F M	
109.2.53B	LIGHT-BEAM GALVANOMETER for light-beam oscillograph (109.2.53).		F M	 Galvanometer (Actual Size)
109.2.53C	AMPLIFIER for light-beam galvanometer.		F M	
109.2.53D	MERCURY VAPOUR LAMP for light-beam oscillograph (109.2.53).		F M	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.54	<p>AUTONOMOUS DATA ACQUISITION SYSTEM</p> <p>for digital recording in real time format (on removable memory units) of analog or digital electrical signals resulting from experiments, process or environmental data etc. and subsequent processing of recorded data on a microcomputer system including printing hard copies.</p> <p>Approximate composition of the system:</p> <ul style="list-style-type: none">- weatherproof acquisition and recording unit with battery supply- four memory units- sensor(s) and/or signal conditioning module(s)/adapters (for example temperature sensor, pulse module, voltmeter module etc.)- reading interface for microcomputer- EPROM erasing device. <p>Complete with:</p> <ul style="list-style-type: none">- two sets of rechargeable batteries- battery charger- operation manual- service manual. <p>Note: The project should attach to the request a list of necessary sensors, modules memory units along with microcomputer technical data.</p>	1	M	<pre>graph TD Sensor --> Acquisition[Acquisition + recording] Acquisition --> Memory1[Memory module] Memory1 --> Reader Reader --> Computer Computer --> Printer Erasure[Erasure device] --> Memory1 Recorder --> Acquisition</pre>

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

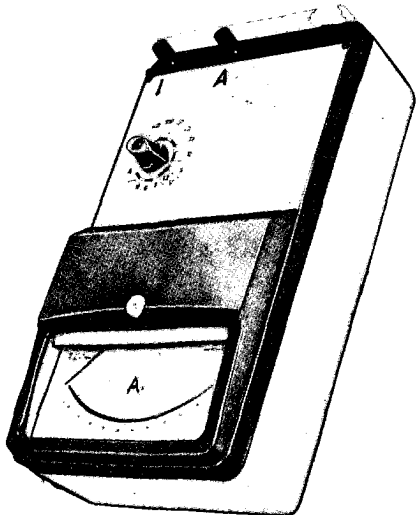
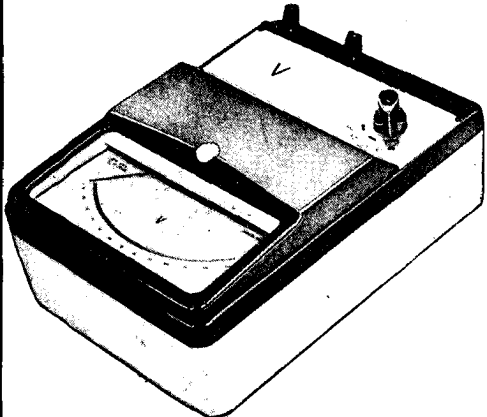
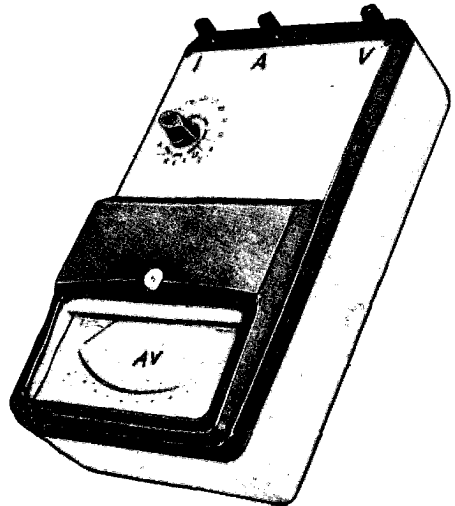


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.55	<p>PRECISION AMMETER AC/DC</p> <p>class 0.2, portable with built-in current transformer.</p> <p>Measuring ranges: 0 to 0.2/0.6/1.2 3/6/12/30 A.</p> <p>Frequency range: 45 to 65 Hz.</p> <p>Extended frequency range: 25 to 75 Hz.</p> <p>Display: mirror-backed scale.</p> <p>Approx. length of scale: 150 mm.</p> <p>Complete with:</p> <ul style="list-style-type: none">- connecting leads- user's manual.	4	M *	
109.2.56	<p>PRECISION VOLTMETER AC/DC</p> <p>class 0.2, portable.</p> <p>Measuring ranges: 0 to 65/130/260/ 520/600 V.</p> <p>Display: mirror-backed scale.</p> <p>Approx. length of scale: 150 mm.</p> <p>Frequency range: 45-60 Hz.</p> <p>Complete with:</p> <ul style="list-style-type: none">- connecting leads- user's manual.	4	M *	
109.2.57	<p>PRECISION VOLTAMMETER AC/DC</p> <p>class 0.2, portable</p> <p>Current measuring ranges: 0 to 6/12 30/60/120/300 mA/0.6/1.2/3/6/12 A.</p> <p>Voltage measuring ranges: 0 to 6/12 30/60/120/300/600/1200 V.</p> <p>Frequency range: 45-60 Hz.</p> <p>Extended frequency range: 25-75 Hz.</p> <p>Display: mirror-backed scale.</p> <p>Approx. length of scale: 150 mm.</p> <p>Complete with:</p> <ul style="list-style-type: none">- connecting leads- user's manual.	4	M *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 91</p>

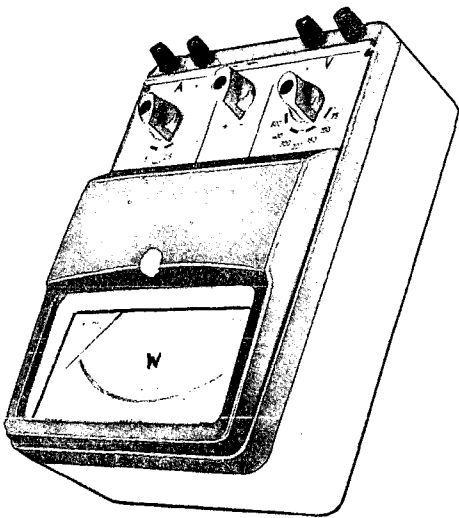
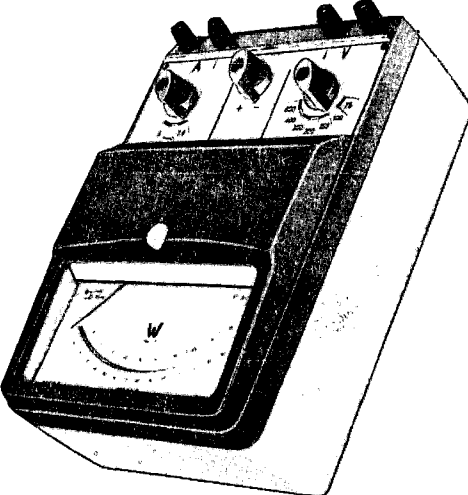


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.58	<p>PRECISION WATTMETER AC/DC</p> <p>class 0.2, portable, electrodynamic, single mechanism, for active power.</p> <p>Current ranges: 2.5 A and 5 A. Voltage ranges: 75/100/150/200/300/400/600 V. Frequency range: 15 to 90 Hz. Extended frequency range: 15 to 500 Hz.</p> <p>Display: mirror-backed scale. Approx. length of scale: 150 mm.</p> <p>Complete with:</p> <ul style="list-style-type: none">- connecting leads- user's manual.	4	M *	
109.2.59	<p>PRECISION WATTMETER-DOUBLE MECHANISM</p> <p>Electrodynamic portable, for active (class 0.5) and reactive (class 1.0) power.</p> <p>Rated current: 2 x 5 A. Rated voltages: 120/240/480 V.</p> <p>Display: mirror-backed scale. Approximate length: 100 mm. Frequency range: 15 to 65 Hz. Extended frequency range: 15 to 400 Hz.</p> <p>Complete with:</p> <ul style="list-style-type: none">- connecting leads- user's manual.	2	M *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 92</p>

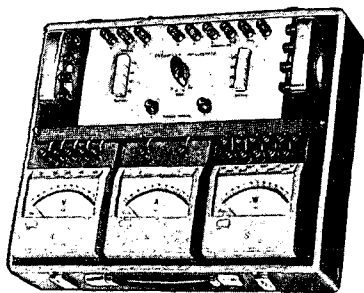


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.60	<p>PRECISION POWER MEASURING SET</p> <p>portable, for measurements in single-phase and three-wire systems with a variable load and an equilateral voltage vector triangle.</p> <p>Ready connected in carrying case for the measurements of :</p> <ul style="list-style-type: none"> - current (for each phase) - voltage (star & delta connection) - active power - apparent power - power factor - rated currents 2x5 A; 10/25/50 100/150/200/300/400/600 A - rated voltages 120/240/480/600V - error limits: <ul style="list-style-type: none"> - for instruments class 0.5 - for transformers class 0.2 - frequency range: 15 to 65 Hz <p>The portable power measuring set shall be equipped with the following instruments and accessories:</p> <ul style="list-style-type: none"> - one ammeter with moving-iron mechanism - one voltmeter with moving-iron mechanism - one wattmeter with electrodynamic double mechanism - two current transformers, primary 10/25/50 A, secondary 5 A - two primary conductors for 100 to 150 A - two primary conductors for 200 and 300 A - two primary bars for 400 and 600 A - two pairs of connecting leads, 1m long, with cable lugs. <p>The instruments can be removed and used individually.</p> <p>Complete with:</p> <ul style="list-style-type: none"> - carrying case - user's manual. 	2	F M	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 93</p>

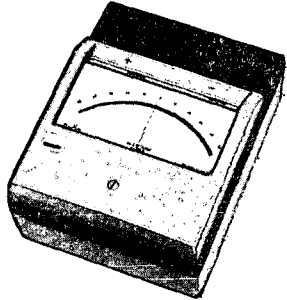
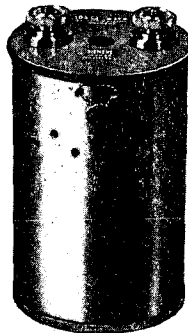
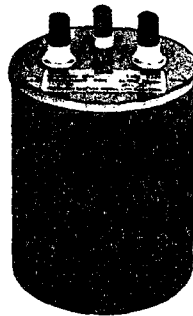
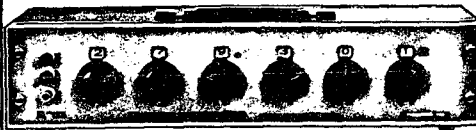


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.61	<p>POINTER GALVANOMETER</p> <p>mirror-backed scale approx. 120 mm.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- terminal resistance 100 Ohm- current constant 0.2 micro A/div- measuring circuit resistance: 400 - 1200 Ohm- response time: 1.8 s	2	F M	
109.2.62	<p>PRECISION RESISTORS, SET</p> <p>for calibration purposes and for accurate DC measurements.</p> <p>Class 0.01 - 0.02.</p> <p>Standard set consists of the following values: 0.1m Ohm, 1m Ohm, 10m Ohm, 0.1 Ohm, 1 Ohm, 10 Ohm, 100 Ohm, 1 kOhm, 10 kOhm, 100 KOhm and 1 MOhm.</p> <p>Complete with test certificates.</p>	2	M *	
109.2.63	<p>MEDIUM VALUE RESISTANCE BOX</p> <p>class 0.01 - 0.05; for calibration of resistances. Approx. range of resistance: 0.1 Ohm to 1111 Ohm. Resolution: 0.001 Ohm.</p>	2	M *	
109.2.64	<p>HIGH VALUE RESISTANCE BOX</p> <p>class 0.05 - 0.2, for calibration of resistances. Approx. resistance range: 0 to 111 MOhm Resolution: 100 Ohm.</p>	2	M *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 94</p>



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.65	<p>POTENTIOMETER, DC VOLTAGE/CURRENT</p> <p>with built-in galvanometer and standard reference voltage device for precise measurements of direct current, direct voltage and resistance and for calibration and testing the accuracy of precision DC ammeters, DC voltmeters and wattmeters; battery operation.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- class: 0.05 - 0.1- measuring ranges: 0 to 0.15/1.5/800 V and 2.5/7.5 A. <p>Complete with:</p> <ul style="list-style-type: none">- standard voltage reference cell- one set of batteries- user's manual.	1	M *	
109.2.66	<p>DC VOLTAGE CALIBRATOR, 1000V</p> <p>for checking and calibrating analog and digital measuring instruments, oscilloscopes, amplifiers etc. It may be used as a high precision voltage source for testing of electronic and communication components and assemblies.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- voltage ranges: 1 V, 10 V, 100 V and 1000 V- resolution in 1 V range: 10 microV- accuracy: better than 0.01% of f.s.d.- digital voltage display- maximum output current limit setting. <p>Complete with:</p> <ul style="list-style-type: none">- standard supplied accessories- recommended optional accessories for two years operation- operation manual- service manual.	2	M *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page

95

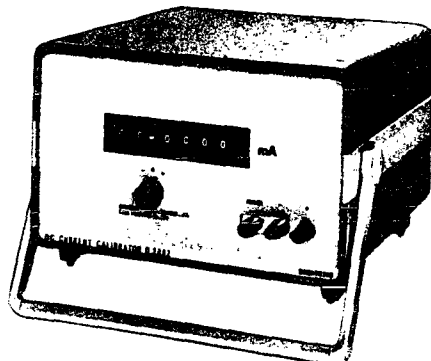
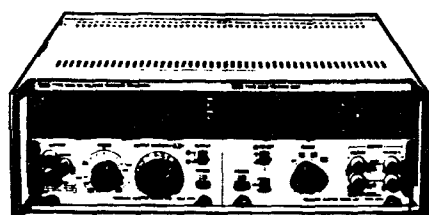


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.67	<p>DC CURRENT CALIBRATOR, 100 MA</p> <p>for delivering a load-independent, adjustable direct current for calibration of measuring instruments (analog or digital) and for measuring functions of non-linear resistors, semiconductors, pick-up and drop-away data of relays etc.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- digitally adjustable current setting: 0.1 microA to 99.9999 mA- resolution: 0.1 micro A- accuracy: better than 0.05% + 0.5 digit of the set value. <p>Complete with:</p> <ul style="list-style-type: none">- standard supplied accessories- recommended accessories for two years of operation- operation manual- service manual.	2	M *	
109.2.68	<p>DC CURRENT CALIBRATOR/STANDARD-1A</p> <p>for testing and calibrating current measuring instruments and to serve as a reference current source for examination and testing of assemblies and components; overload protected.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- class 0.01- current ranges 1/10/100/1000 mA- complete with user's manual.	2	M *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 96</p>

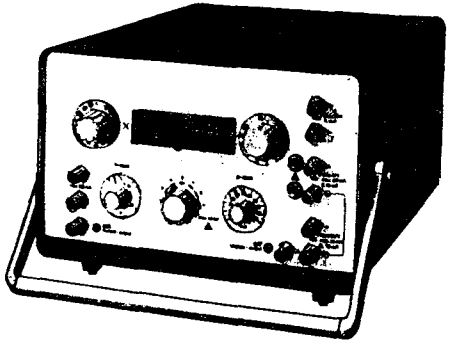
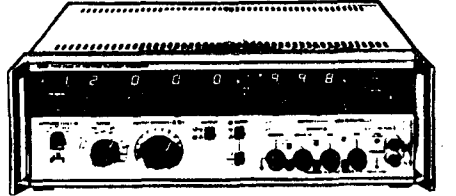
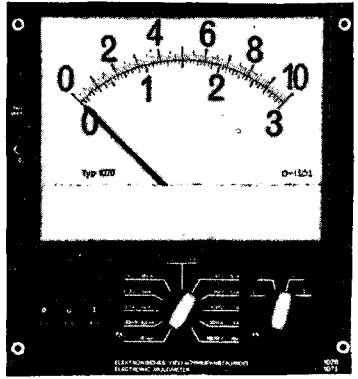


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.69	<p>DC CURRENT STANDARD - 30 A</p> <p>for testing and calibrating current measuring instruments; overload protected.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- class 0.1 - 0.2- current ranges: 0.1/1.0/10/100 mA 1/10/30 A. <p>Complete with user's manual.</p>	2	M *	
109.2.70	<p>AC VOLTAGE/CURRENT STANDARD</p> <p>for testing and calibrating AC voltmeters and ammeters; overload protected.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- class 0.1- voltage ranges: 0.1/1/10/100/300/ 1000 V- current ranges: 0.1/1/10/30 A- frequency range: 40 - 400 Hz <p>Complete with user's manual.</p>	2	M *	
109.2.71	<p>ANALOG DEMONSTRATION MULTIMETER</p> <p>rms, electronic.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- scale length: 170-200 mm- height of types: 18-20 mm- LED polarity indication- input resistance (voltage measurements): 10 MOhm- internal resistance (current measurements): 50 m Ohm- AC and DC voltage range: 0-1000 V- AC and DC current range: 0 - 10 A- resistance range: 0 - 10 MOhm- frequency range: DC - 10 kHz- accuracy: 2.5 percent of f.s.d.- overload protected. <p>Complete with user's manual.</p>	2	F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

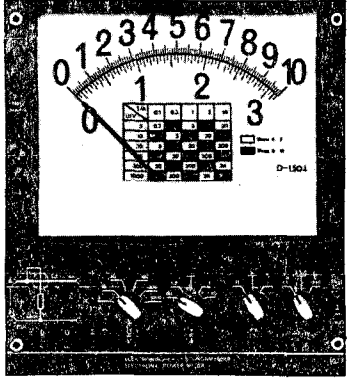


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.2.72	<p>ANALOG DEMO POWER METER</p> <p>dual linear scale; for measuring DC and AC active, apparent and reactive power; electronic.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- scale length: 170 - 200 mm- height of types: 18 - 20 mm- active power measuring range: 0 - 10 kW- reactive power measuring range: 0 - 10 kVA- apparent power measuring range: 0 - 10 kVA- AC/DC voltage range: 0 - 1000 V- AC/DC current range: 0 - 10 A- frequency range for active power: DC - 20 kHz- frequency range for reactive and apparent power: 50 Hz- accuracy: 3 percent of f.s.d.- overload protected. <p>Complete with user's manual.</p>	2	F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

SECTION 3 WINDING AND BALANCING EQUIPMENT

This section deals with rotating and static electrical machines, coil production equipment, coil removing and coil assembling tools and apparatus.

To ensure a complete production line in manufacturing and repair of rotating electrical machines, the specifications for the range of dynamic balancing machines are provided, covering the balancing range from 0.1 kg to 75-100 kg of a rotor weight.

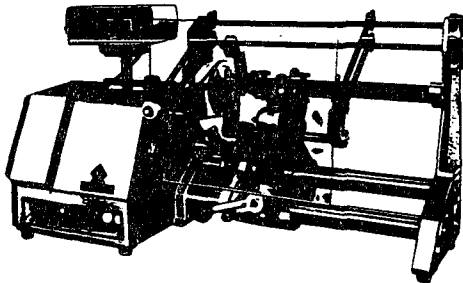


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.3.1	<p>COIL WINDING MACHINE-AUTOMATIC</p> <p>for winding transformers coils relays, chokes etc; motor driven.</p> <p>Equipped with: wire guides, forward/reverse counter, possibility to preset counter, automatic stop when the preset number of turns has been reached, simultaneous two wires winding.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- adjustable pitch from 0.05 mm per turn to 1.5 mm per turn- winding speed approx. 100-3000 rpm in several ranges- stepless variation of speed within each range.- max. winding width 150 mm- distance between centres 300 mm- max. coil dia. 180 mm. <p>Complete with:</p> <ul style="list-style-type: none">- set of winding fixtures- set of wire steel holders with tension control for wires dia. from 0.05 mm to 1.5 mm- set of special tools and accessories for operation and maintenance- coil winding technique manual- user's manual.	1	F	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 100</p>

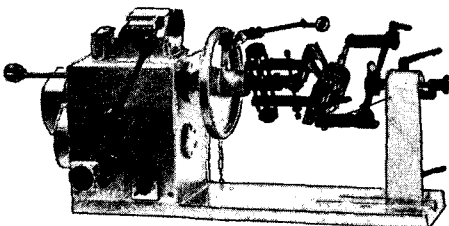


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.3.2	<p>ARMATURE/STATOR COIL WINDING MACHINE</p> <p>for winding diverse range of motor or generator armatures and corresponding stator coils; motor driven.</p> <p>Equipped with:</p> <ul style="list-style-type: none">- variable speed facility- adjustable to armature dia. and stack length wire guiding device- axial (micrometric) and radial adjustments of armature folders- turns counter with automatic stop when the preset number of turns has been reached- clutch for smooth operation- turns counter. <p>Approx. specifications:</p> <ul style="list-style-type: none">- armature dia.: from 20 to 120 mm- max. armature stack length 120 mm- max. armature shaft length 400 mm- wire dia. from 0.1 mm to 1.5 mm- max. coil dia. 500 mm. <p>Complete with:</p> <ul style="list-style-type: none">- set of reel holders with tension control for wires dia. from 0.1 to 1.5 mm- set of coil winding fixtures with holder(s)- set of special tools and accessories for operation and maintenance- armature and coil winding technique manual- user's manual.	1	F *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 101</p>

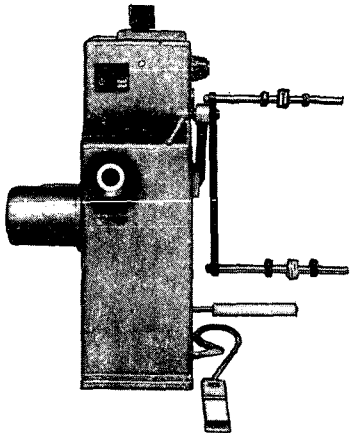
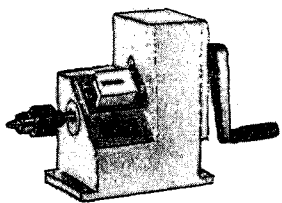


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.3.3	<p>UNIVERSAL WINDING MACHINE</p> <p>motor driven, for universal application.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- min. six winding speeds- automatic counter of turns with preset facility for direct and reverse winding- clutch for smooth start- stop lever with brakes- max. winding dia. about 500 mm- wire dia: 0.1 - 2.0 mm. <p>Complete with:</p> <ul style="list-style-type: none">- ground plate- faceplates- clamping mandrel- winding mandrels (M8, M10, M12 and M14)- winding fixtures- wire reel holder- instruction manual.	1	F *	
109.3.4	<p>MANUAL SMALL WINDING MACHINE</p> <p>simple machine with counter and gear box having at least two speeds (about 1:2 and 1:4). The drive shaft may be equipped with a drill chuck for taking winding spindles and clamping belts up to 13 mm (min.).</p> <p>Complete with:</p> <ul style="list-style-type: none">- recommended winding spindles- spacing bushes- operation manual.	2	F *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 102</p>

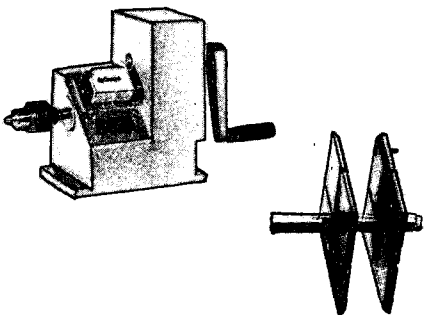
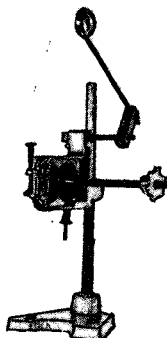
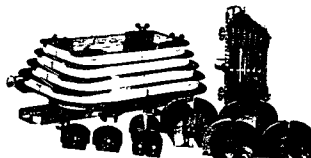
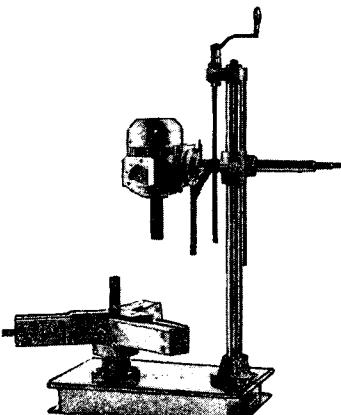


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.3.5	<p>UNIVERSAL MANUAL COIL WINDER</p> <p>fully adjustable through right and left handed spindles; equipped with adjustable motor coil winding heads (4 pieces) and 4 pieces adjusting devices for transformer coils. For wire dia. 0.2 mm to 1.5 mm.</p> <p>Complete with turns counter.</p>	2	F	
109.3.6	<p>REEL HOLDER</p> <p>with adjustable wire tension facility for wires dia. 0.1 - 1.5 mm, double acting brake system, max. supply reel flange dia. 250 mm; foot fixing facility.</p>		F *	
109.3.7	<p>UNIVERSAL WINDING FIXTURE SET</p> <p>continuously adjustable; intended as an attachment to winding machines to wind coils of different sizes (width 10 to 20 mm, circumference 270 to 1100 mm) for rotating electrical machines; consisting of:</p> <ul style="list-style-type: none"> - set of winding arbours/segments - holder of segments - set of support bars - pair of cross bars - instruction manual. 	2	F *	
109.3.8	<p>COIL REMOVING APPARATUS</p> <p>for cutting coil heads from burnt-out stators with rotary sawblade and removing remaining coil parts from stator slots.</p> <p>Complete with:</p> <ul style="list-style-type: none"> - set of accessories, - set of cutters for two years operation - user's manual. 	1	F	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 103</p>

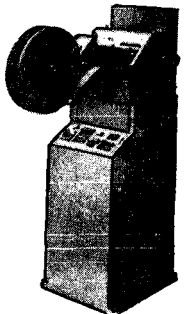
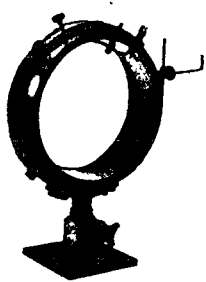
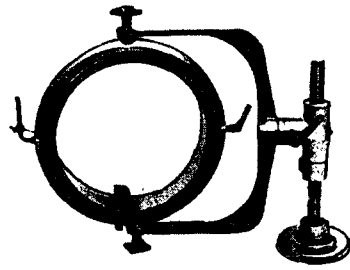


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.3.9	<p>INSULATION CREASING MACHINE</p> <p>double creasing type for production of slot insulations from different materials such as press pan, micanite, leatheroid, etc.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- max. strip width: 150 mm- fold width range: 3 to 140 mm- insulation thickness: 0.15 to 0.8 mm. <p>Complete with:</p> <ul style="list-style-type: none">- table- recommended accessories- operation manual- service manual.	1	F	
109.3.10	<p>STATOR HOLDING RING, 200 MM</p> <p>for holding stators up to 200 mm; adjustable in height and for any angle and plane.</p>	2	F *	
109.3.11	<p>STATOR HOLDING RING 350MM</p> <p>for holding stators up to 350 mm; adjustable in height and for any angle and plane.</p>	2	F *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 104</p>

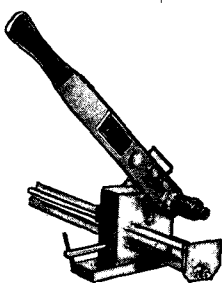
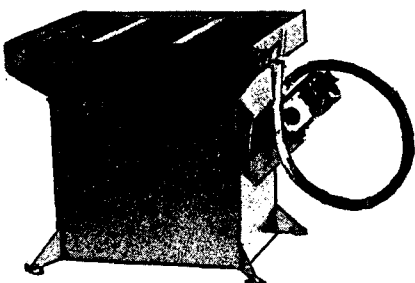
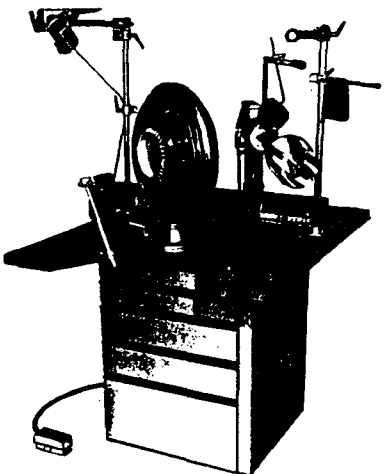


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.3.12	SLOT WEDGE CUTTER hand lever operated to cut profiled slot closing materials (wedges) from wood or other insulating materials; for profiles from 6 to 14mm with length adjustment from 30 to 350 mm.	1	F	
109.3.13	COIL IMPREGNATION PLANT equipped with varnish immersion pump; approx. capacity: 100 litres; complete with operation manual.	1	F	
109.3.14	COIL INSERTING APPARATUS for motorized insertion of coils into stators of rotating electrical machines. The apparatus must be complete with needles and adaptor sets suitable for training and repair purposes. The apparatus shall accommodate stator sizes from approx. 25 mm to 220 mm. Complete with: - storage cupboard with table top - recommended quantity of needles and adaptor sets for two years operation in training and production workshop - set of recommended accessories to support the apparatus such as coil head former, coil clip, brazing device, etc. - two sets of operation manuals.	1	F	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

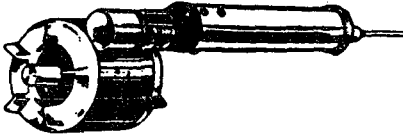
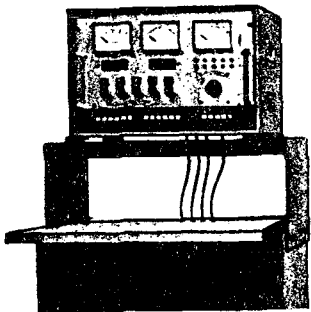
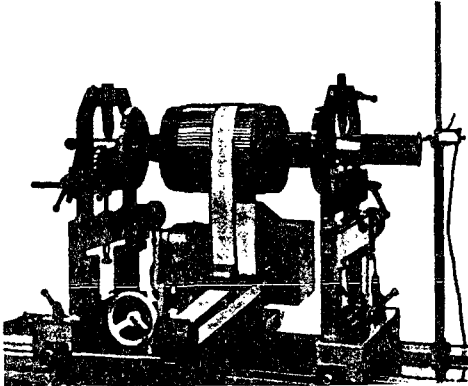


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.3.15	<p>STATOR AND ARMATURE TEST SET</p> <p>for short circuit test up to single turn, squirrel cage armature open circuit test, faulty connections, cross-over shorts, open circuit and collector shorts.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- min. armature or stator wire dia 0.1 mm- min. inside dia. of stator 30 mm- min. length of stack 15 mm. <p>Complete with:</p> <ul style="list-style-type: none">- supply unit- audio and visual indicators- user's manual.	2	F M *	
109.3.16	<p>UNIVERSAL BALANCING MACHINE-75KG</p> <p>for dynamic balancing of rotors, armatures, etc, weighting from 0.5 kg to 75 kg (occasionally max. 100 kg), possibility of balancing below 0.5 kg at reduced accuracy.</p> <p>Maximum distance between bearings approx. 600-625 mm. Min. distance between bearings Approx. 50-55 mm. Automatic marking of compensation places.</p> <p>Complete with:</p> <ul style="list-style-type: none">- measuring unit- foundation plan and set of fastening accessories- set of connecting leads- set of special tools and accessories- user's manual- service manual.	1	F	 
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 106</p>

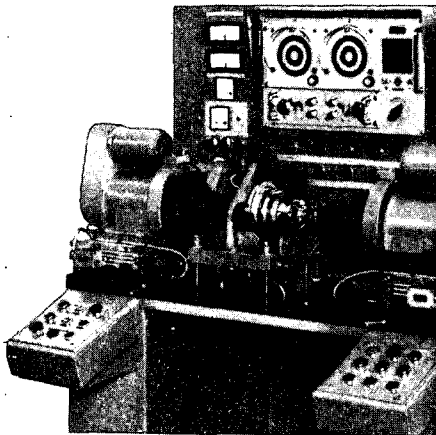
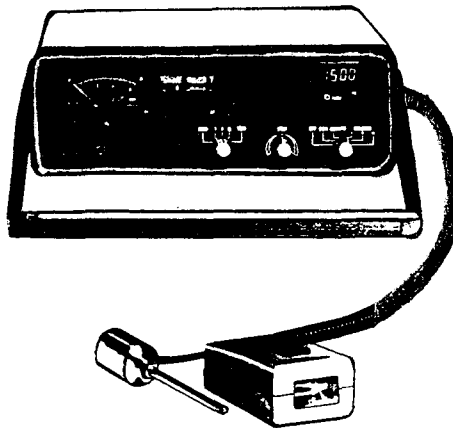


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.3.17	<p>UNIVERSAL BALANCING MACHINE - 10KG</p> <p>for dynamic balancing of rotors, armatures, etc, weighting from 0.1 kg to 10 kg (occasionally max. 15 kg) possibility of balancing below 0.1 kg at reduced accuracy.</p> <p>Max. distance between bearings approx. 350 - 380 mm. Min. distance between bearings approx. 40-50 mm. Automatic marking of compensation places.</p> <p>Complete with:</p> <ul style="list-style-type: none">- measuring unit- set of connecting leads- set of special tools and accessories- user's manual- service manual.	1	F M *	
109.3.18	<p>PORTABLE BALANCING/TESTING FACILITY</p> <p>for field balancing and measurement of vibration severity of assembled electrical rotating machines, machine tools etc; particularly shaft vibrations on machines, speed measurement and monitoring, indication of vibration velocity and of vibration displacement, indication of angular position of unbalance, output connections for recorders and oscilloscopes, speed range approx. 50-20 000 rpm.</p> <p>Complete with:</p> <ul style="list-style-type: none">- electronic evaluation unit with a balancing module- vibration displacement pickup- battery (if applicable)- carrying case- user's manual- service manual.	1	F M	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 107</p>

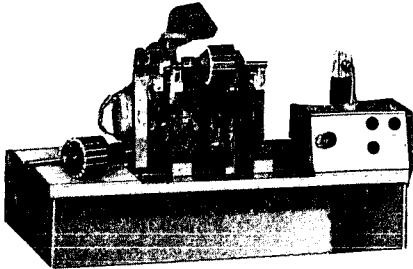


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.3.19	<p>SIMPLIFIED DYNAMIC BALANCING MACHINE</p> <p>for horizontal balancing of small rotors on try-and-test run-out principle in a repair workshop, for weights of parts between approx. 0.03 kg to 6 kg, approx. distance between bearings (adjustable) 70mm to 300 mm; for shafts approx. 3 mm to 50 mm. Balancing speed approx. 500 rpm to 3000 rpm.</p> <p>Complete with:</p> <ul style="list-style-type: none">- balancing compound- set of recommended accessories- user's manual <p>Note: (1) Several unbalance measuring facilities may be available for the above universal balancing machines with different indication methods such as analogue, digital, stroboscopic and vector readout. This should be specified in the equipment request. The analogue type unbalancing facility is generally sufficient for training purposes.</p> <p>(2) Type of balancing machine (horizontal or vertical) should be also specified in the request.</p>	1	F M	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 108

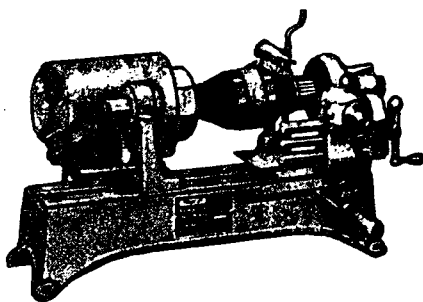


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.3.20	<p>ARMATURE LATHE AND UNDERCUTTER, 200MM</p> <p>for turning commutators and undercutting mica insulation; for armatures up to 200 mm dia; bench type with manual feed and separate electric drives for the undercutter and the lathe.</p> <p>Complete with:</p> <ul style="list-style-type: none">- toolholder- 10 tungsten carbide tipped tool bits for lathe- 10 sets of rotary burrs for mica undercutter- operation and maintenance manual.	1	F *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page
109



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

SECTION 4 MACHINES AND TOOLS

This section describes the minimum requirement of machines, tools and dimension measuring instruments which are usually used in electrical engineering technology for the production and repair of system devices. The user may also utilize specifications from guides 1, 2, 3, 4, 6, and 15 if the need arises.

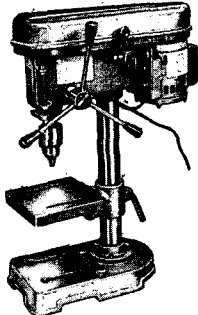
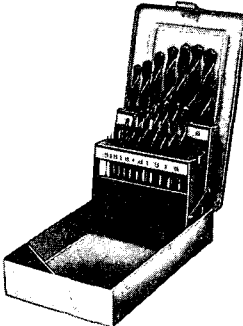


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.1	<p>BENCH DRILLING MACHINE - 13 mm</p> <p>spindle speed adjustable, spring counterbalanced drilling spindle, table adjustable for height upon column.</p> <p>Approx. specifications:</p> <p>Drilling capacity in steel: 13 mm</p> <p>Drilling depth: 80-100 mm</p> <p>Min. distance between column and spindle: 175 mm</p> <p>Number of speeds: 8</p> <p>Speed range: 500-4000 rpm</p> <p>Size of table: 250 x 250 mm.</p> <p>Complete with:</p> <ul style="list-style-type: none">- machine vice, hardened and ground steel jaws with horizontal and vertical "V"-slots, knurled handle; width of jaw 100 mm- 13 mm chuck with key- set of spanner(s) and key(s)- user's manual.	2	F M I *	
109.4.1A	<p>TWIST DRILL SET - 1 TO 13 mm</p> <p>set of 25 HSS right hand drills, straight shank jobbers series, supplied in metal case;</p> <p>Drill sizes: 1 to 13 mm dia. by 0.5 mm steps.</p>		F M I	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 111</p>


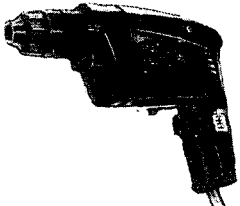
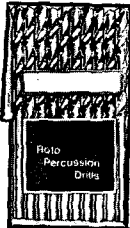


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.1B	COUNTERSINK CUTTER, 90 deg. straight shank type, HSS: angle dia. shank 90 deg 10 mm 8 mm		F M I	
109.4.2	ELECTRIC NORMAL/IMPACT DRILL 13mm two speed electric or electro-pneumatic percussion drill with electronic variable speed control from 0 to maximum with reversing switch for left/right hand rotation, side handle and depth gauge, double insulation, universal chuck with a key, dust tight enclosure and permanent lubrication, suitable for screwdriving; steel drilling capacity 13 mm; approx. power input 600 W - 800 W.	16	F M I C *	
109.4.2A	TWIST DRILL SET, MASONRY carbide tipped for masonry work; sizes from 3 to 12 mm increasing in 1 mm steps.		F M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 112

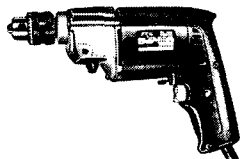
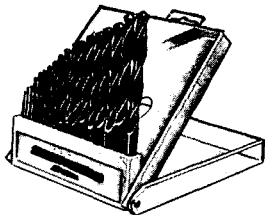


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.3	ELECTRIC NORMAL/IMPACT DRILL-8 MM single-speed electric drill with electronic variable speed control from 0 to max.; double insulation; lock/button for continuous operation; drill chuck with a key; steel drilling capacity 8mm. Approx. power input 300 - 400 W.	16	F M I C *	
109.4.3A	TWIST DRILL SET, 2-8 MM set of 13 HSS right hand drills, straight shank, supplied in metal or plastic holder. Approx. dimensions: Drill sizes: from 2 to 8 mm in 0.5 mm steps.		F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

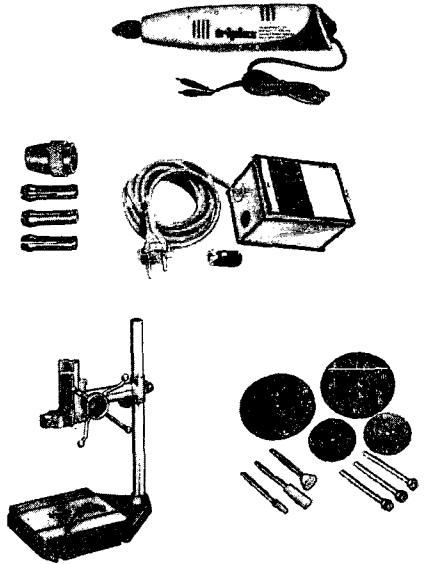
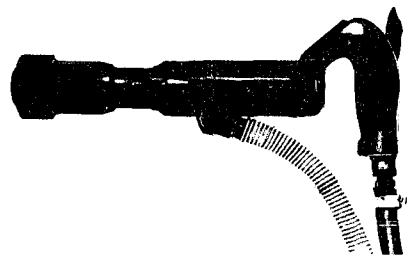


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.4	<p>MINIATURE DRILLING MACHINE SET</p> <p>for drilling, sawing, grinding and polishing.</p> <p>Approx. specifications: Drilling capacity up to 3.0 - 3.5 mm Max. spindle speed: 15000-20000 rpm Supply : 12 - 18 V DC.</p> <p>Complete with:</p> <ul style="list-style-type: none">- set of collets up to 3.0 - 3.5 mm- drill stand- transformer - rectifier (supply unit)- set of assorted tools for drilling grinding, sawing and polishing.	16	F M I C	
109.4.4A	<p>SET OF DRILLS 0.8 - 3 MM</p> <p>Consisting of:</p> <p>Dia: 0.8 - 1.0 - 1.2 - 1.5 - 1.6 1.8 - 2.0 mm each 10 pcs. Dia: 2.1 - 2.3 - 2.5 - 2.6 - 3.0 each 5 pcs.</p>		F M I C	
109.4.5	<p>ELECTRIC ROTARY/STRAIGHT HAMMER</p> <p>for drilling and hammering large anchor holes, chiselling ditches, channels and ducts; electric or electro-pneumatic principle of operation; double insulation, adjustable safety clutch for setting safe torque level, dust-tight enclosure with permanent lubrication, spring damping; drilling capacity in concrete approx. up to 35 mm. Approx. power input 900 - 1100 W.</p> <p>Complete with:</p> <ul style="list-style-type: none">- two sets of standard tools for hammering, bushing, slotting, chipping and demolition- set of standard accessories- carrying case- user's manual.	2	M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 114</p>

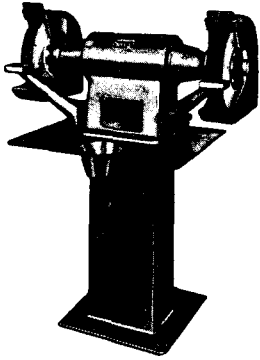


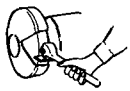



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.6	<p>PEDESTAL GRINDER - 200 MM</p> <p>double ended type with direct drive, totally enclosed motor with ball bearings, approved closed wheel guards and eyeshields; adjustable tool rests; cast iron or sheet metal pedestal for floor mounting; complete with control switch and six vitrified grinding wheels, three 36 grit and three 60 grit, user's manual, set of spanner(s) and key(s).</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- dia of wheel 200 mm- width of wheel 25 mm- spindle speed 2500-3000 r.p.m.	2	F M I C *	
109.4.6A	<p>GRINDING WHEEL-200 MM DIA-36 GRIT</p> <p>Width of wheel 25 mm.</p>		F M I C	
109.4.6B	<p>GRINDING WHEEL-200 MM DIA-60 GRIT</p> <p>Width of wheel 25 mm.</p>		F M I C	
109.4.6C	<p>WHEEL DRESSER - 30 MM</p> <p>Disc cutter type, complete with six spare sets of cutting discs.</p> <p>Approx. dimensions:</p> <ul style="list-style-type: none">- dia of cutting discs 30 mm- width of cutting discs 12 mm- length 300 mm.	4	F M I C	 
109.4.6D	<p>DRILL SHARPENING DEVICE</p> <p>for twist drills. Approx. size: 5 to 25 mm.</p>	2	F M I	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 115

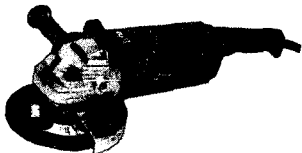
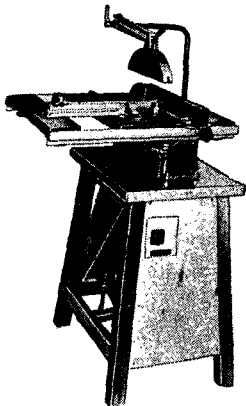


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.7	<p>ANGLE GRINDER - 115 MM</p> <p>for cutting metals and stones, also for grinding, sanding, cleaning; max. dia. of grinding wheel 115 mm, double insulation; approx. no load speed 10000 rpm. Approx. power input 400 - 600W.</p> <p>Complete with:</p> <ul style="list-style-type: none">- wheel guard- handle, flange nut, flange cranked pin spanner- 10 metal cutting discs- 10 stone cutting discs- 10 metal grinding wheels- 10 stone grinding wheels- user's manual.	8	F M I C *	
109.4.8	<p>UNIVERSAL CIRCULAR TABLE SAW</p> <p>for cutting wood, insulation materials and metals.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- tilting table and height adjustment- speed range from 80 to 2800 rpm- coolant system- mitre gauge mounted on base blade with scale adjustable from 40 deg. to 90 deg.- clamp attachment for pipes, round, square and flat material for approx. 10 mm to 40 mm dia with holding screws- cutting blades approx. 200 mm dia. <p>Complete with:</p> <ul style="list-style-type: none">- set of spanners and keys,- saw blades for wood, plastics laminated paper, aluminium, brass, copper and steel (5 of each type of blade)- set of service tools- user's manual.	1	F M I C	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 116</p>


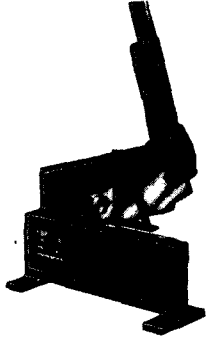


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration												
109.4.9	<p>SHEET METAL SHEARING MACHINE</p> <p>hand operated, with hold down attachments; for sheets up to 4 mm, length of the blade approx. 500 mm.</p> <p>Complete with:</p> <ul style="list-style-type: none">- spare set of blades- operating instruction.	1	F I C													
109.4.10	<p>BENCH SHEAR, 8 MM</p> <p>hand lever operated, for plates, round, square and angle sections; rigid construction of steel plate and alloy casting; automatic hold-down bar and safety guards; upper and lower blades with four reversing cutting edges, blades easily replaceable.</p> <p>Approx. capacity:</p> <table><tr><td>Length of blade</td><td>175 mm</td></tr><tr><td>Cutting of mild steel</td><td>8 mm</td></tr><tr><td>Cutting of steel flats</td><td>12x80 mm</td></tr><tr><td>Cutting of round bars</td><td>20 mm</td></tr><tr><td>Cutting of square bars</td><td>18x18 mm</td></tr><tr><td>Cutting of angle section</td><td>6x50 mm.</td></tr></table> <p>Complete with:</p> <ul style="list-style-type: none">- spare set of blades- operating instruction.	Length of blade	175 mm	Cutting of mild steel	8 mm	Cutting of steel flats	12x80 mm	Cutting of round bars	20 mm	Cutting of square bars	18x18 mm	Cutting of angle section	6x50 mm.	1	F M I C *	
Length of blade	175 mm															
Cutting of mild steel	8 mm															
Cutting of steel flats	12x80 mm															
Cutting of round bars	20 mm															
Cutting of square bars	18x18 mm															
Cutting of angle section	6x50 mm.															

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

117

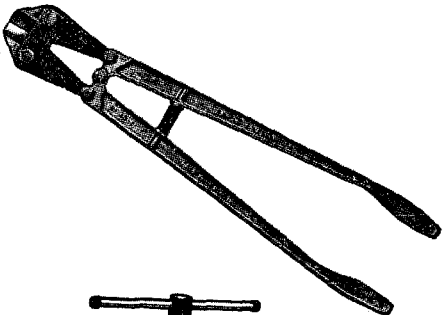
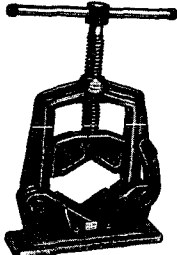
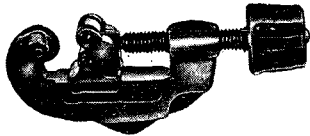

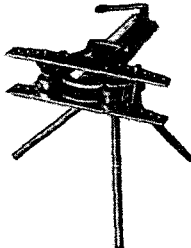


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.11	<p>BOLT CUTTER - 16 MM</p> <p>chrome vanadium or forged alloy steel, with clipper cut jaws.</p> <p>Approx. capacity: 16 mm Approx. length: 900 mm.</p>	4	F M I C	
109.4.12	<p>PIPE VICE, SELF-LOCKING</p> <p>of cast-iron, bench mounting; self-locking, hinged; for pipes of dia. from 1/2 to 2 inch; jaws from tool steel.</p>	2	M I C *	
109.4.13	<p>PIPE CUTTER</p> <p>for cutting Bergman's pipe and plastic PVC pipe.</p> <p>Capacity: up to 28 mm. Length: 200 mm.</p>	2	M I C *	
109.4.14	<p>PIPE CUTTER, 50 mm</p> <p>with one fast cutting wheel and two rollers; to cut steel conduits with outside dia. from 10 to 50 mm.</p>	2	M I C	
109.4.15	<p>PORTABLE CONDUIT BENDER</p> <p>mounted on stand for bending steel conduit pipes from 5/8 to 1 1/4 inch dia.; complete with all formers and accessories.</p>	2	M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 118</p>

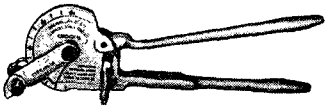
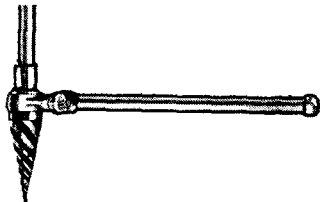
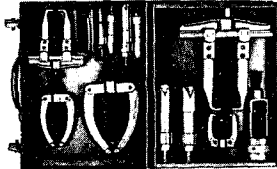
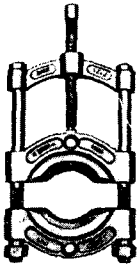
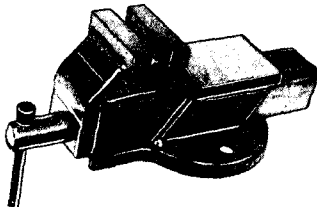


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.16	<p>PIPE-BENDING PLIERS</p> <p>for bending pipes with bore dia. 11, 13, 16, 23, 29 and 36 mm.</p>	16	M I C *	
109.4.17	<p>PIPE REAMER</p> <p>ratchet type, for pipes up to 1 1/2 inch - 38 mm.</p>	16	M I C *	
109.4.18	<p>BEARING PULLER</p> <p>universal set in metal box with 2 and 3 armed pullers and arms for external and internal use; for use on work from approx. 10 mm to 20 mm dia.</p>	2	F M *	
109.4.19	<p>SEPARATOR</p> <p>bearing puller attachment for use with twin grip pullers.</p> <p>Capacity: from 30 to 200 mm piece.</p>	2	F M *	
109.4.20	<p>BENCH VICE</p> <p>Plain screw type, rigid design, body and sliding jaw made of drop forged steel; quick-release action; steel jaw plates interchangeable.</p> <p>Size of jaws: 120 x 80 mm Opening 140 mm.</p> <p>Complete with :</p> <ul style="list-style-type: none">- one pair of copper grips- one pair of lead grips- one pair of fibre grips.	16	F M I C	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 119</p>

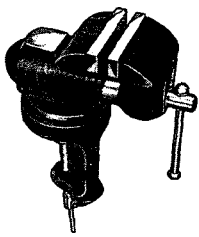
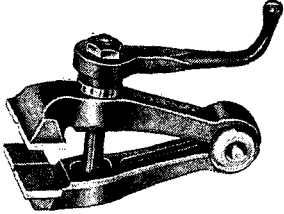

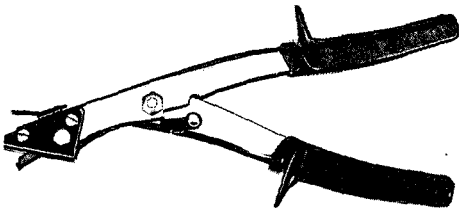


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.21	G-CLAMP SWIVEL VICE Approx. specifications: - 360 deg.C swivel vice - jaw width about 60 mm - jaw opening about 40 mm - G-clamp throat max. size about 70 mm.	16	F M I C *	
109.4.22	HAND VICE cast tool steel, wide jaws with prisme. Length: 130 mm Width of jaws: approx. 50 mm Capacity: 35 mm span.	16	F M I C *	
109.4.23	HAND HELD PIN VICE made from steel: - jaw width 20 mm - opening 8 mm - overall length about 125 mm.	16	F M I C	
109.4.24	SHEETMETAL CUTTER - NIBBLER for profile or straight cutting on sheet metal up to 1,2 mm thickness without distorting the edges or surfaces; nibbling type with interchangeable blades; plastic coated handles with spring and locking lever. Approx. length: 265 mm.	16	F M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item		Page 120


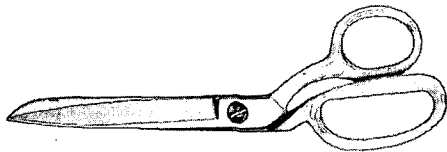
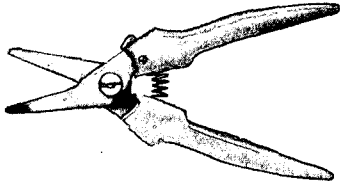




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.25	<p>TINMEN'S SNIPS, STRAIGHT 300 MM</p> <p>for sheet metal, right hand, straight blades, open end handles, hardened steel, polished blades.</p> <p>Approx. length 300 mm.</p>	16	F M I C *	
109.4.26	<p>INDUSTRIAL SCISSORS, 210 MM</p> <p>general purpose; made from hardened carbon steel; cross over cutting action and bevelled blades.</p> <p>Approx. overall length: 210 mm</p>	16	F M I C *	
109.4.27	<p>SHEARS, 190 MM</p> <p>general purpose, for cutting wires, metal shim, plastic, card, paper and fabrics; one blade serrated, with spring return and a safety catch to lock jaws closed.</p>	16	F M I C *	
109.4.28	<p>TRIMMING KNIFE, 160 MM</p> <p>a retractable blade for cutting and scoring copper boards, plastics, etch transfers, drafting films, labels, etc.</p> <p>Approx. overall length: 160 mm.</p> <p>Complete with:</p> <ul style="list-style-type: none">- a set of five heavy duty blades stored in the handle- two sets of replacement blades.	16	F M I C *	 
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 121</p>

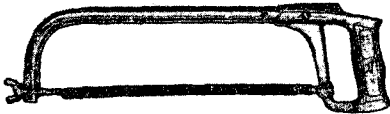

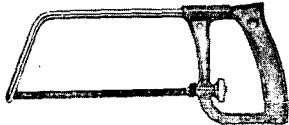



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.29	HACKSAW FRAME - 300 MM shaped handle with metal frame, supplied with one saw blade. Size of blade 300 mm.	16	F M I C *	
109.4.29A	HACKSAW BLADE - 18 TPI For hand use, flexible type, made of low tungsten, steel or HSS size: 300 x 13 x 0.65 mm medium pitch 18 t.p.i.		F M I C *	
109.4.29B	HACKSAW BLADE - 24 TPI for hand use, flexible type, made of low tungsten steel or HSS, Size: 300 x 13 x 0.65 mm Medium pitch: 24 t.p.i.		F M I C *	
109.4.29C	HACKSAW BLADE, 32 TPI For hand use, flexible type, made of low tungsten, steel or HSS size: 300 x 13 x 0.65 mm fine pitch: 32 t.p.i.		F M I C *	
109.4.30	JUNIOR HACKSAW, 230 MM adjustable tension, 150 mm long conventional hacksaw blades. Complete with 50 spare blades.	16	F M I C *	
109.4.30A	HACKSAW BLADES, 150 MM for junior hacksaw. Pack of 10 pcs.		F M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 122







Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.31	<p>HAND SAW CROSS CUT</p> <p>skewback, hardened and tempered chrome vanadium steel blade, high impact polystyrene or polished hardwood handle, solid brass screws.</p> <p>Approx. dimensions: Blade length: 600 mm Teeth points per inch: 7.</p>	16	F M I C *	
109.4.32	<p>COMPASS SAW</p> <p>tungsten alloy steel blade, tapered blade, filed and set teeth, polished wooden or plastic handle.</p> <p>Approx. dimensions: Overall length: 400 mm Blade length: 300 mm.</p>	16	F M I C *	
109.4.33	<p>SCREWDRIVER, 2.5 x 60 MM</p> <p>with insulated transparent shaft and splitproof plastic handle, chrome vanadium round blade.</p> <p>Approx. sizes: Length of blade: 60 mm Width of tip: 2.5 mm.</p>	16	F M I C *	
109.4.34	<p>SCREWDRIVER, 3 x 80 MM</p> <p>with insulated transparent shaft and splitproof plastic handle, chrome vanadium round blade.</p> <p>Approx. sizes: Length of blade: 80 mm Width of tip: 3 mm.</p>	16	F M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 123</p>




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.35	<p>SCREWDRIVER INSULATED 4x100 MM</p> <p>chrome vanadium steel, nickel plated, parallel tip with plastic insulated blade and plastic handle.</p> <p>Approx. sizes: Width of tip: 4 mm Length of blade: 100 mm.</p>	16	F M I C *	
109.4.36	<p>SCREWDRIVER 6 x 125 MM</p> <p>chrome vanadium steel, nickel-plated, with flared tip and plastic handle.</p> <p>Approx. sizes: Width of tip: 5 mm Length of blade: 125 mm.</p>	16	F M I C *	
109.4.37	<p>SCREWDRIVER 8 x 150 MM</p> <p>chrome vanadium steel, nickel-plated, with flared tip and plastic handle.</p> <p>Approx. sizes: Width of tip: 8 mm Length of blade: 150 mm</p>	16	F M I C *	
109.4.38	<p>SCREWDRIVER 10 x 175 MM</p> <p>chrome vanadium steel, nickel plated, with flared tip and plastic handle.</p> <p>Approx. sizes: Width of tip: 10 mm Length of blade: 175 mm.</p>	16	F M I C *	
109.4.39	<p>SCREWDRIVER 12 x 200 MM</p> <p>chrome vanadium steel, nickel plated, with flared tip and plastic handle.</p> <p>Approx. size: Width of tip: 12 mm Length of blade: 200 mm.</p>	16	F M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 124</p>

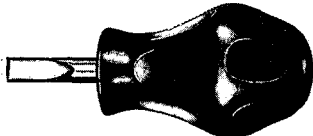





Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.40	<p>SCREWDRIVER 6 x 25 MM</p> <p>chrome vanadium steel, nickel plated, "chubby" type with flared tip and plastic handle.</p> <p>Approx. size: Width of tip: 6 mm Length of blade: 25 mm.</p>	16	F M I C *	
109.4.41	<p>SCREWDRIVER, TESTING</p> <p>for voltage testing, flat nose, plastic handle, insulated blade, with neon light.</p> <p>Approx. specifications: Testing voltage: 100-440 V Width of tip: 3 mm Length of blade: 120 mm.</p>	16	F M I C *	
109.4.42	<p>SCREWDRIVER, PHILLIPS No.1</p> <p>with insulated and split-proof handle. Size No.1.</p>	16	F M I C *	
109.4.43	<p>SCREWDRIVER PHILLIPS No.2</p> <p>chrome vanadium steel, nickel plated, size No. 2.</p> <p>Approx. length of blade: 100 mm.</p>	16	F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item



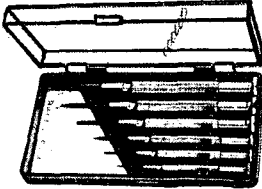



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.44	<p>SCREWDRIVER, PHILLIPS No.3</p> <p>chrome vanadium steel, nickel plated, with Phillips head no. 3 and plastic handle.</p> <p>Approx. length of blade: 150 mm.</p>	16	F M I C *	
109.4.45	<p>SCREWDRIVER, PHILLIPS No. 4</p> <p>chrome vanadium steel, nickel plated, with Phillips head no.4 and plastic handle.</p> <p>Approx. length of blade: 200 mm.</p>	16	F M I C *	
109.4.46	<p>SCREWDRIVER SET</p> <p>watchmakers, solid knurled brass bodies, blades from hardened tool steel, set containing 6 pieces, 0.8 to 3.6 mm, complete with case.</p>	16	F M I *	
109.4.47	<p>SCREWDRIVER SET, OFF-SET</p> <p>"Off-Set" with flat tips.</p> <p>Set of 4 pieces with 4, 6, 8 and 12 mm wide blades.</p>	16	F M I *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 126</p>

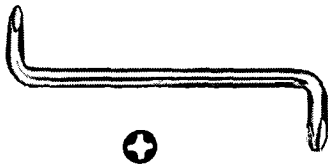
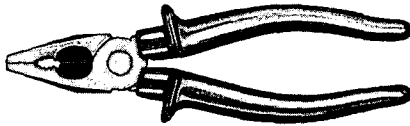
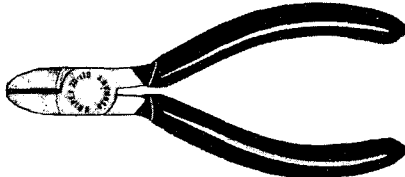
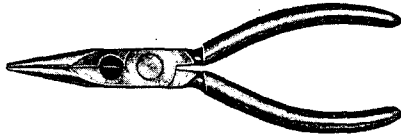


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.48	<p>SCREWDRIVER SET, PHILLIPS, OFF-SET</p> <p>set of 2 off-set screwdrivers, chrome vanadium steel, nickel plated, with the following Phillips head No.: 1, 2, 3 and 4.</p> <p>Approx. length: 125 mm.</p>	16	F M I *	
109.4.49	<p>COMBINATION PLIERS</p> <p>chrome vanadium or forged alloy steel, with pipe grip and side cutter, serrated jaws and polished head, plastic insulated handles.</p> <p>Approx. length: 160 mm.</p>	16	F M I C *	
109.4.50	<p>DIAGONAL CUTTING PLIERS</p> <p>suitable for cutting hard wire; PVC insulated handles.</p> <p>Length: 160 mm.</p>	16	F M I C *	
109.4.51	<p>FLAT NOSE PLIERS</p> <p>with serrated jaws; PVC insulated handles; length 160 mm.</p>	16	F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page
127

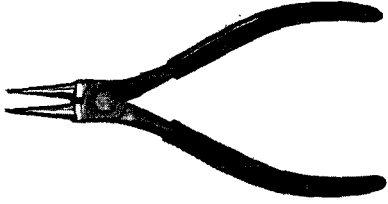
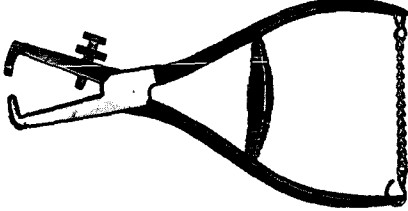



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.52	<p>ROUND NOSE PLIERS</p> <p>non-cutting type; PVC insulated handles. Approx. length: 125 mm - 160 mm.</p>	16	F M I C *	
109.4.53	<p>WIRE STRIPPING PLIERS</p> <p>standard wire end stripping pliers, with return spring and adjusting screw to fit the required wire diameter up to max. 4 mm.</p> <p>Approx. length: 160 mm.</p>	16	F M I C *	
109.4.54	<p>WATER PUMP PLIERS - 240 MM</p> <p>chrome vanadium or forged alloy steel, chrome plated with pipe grip, serrated jaws, slip joint with curved interlocking channels.</p> <p>Approx. capacity: 40 mm Approx. length: 240 mm.</p>	16	F M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 128</p>


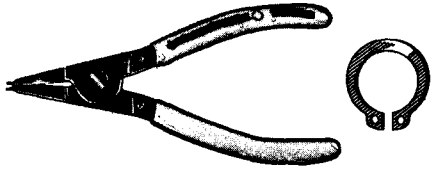
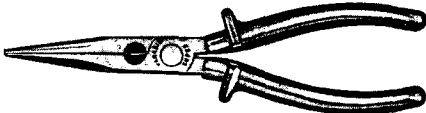
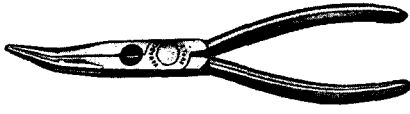


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.55	<p>CIRCLIP PLIERS SET, INTERNAL</p> <p>consisting of:</p> <ul style="list-style-type: none">- straight, for internal circlips up to 30 mm- straight, for internal circlips up to 80 mm.	16	F M F *	
109.4.56	<p>CIRCLIP PLIERS SET, EXTERNAL</p> <p>consisting of:</p> <ul style="list-style-type: none">- straight, for external circlips up to 30 mm- straight, for external circlips up to 80 mm.	16	F M I *	
109.4.57	<p>LONG CHAIN-NOSE PLIERS, STRAIGHT</p> <p>serrated jaws of approx. 75 mm long, with side cutter; total approx. length 200 mm.</p>	16	F M I C *	
109.4.58	<p>LONG CHAIN NOSE PLIERS 200 MM CURVED</p> <p>chrome vanadium or forged alloy steel, long serrated jaws, nose curved to 45 deg., with side cutter.</p> <p>Approx. length 200 mm.</p>	16	F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page
129







Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.59	SCRIBER single ended. Approx. 5 mm dia. Length: 115 to 185 mm.	16	F M I C *	
109.4.60	AUTOMATIC CENTRE PUNCH, 120 MM	16	F M I C	
109.4.61	CENTRE PUNCH - 125 MM chrome vanadium or cast steel, octagonal or round type. Approx. size: Dia. of shank: 10 mm Length: 125 mm.	16	F M I C	
109.4.62	PUNCH SET set of 6 punches with straight shaft; sizes 2, 3, 4, 5, 6, 8 mm dia; 120 mm long, in stand.	16	F M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 130

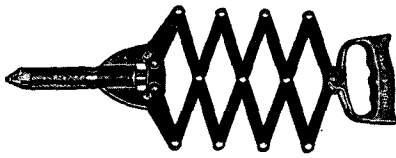
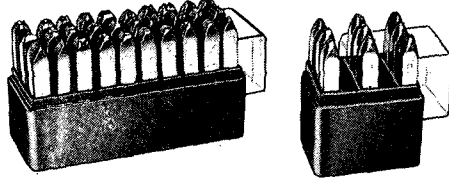




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.63	<p>RIVET PUNCH SET, 2 TO 10 MM</p> <p>of hardened steel, combined set-up and snap.</p> <p>Complete set from 2 to 10 mm in 1 mm steps.</p>	16	F M I	
109.4.64	<p>MARKING PUNCHES, ALPHA-NUMERICAL, SET</p> <p>for permanent identification, marking of instrument panels, machine frames, tools etc. Consisting of alphabetical (A to Z and &) and numerical (0 to 9) set. Character height 3 mm; complete with boxes.</p>	4	F M I C *	
109.4.65	<p>SCREW EXTRACTORS SET</p> <p>set of 6, tapered spiral type, to remove broken screws.</p> <p>Approx. dia. 3 to 20 mm.</p>	16	F M I *	
109.4.66	<p>OPEN-ENDED SPANNERS 6 TO 32 MM</p> <p>metric, double-ended type, chrome-vanadium; set comprising 12 spanners from 6 to 32 mm, with holder.</p>	16	F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

131

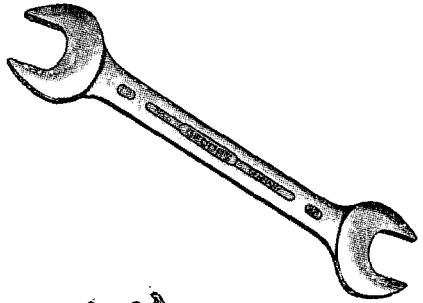
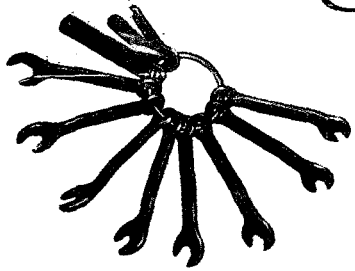
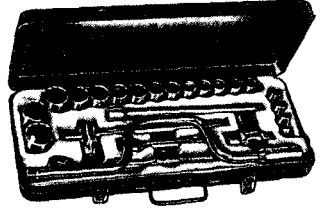


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.67	<p>OPEN-ENDED SPANNER SET, WHITWORTH</p> <p>imperial, double-ended type, chrome-vanadium.</p> <p>set comprising 16 spanners from 1/4 inch to 1 1/2 inch, with holder.</p>	16	F M I C	
109.4.68	<p>MAGNETO SPANNER SET 4 TO 7.5 MM</p> <p>set of 8 open-ended magneto spanners from 4 to 7.5 mm in 0.5 mm steps fitted to a key ring, nickel plated, complete with feeler gauge, ignition file and screwdriver.</p>	16	F M I C *	
109.4.69	<p>SOCKETS - WRENCH SET</p> <p>metric, chrome-vanadium; set comprising reversible ratchet, speeder brace, joint nut spinner, sliding "T" bar, universal joint, extension bar and 19 sockets from 6 to 22 mm.</p>	16	F M I C	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

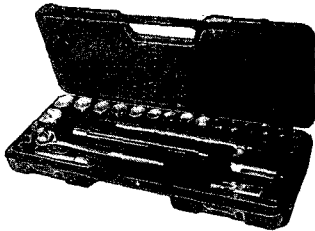
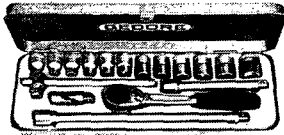
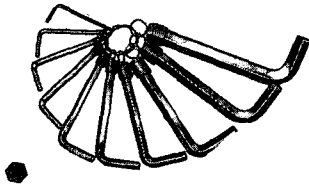
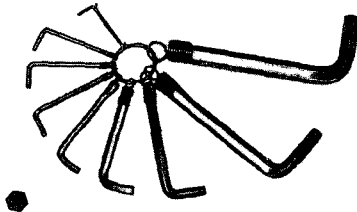


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.70	SOCKET SET, 3/6 TO 7/8 INCH chrome-vanadium; set comprising reversible ratchet, speeder brace, joint nut spinner, sliding 'T'-bar, universal joint, extension bar and 16 sockets from 3/16 to 7/8 inch. In steel case.	16	F M I C	
109.4.71	SOCKETS-METRIC chrome-vanadium; set comprising ratchet handle, swivel handle, extension bars and 11 sockets from 4 to 13 mm.	16	F M I C	
109.4.72	ALLEN KEY SET 2 TO 10 MM set of 10 hexagonal Allen keys from 2 to 10 mm, chrome vanadium steel, fitted on key ring or supplied in plastic wallet.	16	F M I C *	
109.4.73	ALLEN KEY SET 3/64 TO 1/4 INCH AF set of 9 hexagonal Allen keys from 1/16 to 1/4 inch AF, chrome vanadium steel, fitted on key ring or supplied in plastic wallet.	16	F M I C	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

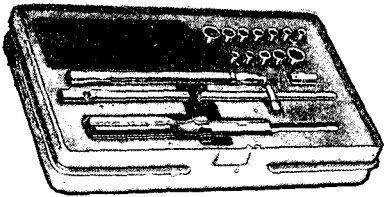



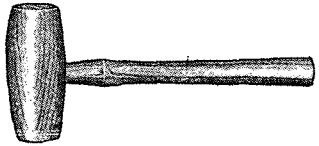


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant	Use	Illustration
109.4.74	<p>SOCKET SPANNER SET</p> <p>metric, chrome vanadium, 16 hexagonal sockets with handle and medium long shaft.</p> <p>Sizes: 3 to 17 mm.</p>	16	F M I C	
109.4.75	<p>RIVETTING HAMMER, 500 G</p> <p>forged and tempered steel head with handle.</p> <p>Approx. weight: 500 g.</p>	16	F M I C	
109.4.76	<p>BALL PEIN HAMMER, 500 G</p> <p>forged and tempered steel head, polished face and pein, with handle.</p> <p>Approx. weight 500 g.</p>	16	F M I C *	
109.4.77	<p>BALL PEIN HAMMER, 150 G</p>	16	F M I C *	
109.4.78	<p>TINMAN'S MALLET, 50 MM DIA</p> <p>boxwood, with wooden handle.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- dia: 50 mm- weight: 350 g- length of handle: 300 mm.	16	I C	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 134</p>

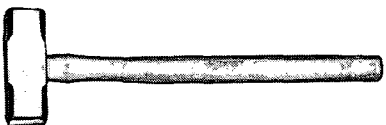

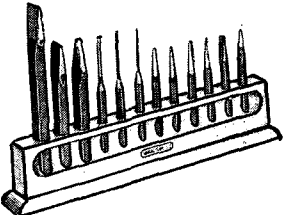




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.79	<p>COPPER HAMMER, 2 KG</p> <p>double-faced, with wooden handle.</p> <p>Weight of head: 2 kg.</p>	16	I C	
109.4.80	<p>SOFT HAMMER, 750 G</p> <p>with plastic tips, dia. 50 mm, with ash handle.</p> <p>Approx. weight: 750 g.</p>	16	I C	
109.4.81	<p>CHISEL SET</p> <p>consisting of:</p> <ul style="list-style-type: none"> - cold chisel 150 x 18 mm - cold chisel 180 x 25 mm - cross cut chisel 150 x 7 mm - diamond point chisel 150 x 5 mm - hand punches 120 x 3 mm - centre punches 120 x 1.5 mm. <p>In stand.</p>	16	F M I C *	
109.4.82	<p>STAR DRILL SET</p> <p>for drilling holes in tough concrete;</p> <p>containing:</p> <ul style="list-style-type: none"> - drill dia. 15 mm, 300 mm long - drill dia. 20 mm, 400 mm long. 	16	I C *	
109.4.83	<p>MASONRY DRILL SET</p> <p>for drilling holes in masonry walls;</p> <p>containing:</p> <ul style="list-style-type: none"> - drill dia. 15 mm, 300 mm long - drill dia. 20 mm, 300 mm long - drill dia. 30 mm, 500 mm long. 	16	I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

135

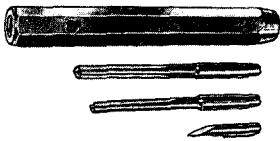
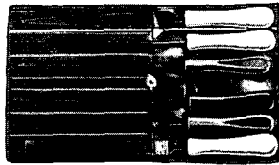
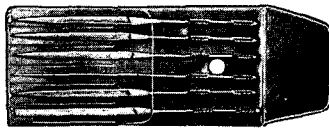




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.84	MASONRY DRILL SET drills from 4 to 10 mm, with handle and metal or plastic case.		I C *	
109.4.85	FILE SET - 250 MM hand files with plastic or wooden handles, for general use, double cut, 250 mm long; set consisting of 6 files: - flat, second cut - flat, smooth cut - half-round, second cut - half-round, smooth cut - round, second cut - round, smooth cut.	16	F M I C *	
109.4.86	NEEDLE FILE SET of six files (hand, square, warding, half-round, three-square and round) in plastic wallet. Approx. length: 140 mm Complete with handles.	32	F M I C *	
109.4.87	TRIANGULAR SCRAPER engineers' type, all cutting edges forged and ground, with handle. approx. length of blade: 200 mm.	16	I C	
109.4.88	TWEEZERS for instrument makers; nickel-plated; broad section with fine points; overall length 75 - 130 mm.	16	F I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

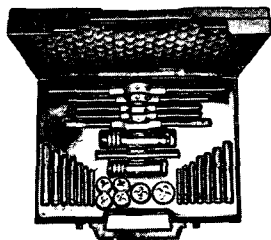
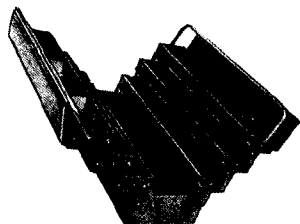
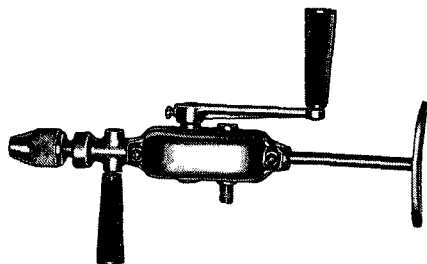
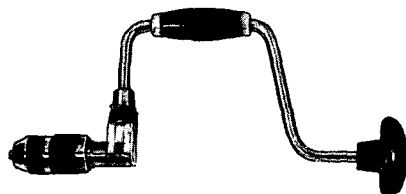
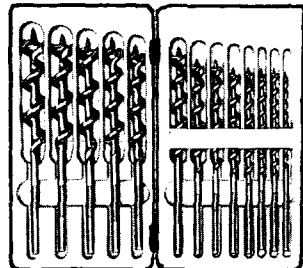


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.89	<p>DIES AND TAPS SET - M4 TO M12</p> <p>set of 6 metric-standard, circular split pattern, HSS; containing: taper, second and bottoming taps, dies, die-stocks and tap wrenches, supplied in case.</p> <p>Sizes: M4, M5, M6, M8, M10 and M12.</p>		F M I C *	
109.4.90	<p>TOOLBOX</p> <p>made from sheet-metal, with three compartments, tubular handles and locking catch for padlock.</p> <p>Approx. dimensions: Length: 500 mm Width: 200 mm Height (excl. handles): 180 mm.</p>	16	F M I C *	
109.4.91	<p>HAND DRILL, 10 MM</p> <p>breast type, enclosed gears, two-speed model, adjustable crank, supporting handle, self-centering chuck.</p> <p>Capacity: 10 mm.</p>	16	I C *	
109.4.92	<p>RATCHET BRACE, 200 MM, SWEEP</p> <p>open type, twelve-point ratchet, fitted with universal jaws and self-centring chuck.</p> <p>Approx. sweep: 200 mm.</p>	16	I C *	
109.4.92A	<p>AUGER BITS SET, 3 TO 30 MM DIA</p> <p>13 pieces in a box: bits of 3, 6, 8, 10, 12, 15, 18, 20, 22, 24, 26, 28 and 30 mm dia.</p>	16	I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page

137

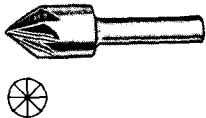







Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.92B	ROSEHEAD COUNTERSINK BIT 90 deg. cutting angle; approx. outside dia. 18 mm.	16	I C *	
109.4.93	COMBINATION CENTRE DRILL SET three pieces with 60 deg. countersinks 4, 6 and 8 mm outside dia. Complete with 1, 2 and 3 mm pilot drills.	16	F M I C	
109.4.94	FILECARD BRUSH with wooden handle. Approx. length: 225 mm.	16	F M I C *	
109.4.95	STEEL BRUSH medium size with wooden handle for normal cleaning of corrosive metal parts; semi-hard. Approx. 300 x 50 mm.	16	F M I C	
109.4.96	BENCH BRUSH - 300 mm hand broom, black fibre or nylon bristles, for workbench machines and work surfaces cleaning. Approx. length: 300 mm	16	F M I C *	
109.4.97	PAINT BRUSH SET Set of 4 pieces, flat; Approx. widths: 15, 20, 25 and 40 mm	16	F M I C	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 138

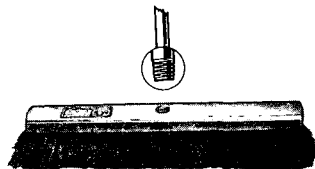

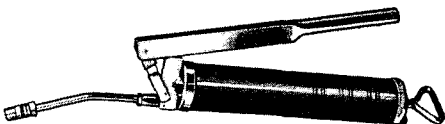
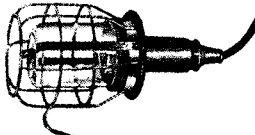
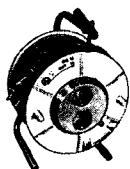


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.98	DUSTING BRUSH 10 to 20 mm dia of a handle. Approx. size: 400 x 50 mm Length of bristle: approx. 70 mm.	16	F M I C	
109.4.99	OIL CAN - 0.25 l for lubricants, fitted with force feed pump, fixed detachable spout. Approx. capacity: 0,25 l.	16	F M *	
109.4.100	GREASE GUN - LEVER TYPE standard hand-operated lever type, for use with grease in bulk; complete with hydraulic connector on curved delivery tube. Approx. specifications: Capacity: 450 g Pressure: 50.0 MPa Length of tube: 200 mm.	2	F M	
109.4.101	PORTABLE LAMP moisture-proof with heavy protection against mechanical damage; suitable for 100 W screw-type bulbs with 6 to 8 m of cable.	8	F M I C	
109.4.102	CABLE WINDER extension cable enclosed in case, 2 earthed sockets, fast rewind by means of a handle, 3 cores rubber insulated cable with main plug, supplied with 6 spare plugs. Approx. specifications: Cable: 3 x 2,5 mm Cable length: 30 m Max. load: 20 A.	16	F M I C	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page
139




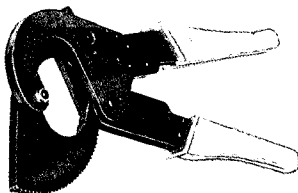




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.103	CABLE KNIFE with one folding steel blade 120 mm long.	16	I C *	
109.4.104	PLUMBER'S KNIFE with safety stag handle and carbon steel blade. Approx. length: 140 mm.	16	I C *	
109.4.105	SHEATH-CUTTING KNIFE to cut the outer sheath on PVC or rubber insulated cables; adjustable blade. Complete with 5 spare blades.	16	I C *	
109.4.106	CABLE CUTTER for rubber and PVC insulated cables with an overall dia. of up to 30 mm.	16	I C *	
109.4.107	STEEL SPIRAL SET for bending rigid PVC conduit; to fit conduits from 11 to 29 mm dia.	4	I C *	
109.4.108	LEAD DRESSER boxwood with face sizes 200 x 50 mm. Approx. 200 g.	16	C	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 140

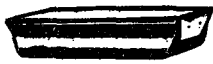

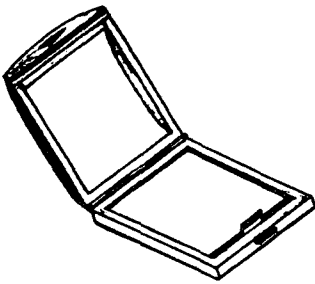
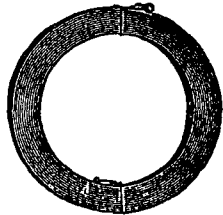
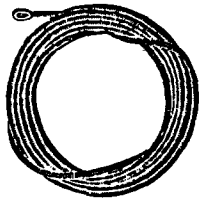
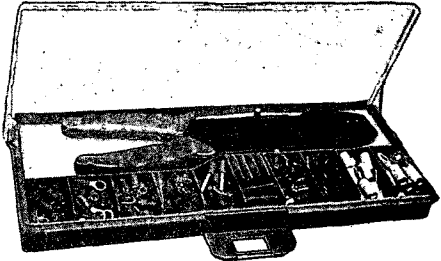


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.109	PLUMBERS WIPER superfine, best quality moleskin. Approx. 100 x 75 mm.	16	C *	
109.4.110	SCRAPER/SHAVE HOOKS for material cleaning, triangle type. Width of blade: 50 mm.	16	C *	
109.4.111	PLUMBER'S MIRRORS, SET consisting of one magnifying and a normal one; each in a metal frame. Approx. size of each: 175 x 100 mm.	16	C *	
109.4.112	DRAW-IN TAPE steel tape for drawing wires into conduit. Length: 10 m Width: 3 mm	16	I C *	
109.4.113	DRAW-IN SPIRAL steel spiral for drawing wires into pipes. Length: 20 m	16	I C *	
109.4.114	CRIMPING SET complete with pliers and assortment of terminals of various shapes and sizes (about 100 pcs).	16	F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

141

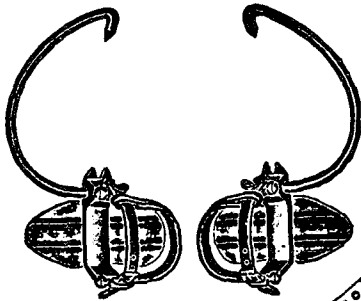
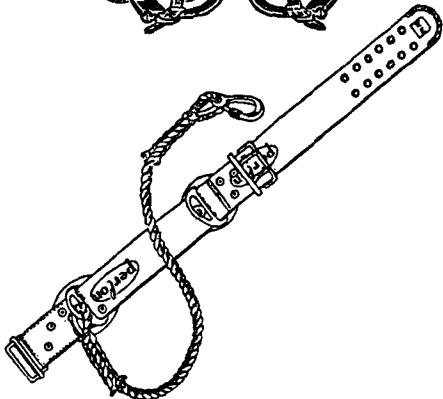
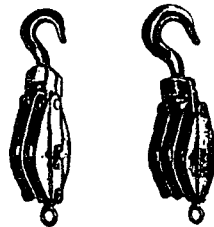
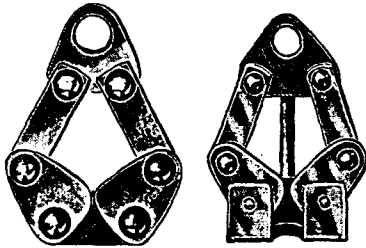


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.115	CLIMBING IRONS for climbing wooden overhead line poles.	16	M I C *	
109.4.116	LINESMAN'S SAFETY BELT for work on overhead lines; made from finest leather, with adjustable D-ring. Complete with: - nylon line 20 m - safety rope and locable hook. Should meet recognized safety standards.	16	M I C *	
109.4.117	LINESMAN'S BLOCK AND FALLS SET standard set consisting of a pair of 2 and 3 sheave galvanised pulleyblocks fitted with 30 m rope.	16	M I C *	
109.4.118	DRAW TONG, PAIR medium type; to grip wires up to 50 square mm.	16	M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item		Page 142

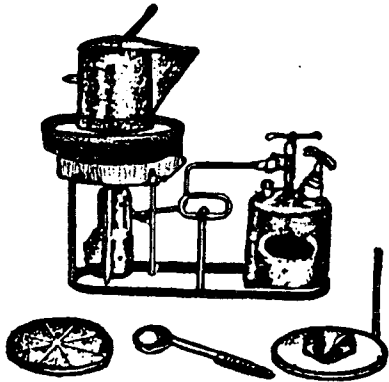
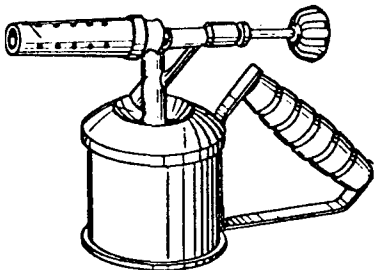
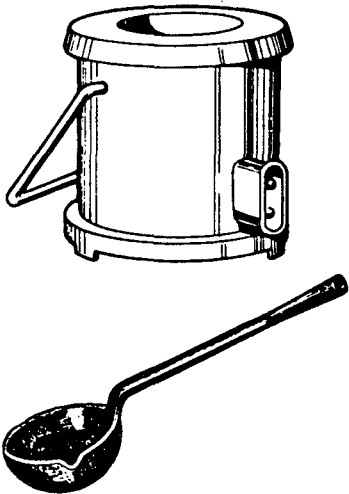


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.119	<p>PORTABLE FURNACE SET</p> <p>paraffin-operated for cable jointers.</p> <p>Complete with:</p> <ul style="list-style-type: none">- melting pots for solder and bitumen- two ladles- bitumen bucket with lid and false bottom- operating instruction.	2	C	
109.4.120	<p>BLOWLAMP, 0.75 L</p> <p>for use with petrol or paraffin, fitted with "ever-cool" handle, built-in safety devices and automatic nozzle cleaning.</p> <p>Approx. capacity: 0,75 l.</p> <p>Operating instructions.</p>	16	C *	
109.4.121	<p>SOLDERING POT, ELECTRIC</p> <p>for melting of solder; round; approx. capacity 5 kg.; supplied with two ladles for soldering purposes. Electric heater approx. 600 W; Complete with cable and one spare heating element. Operating instructions.</p>	2	C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item


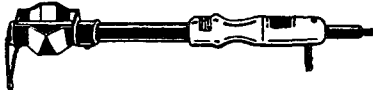




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.122	MELTING POT, ELECTRIC for bitumen; approx. capacity 7 to 8 kg; with handle and pouring spout. Electric heater approx. 600 W; complete with cable and one spare heating element. Operating instructions.	2	C *	
109.4.123	SOLDER BATH, ELECTRIC contents: 25 to 50 ccm, power, approx. 250 W. Complete with cable and 2 spare elements.	16	C *	
109.4.124	SOLDERING IRON - 400 G non electric; straight with hammer bit; 400 g with wooden handle.	16	C *	
109.4.125	SOLDERING IRON, 30 W with straight copper bit; for instrument repair; plastic handle; 30 W; complete with cable, 2 spare bits and 2 spare elements.	16	F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page
144

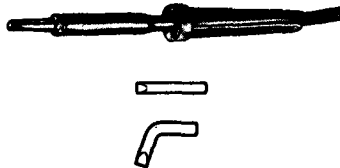
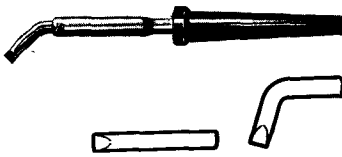

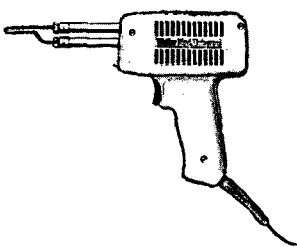


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.126	<p>SOLDERING IRON - 100 W</p> <p>electric, with insulated plastic handle and interchangeable angle bit for general use; supplied with approx. 1,5 m 3-core main cable and two spare bits.</p> <p>Approx. power: 100 W.</p>	16	F M I C *	
109.4.127	<p>SOLDERING IRON - 300 W</p> <p>electric, with insulated plastic handle and interchangeable angle bit for general use, supplied with approx. 1,5 m 3-core main cable and two spare bits.</p> <p>Approx. power: 300 W.</p>	4	F M I C	
109.4.128	<p>SOLDERING IRON - 450 W</p> <p>electric with oval tapered copper bit for cable jointer; plastic handle; 450 W.</p>	2	F M I C	
109.4.129	<p>SOLDERING GUN - 80W</p> <p>quick-heating transformer-action; with illumination lamp; approx. 80 W; complete with cable and 2 spare bits.</p>	16	F M I C *	
109.4.130	<p>HOLDER</p> <p>for soldering irons of any size.</p>	16	F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

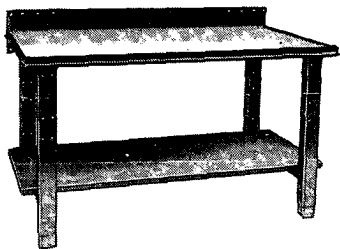
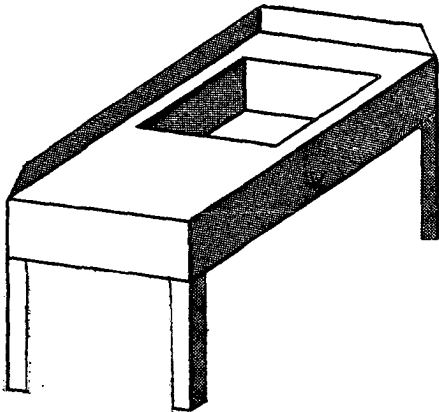
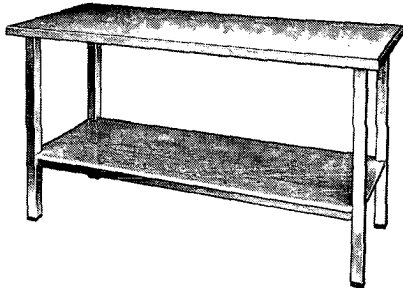


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.131	<p>TABLE, 2000 x 1000 x 500 MM</p> <p>for coil winding and disassembling/assembling of electrical machines; strong steel construction with 5 mm thick steel top with fixing rings will be mounted on the corners of the table.</p> <p>Approx. dimensions: Length: 2000 mm Width: 1000 mm Height: 500 mm.</p>	4	F *	
109.4.132	<p>CLEANING BENCH</p> <p>steel sheet metal construction with basin, false bottom, drainage and splash guard; for cleaning metal parts with kerosene or diesel oil.</p> <p>Approx. dimensions: 1200 mm long, 700 mm wide and 800 mm high; dimensions of basin: 400 x 600 x 200 mm.</p>	1	F *	
109.4.133	<p>EXPERIMENT TABLE, 1600x800x800 MM</p> <p>strong steel pipe or wooden construction, with plastic or rubber top.</p> <p>Approx. dimensions: length 1600 mm depth 800 mm height 800 mm.</p>	8	F M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 146</p>

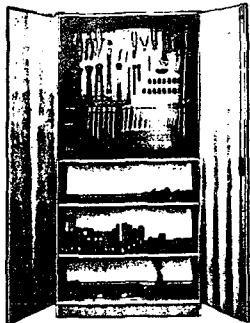

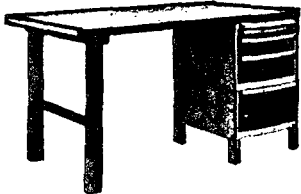
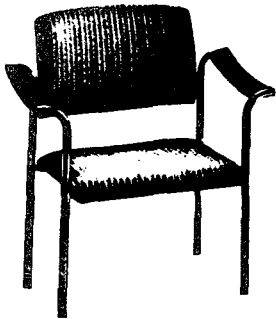
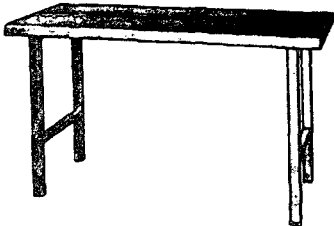


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.134	<p>TOOL STORAGE CABINET</p> <p>metal construction, with drawers for drills and other small tools.</p> <p>Approx. dimensions:</p> <ul style="list-style-type: none">- height 2000 mm- depth 400 to 500 mm- width 1000 mm.	8	F M I C	
109.4.135	<p>MATERIAL STORAGE CABINET</p> <p>metal construction with 6 shelves and 2 lockable doors.</p> <p>Approx. dimensions:</p> <ul style="list-style-type: none">Height 2000 mmDepth 400 mmWidth 1000 mm.	8	F M I C	
109.4.136	<p>INSTRUCTOR'S DESK</p> <p>metal construction with plastic or rubber top and 3 drawers on one side.</p> <p>Approx. dimensions:</p> <ul style="list-style-type: none">Length: 1000 to 1200 mmDepth: 600 to 700 mmHeight: 800 mm.		F M I C	
109.4.137	<p>OFFICE INSTRUCTOR'S CHAIR</p> <p>Strong metal construction with arm rests. Plastic or cloth upholstery.</p> <p>Approx. sitting height: 450 mm.</p>		F M I C	
109.4.138	<p>TWO-TRAINEE TABLE</p> <p>heavy duty, laminated surface, for experiments and test equipment.</p> <p>Approx. size of working area: 75 cm x 200 cm.</p> <p>Approx. height: 70 - 80 cm.</p>	8	F M I C	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

147


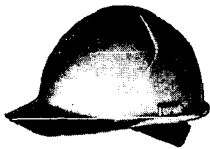

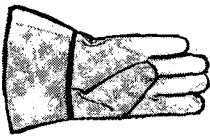
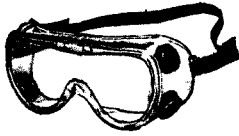


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.139	TRAINEE STOOL stool of heavy steel construction, adjustable height, swivel chair, with castors.	16	F M I C	
109.4.140	SAFETY HELMET Fibre glass, conform to recognized safety standard, with fully adjustable harness with low back strap to ensure a firm fit.	16	F M I C *	
109.4.141	GLOVES, RUBBER, ELECTRICAL WORK heavy duty, tested to suit electrical work.	16	F M I C	
109.4.142	WELDER'S GLOVES pair, chrome tanned leather with waterproof lining.	16	F M I C	
109.4.143	SAFETY SPECTACLES shall be expandable to protect against most eye hazards. Shall fit over prescription glasses.	16	F M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 148

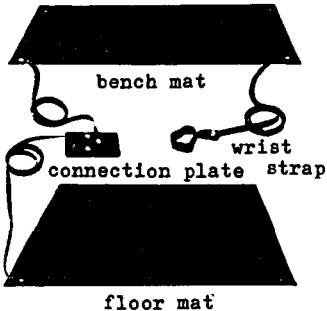


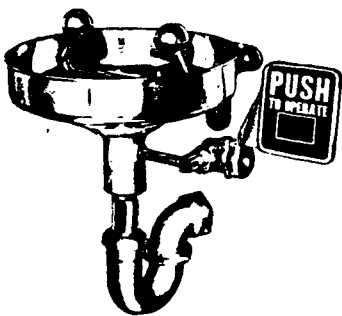


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.144	<p>WORK STATION ANTI-STATIC KIT</p> <p>consisting of bench mat approx. 60 x 120 cm and floor mat (approx. 120 x 120 cm), wrist strap and earthing connecting cables between bench mat, floor mat and on independent earth. Mat surface resistivity about 10000 to 100000 Ohm/square cm.</p>	16	F M I	
109.4.145	<p>FIRST AID KIT</p> <p>suitable for workshop up to 25 people; contents to comply with recommendations of industrial safety commission of the recipient country; contained in double seam welded plastic case, cardboard reinforced.</p> <p>Approx. dimensions of box: 300 x 270 x 100 mm.</p> <p>Note: The project should ensure that the validity of the first aid kit has been certified by a qualified doctor.</p>		F M I C *	
109.4.146	<p>FIRE EXTINGUISHER - CLASS B, E</p> <p>filled with carbon dioxide (CO2) to fight fires of class B and E of materials such as (B) inflammable liquids such as petrol, oil, grease and fat, (E) electrical equipment and computers, refillable.</p> <p>Approx. volume 6 kg, fire size 2.</p>		F M I C *	
109.4.147	<p>EYE WASH UNIT</p> <p>first aid for eyes. Independent from mains water supply unit suitable for at least 3 minutes of eye washing; wall mounted.</p> <p>Water content: 25 l Weight: 4.5-5.0 kg.</p>	1	F M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 149

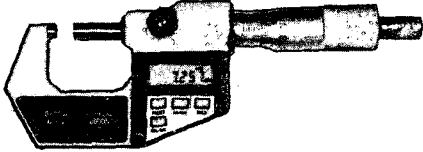


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.148	<p>DIGITAL MICROMETER, 0-25 MM</p> <p>with high accuracy and resolution 0.001 mm. Should include traditional features such as spindle locking clamp, ratchet stop, vernier thimble scale and carbide tipped measuring faces, to ensure use of a micrometer in a conventional manner in case of battery or electronic circuitry failure</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- thimble graduation: 0.01 mm- display accuracy: 0.001 mm- pre-setting to a required reference value- automatic power-off facility <p>Complete with:</p> <ul style="list-style-type: none">- internally fitted battery- one spare battery- safe storage box- adjustable maintenance spanner- instructions manual	16	F I *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item


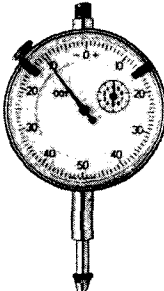
Page
150



Equipment guide list

List number: 9
Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.149	<p>DIGITAL CALIPER, 0-150 MM</p> <p>for accurate inside, outside depth and step measurements.</p> <p>Approx. specifications:</p> <ul style="list-style-type: none">- measuring range: 0 - 150 mm- resolution: 0.01 mm- automatic power-off facility- automatic wear compensation. <p>Complete with:</p> <ul style="list-style-type: none">- safe storage box- fitted battery- one spare replacement battery- instructions sheet.	16	F I *	
109.4.150	<p>DIAL GAUGE, 0-50-0</p> <p>dial and bezel rotatable through 360 deg. for zero setting; spindle rack and pivot of stainless steel; contact point hardened and ground; with fixing lug; supplied in fitted case.</p> <p>Range: 10 mm Graduation: 0.01 mm Reading: 0-50-0 Approx. dial dia: 60 mm.</p>	4	F	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

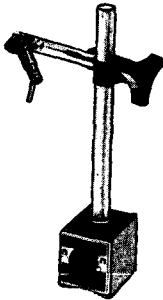

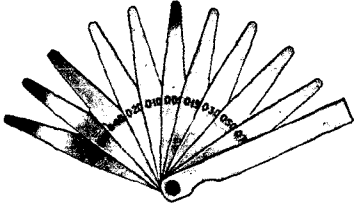



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.151	<p>MAGNETIC BASE FOR DIAL GAUGE</p> <p>permanent magnet type, supplied with adjustable holder, brackets and attachments and fitted in wooden case.</p> <p>Approx. size of base: 80x65x65 mm Approx. dia. of column: 22 mm.</p>	4	F	
109.4.152	<p>RADIUS GAUGE SET</p> <p>convex and concave, from 1 to 25.5 mm radius increasing in 1 mm steps.</p>	2	F	
109.4.153	<p>FEELER GAUGE SET - METRIC</p> <p>set of 13 tapered blades, made from steel, hardened and ground, etched thickness on each blade, folding-in steel case.</p> <p>Approx. length of blades: 100 mm Blade thickness: 0.05 to 1.00 mm in 0.05 mm steps.</p>	16	F	
109.4.154	<p>SCREW PITCH GAUGE SET - METRIC</p> <p>60 deg., 24 blades made from steel, hardened and ground, with folding-in steel case.</p> <p>Range of pitches: 0.25 to 6 mm.</p>	2	F I	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 152</p>


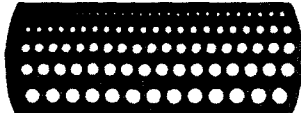

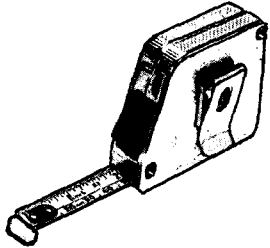


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.155	SCREW PITCH GAUGE SET - BSW, BSF For 55 deg. - threads (BSW and BSF); comprising of 28 blades from 4 to 60 t.p.i.	1	F I	
109.4.156	SCREW PITCH GAUGES SET - BA 12 blades from 0 to 10 B.A.	1	F I	
109.4.157	WIRE GAUGE hardened and tempered steel tool, for measuring dia non-ferous metal wire such as copper, brass, and aluminium.	16	F M I C *	
109.4.158	RULER, 300 MM made from steel, metric.	16	F M I C *	
109.4.159	MEASURING TAPE, 3 M made from steel, metric, scratch resistant epoxy coating, rust-proof, slide lock and automatic return.	16	I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

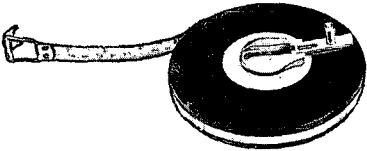
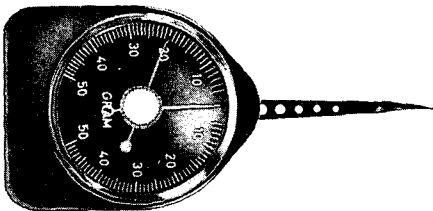
153



Equipment guide list

List number: 9
Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.4.160	STEEL MEASURING TAPE, METRIC - 30 M Stainless steel tape, metallic reel. Metric and inch graduation. Length 30 metres.	8	I C *	
109.4.161	CONTACT SPRING BALANCE - 5 G Approx. range: 0 to 5 g.	16	F M *	
109.4.162	CONTACT SPRING BALANCE-5 TO 50 G Approx. range: 5 to 50 g.	16	F M *	
109.4.163	CONTACT SPRING BALANCE-50 TO 500 G Approx. range: 50 to 500 g.	4	F M	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

SECTION 5 COMPONENTS AND CONSUMABLES

This section deals only with the general purpose first priority consumables, as well as fastening and maintenance products for all set-ups, except for trainers.

The trainers shall be supplied with set(s) of components and consumables usually for two years of operation and their reordering should be done in accordance with a recommended list of components attached to each particular trainer.

The coverage of all existing components is not possible and cannot be satisfactory due to permanent modification of parameters and the appearance on the market of new devices. Therefore, depending upon the aims and level of the project, the list of necessary components must be decided based on latest manufacturers' catalogues.

However, as a general guidance the following groups of devices may be needed by projects: cables, cable accessories, connectors, equipment fuses, indicators, passive components such as resistors and capacitors, of different types and values, relays, solenoids, semiconductors, sensors, special service aids, switches, timers, counters, controllers, transformers and other wound components, conduits, circuit breakers, terminals.

Electrical and electronic components as well as any electronic equipment should be stored in a dry area where the temperature does not change drastically. Storage media parameters are usually given in operation manuals and data sheets.

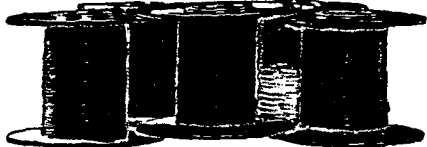



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.1	<p>COPPER WIRE</p> <p>varnish insulated, for winding motor and transformer coils (list to be attached).</p> <p>Note: (1) due to large variety of diameters of wires and specific project needs, the project shall establish a list of necessary wires in accordance with standards and shall show total quantity in reels or (more precise) in weight units.</p> <p>(2) as a general guidance diameters between 0.1 mm and 1.0 - 1.5 mm may be recommended for training purposes for the majority of projects. Wires below 0.1 mm are mainly used in measuring instruments industry and above 1.5 mm in power transformers and industrial motors.</p>		F M *	
109.5.2	<p>RIGID SOLID CONDUCTOR, SET</p> <p>1 mm sq.; a plain annealed copper PVC insulated; for wiring of control and instrument panels, metering equipment, industrial plants wiring etc. Voltage rating: 1000 V. Length 100 m on reel. A set consisting of five reels, each one of different colour: black, blue, red, yellow, green/yellow.</p>		I *	
109.5.3	<p>RIGID SOLID CONDUCTOR, SET</p> <p>1.5 mm sq.; a plain annealed copper PVC insulated for wiring of control and instrument panels, metering equipment, industrial plants wiring etc. Voltage rating: 1000 V. Length 100 m on reel. A set consisting of five reels, each one of different colour: black, blue, red, yellow, green/yellow.</p>		I *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 156</p>





Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.4	<p>RIGID SOLID CONDUCTOR, SET</p> <p>2.5 mm sq. a plain annealed copper PVC insulated; for wiring of control and instrument panels, metering equipment, industrial plants wiring etc. Voltage rating: 1000 V. Length 100 m on reel. A set consisting of five reels, each one of different colour: black, blue, red, yellow, green/yellow.</p>		I *	
109.5.5	<p>RIGID STRANDED CONDUCTOR, SET</p> <p>1.0 mm sq.; a plain annealed copper stranded conductor, PVC insulated; for wiring of control and instrument panels, metering equipment, industrial plant wiring etc. Voltage rating: 1000 V. Length 100 m on reel. A set consisting of five reels, each one of different colour: black, blue, red, yellow, green/yellow.</p>		I	
109.5.6	<p>RIGID STRANDED CONDUCTOR, SET</p> <p>1.5 mm sq. a plain annealed copper stranded conductor, PVC insulated; for wiring of control and instrument panels, metering equipment, industrial plant wiring etc. Voltage rating: 1000 V. Length 100 m on reel. A set consisting of five reels, each one of different colour: black, blue, red, yellow, green/yellow.</p>		I	
109.5.7	<p>RIGID STRANDED CONDUCTOR, SET</p> <p>2.5 mm sq.; a plain annealed copper stranded conductor, PVC insulated for wiring of control and instrument panels, metering equipment, industrial plant wiring etc. Voltage rating: 1000 V. Length 100 m on reel. A set consisting of five reels, each one of different colour: black, blue, red, yellow, green/yellow.</p>		I	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

157




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.8	<p>TWIN SURFACE INSTALLATION CABLE</p> <p>1.0 mm sq.; PVC insulated solid conductors and earth plain copper continuity conductor. For surface wiring of sockets, fittings, etc., installation in wall channels or similar applications. Voltage rating: 500 V. Length 100 m on reel.</p>		I	
109.5.9	<p>TWIN SURFACE INSTALLATION CABLE</p> <p>1.5 mm sq.; PVC insulated solid conductors and earth plain copper continuity conductor. For surface wiring of sockets, fittings, etc., installation in wall channels or similar applications. Voltage rating: 500 V. Length 100 m on reel.</p>		I *	
109.5.10	<p>TWIN SURFACE INSTALLATION CABLE</p> <p>2.5 mm sq., PVC insulated solid conductors and earth plain copper continuity conductor. For surface wiring of sockets, fittings, etc., installation in wall channels or similar applications. Voltage rating: 500 V. Length 100 m on reel.</p>		I *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 158</p>





Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.11	TWIN SURFACE INSTALLATION CABLE 4.0 mm sq., PVC insulated solid conductors and earth plain copper continuity conductor. For surface wiring of sockets, fittings, etc. installation in wall channels or similar applications. Voltage rating: 500V. Length 100 m on reel.		I *	
109.5.12	TRIPLE SURFACE INSTALLATION CABLE 1.0 mm sq., PVC insulated solid conductors and earth plain copper continuity conductor. For surface wiring of sockets, fittings, etc., installation in wall channels for lighting applications. Voltage rating: 500 V. Length 100 m on reel.		I	
109.5.13	TRIPLE SURFACE INSTALLATION CABLE 1.5 mm sq., PVC insulated solid conductors and earth plain copper continuity conductor. For surface wiring of sockets, fittings, etc., installation in wall channels for lighting applications. Voltage rating: 500 V. Length 100 m on reel.		I	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item





Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.14	3-CORE FLEXIBLE MAINS CABLE 0.75 mm sq., voltage rating: 300 V; rubber covered; conductors: tinned copper. For use as an instrument and apparatus supply cable. Length 50 m on reel.		I	
109.5.15	3-CORE FLEXIBLE MAINS CABLE 1.5 mm sq.; voltage rating: 300 V; rubber covered; conductors: tinned copper. For use as an instrument and apparatus supply cable. Length 50 m on reel.		I *	
109.5.16	4-CORE FLEXIBLE MAINS CABLE 0.75 mm sq.,; voltage rating: 500 V; rubber covered; conductors: tinned copper. For use as 3-phase apparatus (motor) supply cable. Length 50 m on reel.		I	
109.5.17	4-CORE FLEXIBLE MAINS CABLE 1.0 mm sq.; voltage rating: 500 V; rubber covered; conductors: tinned copper. For use as 3-phase apparatus (motor) supply cable. Length 50 m on reel.		I	
109.5.18	4-CORE FLEXIBLE MAINS CABLE 1.5 mm sq.; voltage rating: 500 V; rubber covered; conductors: tinned copper. For use as 3-phase apparatus (motor) supply cable. Length 50 m on reel.		I	
Note: Any similarity in above item de- scriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 160

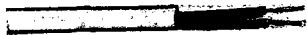
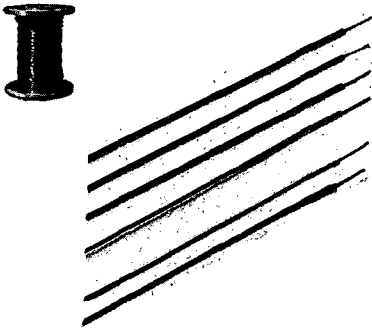


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.19	2-CORE FLEXIBLE MAINS CABLE 0.5 mm sq.; voltage rating: 300 V; PVC covered; conductors: tinned copper. For use as an apparatus supply cable. Length 100 m on reel.		I *	
109.5.20	FLEXIBLE WIRE, SET 0.5 mm sq. highly flexible, stranded, tin-coated copper conductor with PVC insulation. Voltage rating: 500 V. Main application: internal wiring of apparatus. Length 100 m on reel. Set of six reels containing colours: red, black, white, blue, green and yellow.		F M I	
109.5.21	FLEXIBLE WIRE, SET 0.75 mm sq. highly flexible, stranded, tin-coated copper conductor with PVC insulation. Voltage rating 500 V. Main application: internal wiring of apparatus. Length 100 m on reel. Set of six reels containing colours: red, black, white, blue, green and yellow.		F M I	
109.5.22	FLEXIBLE WIRE, SET 1.0 mm sq. highly flexible, stranded, tin-coated copper conductor with PVC insulation. Voltage rating 500 V. Main application: internal wiring of apparatus. Length 100 m on reel containing colours: red, black, white, blue, green and yellow.		F M I *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page

161







Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.23	EXTRA FLEXIBLE WIRE stranded (approx. 55/0.1), plain copper with pliable PVC insulation. Voltage rating 500 V. Main application: test leads. Length 25 m on reel. Set of five colours: red, black, blue, green, yellow.		F M	
109.5.24	FLAT BUILDING WIRE 2 x 1.5 mm square. Length 100 m on reel.		I *	
109.5.25	FLAT BUILDING WIRE 3 x 1.5 mm square. Length 100 m on reel.		I *	
109.5.26	CABLE 3 X 1.5 MM SQ. solid copper conductors, PVC insulated. Voltage rating: 1000 V Main application: low power distribution network in buildings. Length unit: 100 m.		I *	
109.5.27	CABLE 4 X 1.5 MM SQ. solid copper conductors, PVC insulated. Voltage rating: 1000 V. Main application: low power distribution network in buildings. Length unit: 100 m.		I	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 162








Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.28	<p>CABLE 3 X 2.5 MM SQ.</p> <p>solid copper conductors, PVC insulated. Voltage rating: 1000 V. Main application: power distribution network in buildings. Length unit: 100 m.</p>		I *	
109.5.29	<p>CABLE 4 X 2.5 MM SQ.</p> <p>solid copper conductors, PVC insulated. Voltage rating: 1000 V. Main application: low power distribution network in buildings. Length unit: 100 m.</p>		I	
109.5.30	<p>CABLE 3 X 4 MM SQ.</p> <p>solid copper conductors, PVC insulated. Voltage rating: 1000 V. Main application: power distribution network in buildings. Length unit: 100 m.</p>		I	
109.5.31	<p>CABLE 4 X 4 MM SQ.</p> <p>solid copper conductors, PVC insulated. Voltage rating: 1000 V. Main application: power distribution network. Length unit: 100 m.</p>		I	
109.5.32	<p>CABLE 4 X 16 MM SQ.</p> <p>stranded copper conductors, PVC insulated.</p> <p>Voltage rating: 1000 V. Main application: local power network. Length unit: 1 metre.</p>		I	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 163</p>

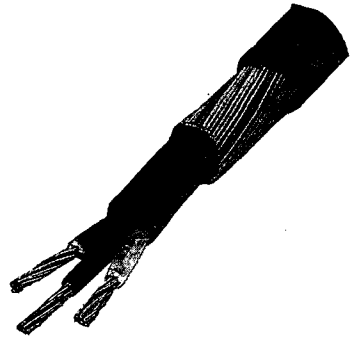
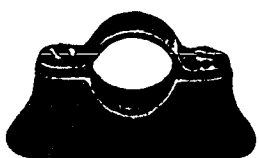
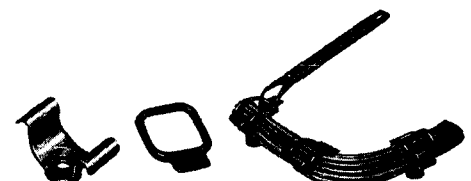


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.33	<p>CABLE 3 X 35 MM SQ.</p> <p>with stranded copper conductors, lead sheathed and steel armoured.</p> <p>Voltage rating: 1000 V. Main application: local power network. Length unit: 1 metre.</p>		I C	
109.5.34	<p>SADDLE 9-18 MM DIA</p> <p>for surface cable installation with mounting hole, single type.</p>		I	
109.5.35	<p>SADDLE 9-18 MM DIA</p> <p>for surface cable installation with mounting hole, double type.</p>		I	
109.5.36	<p>SADDLE 18-25 MM DIA</p> <p>for surface cable installation with mounting hole, single type.</p>		I	
109.5.37	<p>SADDLE 18-25 MM DIA</p> <p>for surface cable installation with mounting hole, double type.</p>		I	
109.5.38	<p>CRADLES AND CLIPS 8 MM DIA</p> <p>for surface wiring; releasable cable binding. In 100 pcs pack.</p>		I	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 164</p>

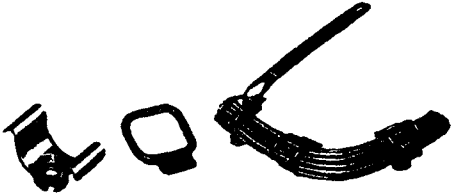




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.39	CRADLES AND CLIPS 11 MM DIA for surface wiring; releasable cable binding. In 100 pcs pack.		I	
109.5.40	CRADLES AND CLIPS 14 MM DIA for surface wiring; releasable cable binding. In 100 pcs pack.		I	
109.5.41	CRADLES AND CLIPS 18 MM DIA. for surface wiring; releasable cable binding. In 100 pcs pack.		I	
109.5.42	CRADLES AND CLIPS 25 MM DIA for surface wiring; releasable cable binding. In 100 pcs pack.		I	
109.5.43	RELEASABLE WIRE CLAMP for surface wiring with fixing screw. For max. dia. of cable 20 mm. In 100 pcs pack.		I	
109.5.44	RELEASABLE CABLE TIES with release tab and ratchet lock action. For temporary installations where wires need to be added or removed from cable forms. Max. cable dia. 35 mm. In 100 pcs pack.		I	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 165

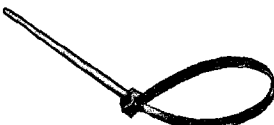
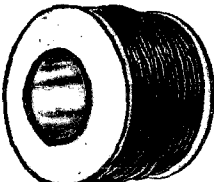




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.45	<p>PERMANENT CABLE TIES</p> <p>with non-release lock for binding wires and cables. For permanent installation. Max. cable dia. 35 mm. In 100 pcs pack.</p> <p>Note: Permanent cable ties dimensions range is from about 15 mm to 100 mm dia. of cable. Project may specifically list other dimensions of item 109.5.45 if necessary.</p>		I M C	
109.5.46	<p>LACING CORD</p> <p>flexible rayon-cored PVC string for cable forming and similar applications.</p> <p>Approx. dia 0.75 mm Length 25 m on reel.</p>		I M C	
109.5.47	<p>RIGID CONDUIT, PVC, 20 MM</p> <p>Unit of length: 1 metre</p>		I C	
109.5.48	<p>PVC TERMINAL BOX</p> <p>with lid and screws for 20 mm conduit. In 10 pcs pack.</p>		I C	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 166</p>


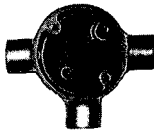
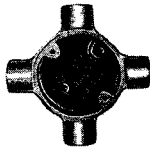
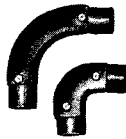
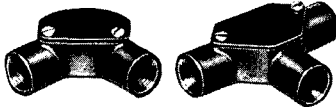


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.49	PVC THROUGH BOX with lid and screws for 20 mm conduit. In 10 pcs pack.		I C	
109.5.50	PVC TEE BOX with lid and screws for 20 mm conduit. In 10 pcs pack.		I C	
109.5.51	PVC INTERSECT BOX with lid and screws for 20 mm conduit. In 10 pcs pack.		I C	
109.5.52	PVC INSPECTION BEND with lid and screws for 20 mm conduit. In 10 pcs pack.		I C	
109.5.53	PVC INSPECTION ELBOW with lid and screws for 20 mm conduit. In 10 pcs pack.		I C	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

167




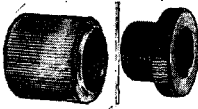






Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.54	PVC INSPECTION TEE with lid and screws for 20 mm conduit. In 10 pcs pack.		I C	
109.5.55	PVC CONDUIT COUPLER for 20 mm conduit. In 10 pcs pack.		I C	
109.5.56	PVC MALE ADAPTER for 20 mm conduit. In 10 pcs pack.		I C	
109.5.57	PVC FEMALE ADAPTER for 20 mm conduit. In 10 pcs pack.		I C	
109.5.58	PVC ADHESIVE for PVC conduit. In 250 ml tin.		I C	
109.5.59	NUT ASSORTMENT cadmium plated steel. size: M3, M4, M5, M6 and M8 100 pcs of each size.		F M I	
109.5.60	PLAIN WASHERS cadmium plated steel, for screws: M3, M4, M5, M6 and M8. 100 pcs of each size.		F M I	
109.5.61	SPRING WASHERS steel, for screws: M3, M4, M5, M6 and M8. 100 pcs of each size.		F M I	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 168






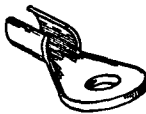


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.62	TERMINAL STRIP, 2 WIRE For 2 wires, screw type. Rating: 15 A, 500 VAC. In 5 pcs pack.		I C	
109.5.63	TERMINAL STRIP, 3 WIRE For 3 wires, screw type. Rating: 15 A, 500 VAC. In 5 pcs pack.		I C	
109.5.64	TERMINAL STRIP, 4 WIRE For 4 wires, screw type. Rating: 15A, 500 VAC. In 5 pcs pack.		I C	
109.5.65	CABLE TERMINALS, 1.5 MM Tin-coated, soldering type for 1.5 mm sq. conductors. In 10 pcs pack.		C	
109.5.66	CABLE TERMINALS, 2.5 MM Tin-coated, soldering type for 2.5 mm sq. conductors. In 10 pcs pack.		C	
109.5.67	CABLE TERMINALS, 4 MM Tin-coated, soldering type for 4 mm sq. conductors. In 10 pcs pack.		C	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page

169

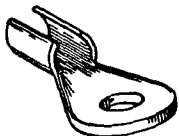
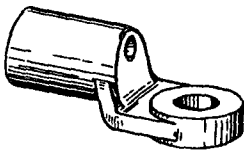





Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.68	<p>CABLE TERMINALS, 16 MM</p> <p>Tin-coated, soldering type for 16 mm sq. conductors. In 10 pcs pack.</p>		C	
109.5.69	<p>CABLE TERMINALS, 35 MM</p> <p>Tin-coated, soldering type for 35 mm sq. conductors. In 10 pcs pack.</p>		C	
109.5.70	<p>CABLE CONNECTORS, 1.5 MM</p> <p>Tin-coated. Soldering type for 1.5 mm sq. cable. In 10 pcs pack.</p>		C	
109.5.71	<p>CABLE CONNECTORS, 2.5 MM</p> <p>Tin-coated, soldering type for 2.5 mm sq. cable conductors. In 10 pcs pack.</p>		C	
109.5.72	<p>CABLE CONNECTORS, 4.0 MM</p> <p>Tin-coated, soldering type for 4.0 mm sq. cable conductors. In 10 pcs pack.</p>		C	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 170</p>




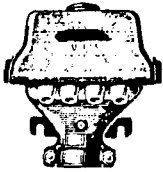



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.73	CABLE CONNECTORS, 16 MM Tin-coated, soldering type for 16 mm. sq. cable conductors. In 10 pcs pack.		C	
109.5.74	CABLE CONNECTORS, 35 MM Tin-coated, soldering type for 35 mm sq. cable conductors. In 10 pcs pack.		C	
109.5.75	CABLE JOINT STRAIGHT, PVC For 4 x 4 mm sq. PVC cables. Complete with accessories.		C	
109.5.76	CABLE END SEAL For PVC cables 4 x 4 mm sq. Complete with accessories.		C	
109.5.77	PVC CABLE JOINT, STRAIGHT For 4 x 16 mm sq. PVC cables. Complete with accessories.		C	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item		Page 171

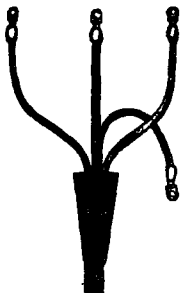

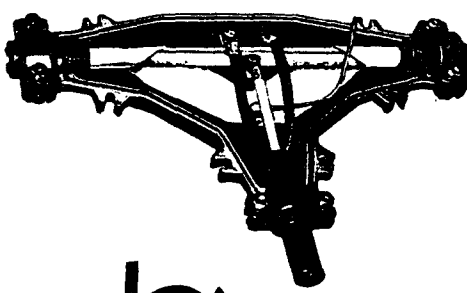
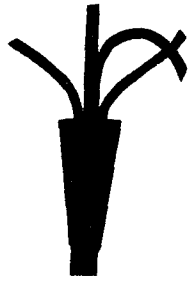


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.78	CABLE END SEAL For PVC cables 4 x 16 mm sq. Complete with accessories.		C	
109.5.79	STRAIGHT CABLE JOINT Cast iron, for 3 x 35 mm sq. cable. Complete with lead sleeve, cable connectors and all standard accessories for jointing.		C	
109.5.80	T-TYPE CABLE JOINT Cast iron, for 3 x 35 mm sq. cable. Complete with lead sleeve, cable connectors and all standard accessories for jointing.		C	
109.5.81	CABLE END SEAL for 3 x 35 mm sq. cable. Complete with all standard accessories for jointing.		C	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 172



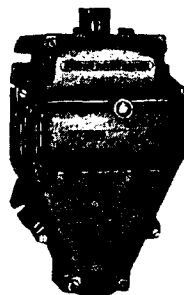

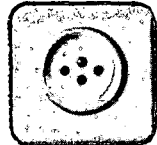


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.82	FILLING FOR PVC JOINTS in 5 kg can.		C	
109.5.83	COMPOUND FOR POWER CABLE JOINTS for filling joints made in lead sleeves on paper insulated power cables. In 5 kg can.		C	
109.5.84	BITUMEN for filling cast-iron joints. In 5 kg can.		C	
109.5.85	CABLE ENTRY BOX 3-phase, 4-wires for 4 x 16 mm square, PVC insulated cable with earthing connection and triple fuse base for diazed fuse plugs 35 to 63 A; cast iron or plastic construction.		C	
109.5.86	INSTALLATION OUTLET, SINGLE, 15 A surface mounting, safety-type outlet with earthing contact. For single-phase 15 A.		I C	
109.5.87	INSTALLATION OUTLET, SINGLE, 15 A for under plaster mounting with plastic wall-mounting box; safety-type outlet with earthing contact. For single-phase, 15 A.		I C	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

173

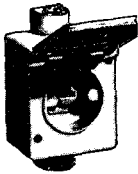







Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.88	INSTALLATION OUTLET, 3-PHASE, 15 A surface mounting, safety-type outlet with earthing contact. For 3-phase 15 A.		I C	
109.5.89	INSTALLATION OUTLET, 3-PHASE, 35 A surface mounting, safety-type outlet with earthing contact. For 3-phase, 35 A.		I C	
109.5.90	PLUG, SINGLE PHASE, 15 A safety type with earthing contact.		I C	
109.5.91	PLUG, 3-PHASE, 15 A safety type with earthing contact.		I C	
109.5.92	PLUG, 3-PHASE, 35 A with earthing contact.		I C	
109.5.93	RECEPTACLE, 4 MM, BLACK for standard 4 mm dia. banana plugs; insulated terminal with nuts and washers. 5 pcs in pack.		F	
109.5.94	RECEPTACLE, 4 MM, RED for standard 4 mm dia. banana plugs; insulated terminal with nuts and washers. 5 pcs in pack.		F	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

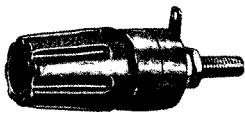



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.95	RECEPTACLE, 4 MM, GREEN for standard 4 mm dia. banana plugs; insulated terminal with nuts and washers. 5 pcs in pack.		F	
109.5.96	RECEPTACLE, 4 MM, YELLOW for standard 4 mm dia. banana plugs; strong and fully insulated type, with nuts and washers.		F	
109.5.97	RECEPTACLE, 4 MM, BLUE for standard 4 mm dia. banana plugs; insulated terminal with nuts and washers. 5 pcs in pack.		F	
109.5.98	PLUG, 4 MM, BLACK with insulated and unbreakable plastic cord inlet; banana type; solder connection; 5 pcs in pack.		F	
109.5.99	PLUG, 4 MM, RED with insulated and unbreakable plastic cord inlet; banana type; solder connection. 5 pcs in pack.		F	
109.5.100	PLUG, 4 MM, GREEN with insulated and unbreakable plastic cord inlet; banana type; solder connection; 5 pcs in pack.		F	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item


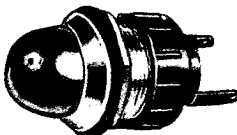



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.101	PLUG, 4 MM, YELLOW with insulated and unbreakable plastic cord inlet; banana type; solder connection; 5 pcs in pack.		F	
109.5.102	PLUG, 4 MM, BLUE with insulated and unbreakable plastic cord inlet; banana type; solder connection; 5 pcs in pack.		F	
109.5.103	SIGNAL LAMP SOCKET for use in motor control circuits; surface mounting, totally enclosed construction with 3 spare bulbs for mains voltage, green lens.		F	
109.5.104	SIGNAL LAMP SOCKET for use in motor control circuits; surface mounting, totally enclosed construction with 3 spare bulbs for mains voltage, red lens.		F	
109.5.105	SIGNAL LAMP SOCKET for use in motor control circuits; surface mounting, totally enclosed construction with 3 spare bulbs for mains voltage, yellow lens.		F	
109.5.106	SOCKET for normal screw-type light bulbs; screw size E27; surface mounting.		F	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 176

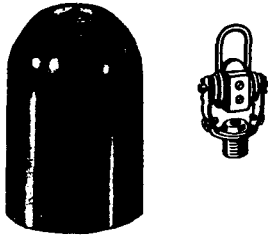
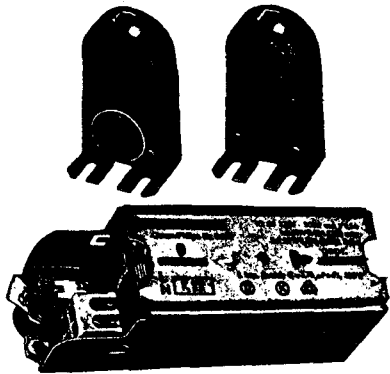




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.107	SOCKET for normal screw-type light bulbs, screw size E27; suspension mounting, complete with suspension ring.		I	
109.5.108	SOCKET WITH STARTER AND CHOKE, SET For standard fluorescent light tube. Note: Wattage of the tube to be given in the request by the project.		I	
109.5.109	FUSE BASE, SINGLE, 25 A for diazed fuse plugs up to 25 A; with screw cap thread E27 and fuse adapter, surface mounting with cover.		I	
109.5.110	FUSE BASE, SINGLE, 60 A for diazed fuse plugs up to 35-60 A; with screw cap thread E33 and fuse adapter, surface mounting with cover.		I	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 177





Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.111	FUSE BASE, TRIPLE, 25 A for diazed fuse plugs up to 25 A; with screw cap thread E27 and fuse adapters, surface mounting with cover.		I	
109.5.112	FUSE BASE, TRIPLE, 60 A for diazed fuse plugs from 35 to 60 A; with screw cap thread E27 and fuse adapters, surface mounting with cover.		I	
109.5.113	FUSE, DIAZED, 10 A		M I	
109.5.114	FUSE, DIAZED, 15 A		M I	
109.5.115	FUSE, DIAZED, 25 A		M I	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 178



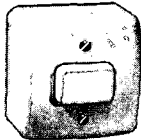
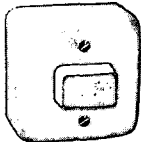
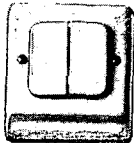
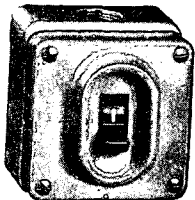


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.116	FUSE, DIAZED, 35 A		M I	
109.5.117	FUSE, DIAZED, 60 A		M I	
109.5.118	CROCODILE CLIPS, SET insulated, to fit on to 4 mm banana plugs. black and red.		M I C	
109.5.119	INSTALLATION SWITCH standard type, one way switching (on-off); single pole, surface mounting, 5A.		I	
109.5.120	INSTALLATION SWITCH standard type, one-way switching (on-off); double pole, surface mounting, 5 A.		I	
109.5.121	INSTALLATION SWITCH standard type, two-way switch; surface mounting, 5 A.		I	
109.5.122	INSTALLATION SWITCH standard type, intermediate switch, surface mounting, 5 A.		I	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

179


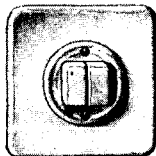
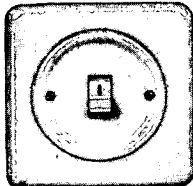
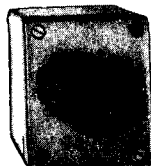
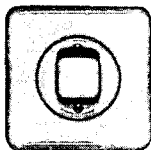



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.123	INSTALLATION SWITCH standard type, 5 A; single pole for under plaster mounting, with plastic wall-mounting box.		I	
109.5.124	INSTALLATION SWITCH standard type, 5 A, two-way switch; for under plaster mounting, with plastic wall-mounting box.		I	
109.5.125	INSTALLATION SWITCH standard type, 5 A, intermediate switch; single pole, for under plaster mounting, with plastic wall-mounting box.		I	
109.5.126	INSTALLATION SWITCH momentary contact, standard type; 5 A, single pole, surface mounting, 5 A.		I	
109.5.127	INSTALLATION SWITCH momentary contact, standard type; 5 A, single pole, for under plaster mounting with plastic wall-mounting box.		I	
109.5.128	MOMENTARY CONTACT SWITCH Push-button station; surface mounting, totally enclosed in strong plastic housing; one normally opened contact, 5 A, 500 V.		I	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item		Page 180

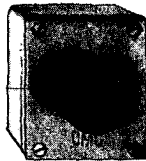
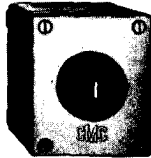
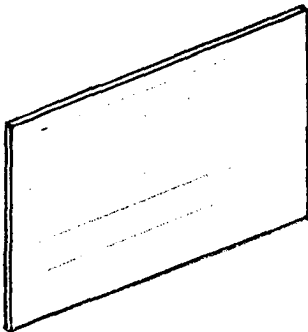


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.129	MOMENTARY CONTACT SWITCH push-button station; surface mounting, totally enclosed in strong plastic housing; with one normally closed contact and one normally open contact; 5 A, 500 V.		I	
109.5.130	SWITCH, TIME CONTROL for staircase lights; adjustable timing from 2 to 5 minutes, surface mounting. Contact load 5 A.		I	
109.5.131	LAMINATED PAPER sheet size 3 x 1000 x 1000 mm.		F I	
109.5.132	LAMINATED PAPER sheet size 5 x 1000 x 1000 mm.		F I	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 181

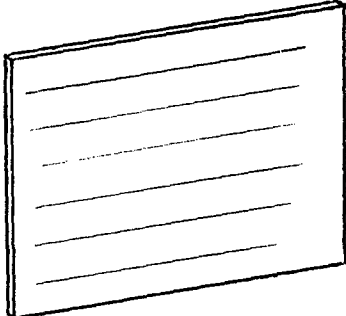


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.133	<p>SLOT INSULATION MATERIAL</p> <p>presspan or similar in quality slot insulation material.</p> <p>Thickness: 0.10 mm. Unit of measure: square metre.</p>		F	
109.5.134	<p>SLOT INSULATION MATERIAL</p> <p>presspan or similar in quality slot insulation material.</p> <p>Thickness: 0.20 mm. Unit of measure: square metre.</p>		F	
109.5.135	<p>SLOT INSULATION MATERIAL</p> <p>presspan or similar in quality slot insulation material.</p> <p>Thickness: 0.30 mm. Unit of measure: square metre.</p>		F	
109.5.136	<p>SLOT INSULATION MATERIAL</p> <p>presspan or similar in quality slot insulation material.</p> <p>Thickness: 0.4 mm. Unit of measure: square metre.</p>		F	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 182</p>

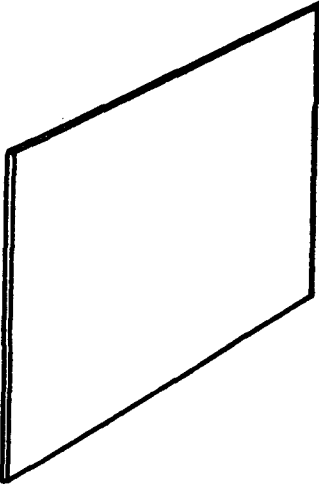


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.137	<p>SLOT INSULATION MATERIAL</p> <p>presspan or similar in quality slot insulation material.</p> <p>Thickness: 0.50 mm.</p> <p>Unit of measure: square metre.</p>		F	
109.5.138	<p>SLOT INSULATION MATERIAL</p> <p>presspan or similar in quality slot insulation material.</p> <p>Thickness: 0.60 mm.</p> <p>Unit of measure: square metre.</p>		F	
109.5.139	<p>SLOT INSULATION MATERIAL</p> <p>presspan or similar in quality slot insulation material.</p> <p>Thickness: 0.70 mm.</p> <p>Unit of measure: square metre.</p>		F	
109.5.140	<p>SLOT INSULATION MATERIAL</p> <p>presspan or similar in quality slot insulation material.</p> <p>Thickness: 0.80 mm.</p> <p>Unit of measure: square metre.</p>		F	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

183

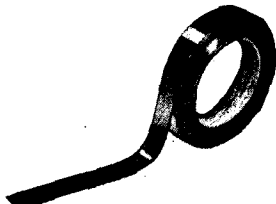
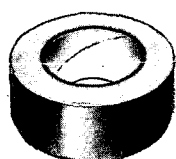
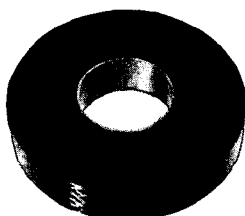
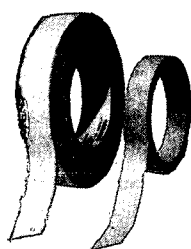


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.141	<p>PLASTIC INSULATION TAPE</p> <p>plastic type (P.V.C.) in black, red, yellow and green; 15 mm wide. Set of 4 rolls (20 m each).</p>		M I C	
109.5.142	<p>TEXTILE INSULATION TAPE</p> <p>impregnated textile type in rolls.</p> <p>Approx. sizes: Width: 15-25 mm Length: 50 m.</p>		C	
109.5.143	<p>SELF-AMALGAMATING TAPE</p> <p>to produce waterproof joints.</p> <p>Approx. width: 20-25 mm In 10 m rolls.</p>		M I C	
109.5.144	<p>COTTON TAPE SET</p> <p>in 20 m reels.</p> <p>Set of 5, 7, 10 and 15 mm wide.</p>		I C	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 184</p>



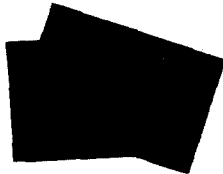


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.145	BINDING YARN SET cotton or nylon; assortment of 3 different sizes.		C	
109.5.146	INSULATION SLEEVING SET assortment as follows: 20 m of each size: 0.5, 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 mm dia.		F M I C	
109.5.147	COPPER SHEET size 1 x 1000 x 1000 mm.		F	
109.5.148	COPPER SHEET size 2 x 1000 x 1000 mm.		F	
109.5.149	BRASS SHEET size 1.5 x 1000 x 1000 mm.		F	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page
185



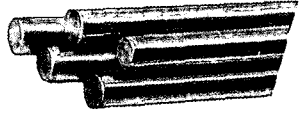


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.150	BRASS FLAT size 3 x 20 x 1000 mm.		F	
109.5.151	RESIN CORE SOLDER On 500 g reels; solder approx. 1.5 mm dia.		F M I C	
109.5.152	SOLDER, ALL PURPOSE for jointing aluminium, tin, plate, brass, nickel, copper or stainless steel. Approx. composition: 18% tin, 80% lead, 2% silver; should contain cores of water soluble flux. Approx. temperature of full melting 270 deg. C. On drums of 500 g.		F M I C	
109.5.153	SOLDER TINMEN'S 40/60 solder suitable for sheet metal soldering as galvanised steel, copper and brass. Supplied in sticks of an approx. weight of 200 g.		F M I C	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item		Page 186



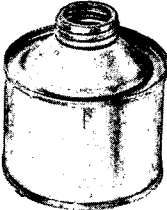

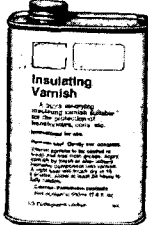


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.154	PLUMBERS METAL Supplied in sticks of total weight 1 kg.		C	
109.5.155	SOLDERING AMMONIAC STONE speedily cleans and brightens the soldering copper. in brick form of approx. 500 g.		I C	
109.5.156	SOFT SOLDERING FLUX soldering paste, acid-free; tin of 500 g.		F M I C	
109.5.157	SOLDERING FLUID for tinning the soldering copper and also for fast preparation for soldering of all metals. Tin of 500 g.		F M I C	 
109.5.158	VARNISH for varnishing insulated copper wire; oven-drying type. In 10 l container.		F	
109.5.159	VARNISH for varnishing insulated copper wire; air-drying type. In 10 l container.		F I C	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page
187




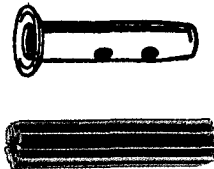


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.5.160	CHEMICAL for removing varnish from burnt-out motor windings; harmless and extremely efficient. In drum containing 100 l.		F M I C	
109.5.161	SINGLE COMPONENT STRONG ADHESIVE based possibly on cyanoacrylate component; should form a clear bond in seconds; suitable for use with metals, most plastics, ceramics, wood and rubber. In 20 g bottle.		F M I C	
109.5.162	STEEL PIN ASSORTMENT with captive presspan washer; in paper bags of 100 pieces, total. Containing sizes: 12 mm, 18 mm, 23 mm, 30 mm and 40 mm.		F	
109.5.163	WOOD SCREW KIT round head wood screws 100 pcs of each of the following sizes: 3 x 10 mm; 5 x 10 mm; 6 x 40 mm 3 x 15 mm; 5 x 15 mm; 3 x 20 mm; 5 x 20 mm; 4 x 10 mm; 5 x 30 mm; 4 x 15 mm; 5 x 40 mm; 4 x 20 mm; 6 x 10 mm; 4 x 30 mm; 6 x 20 mm; 4 x 40 mm; 6 x 30 mm;		M I	
109.5.164	WALL PLUG KIT 100 of each size below: 4 x 25 mm; 6 x 50 mm; 5 x 35 mm; 8 x 65 mm; 6 x 35 mm; 10 x 65 mm;		M I C	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 188




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration															
109.5.165	<p>CYLINDER HEAD SCREW KIT</p> <p>cadmium plated steel assortment, 100 pcs of each size:</p> <table><tr><td>M3 x 20</td><td>M3 x 30</td><td>M3 x 40</td></tr><tr><td>M4 x 20</td><td>M4 x 30</td><td>M4 x 40</td></tr><tr><td>M5 x 20</td><td>M5 x 30</td><td>M5 x 50</td></tr><tr><td>M6 x 30</td><td>M6 x 40</td><td>M6 x 50</td></tr><tr><td></td><td></td><td>M8 x 50</td></tr></table>	M3 x 20	M3 x 30	M3 x 40	M4 x 20	M4 x 30	M4 x 40	M5 x 20	M5 x 30	M5 x 50	M6 x 30	M6 x 40	M6 x 50			M8 x 50		F M I	
M3 x 20	M3 x 30	M3 x 40																	
M4 x 20	M4 x 30	M4 x 40																	
M5 x 20	M5 x 30	M5 x 50																	
M6 x 30	M6 x 40	M6 x 50																	
		M8 x 50																	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

SECTION 6 AUDIOVISUAL AIDS AND REFERENCE LIBRARY

This section lists essential video-tapes, handbooks, components and data books in the field of electrical engineering including installation of equipment and cables.

The handbooks on standards, workshop practice and occupational safety also form a part of this section.

As far as audiovisual hardware and consumables are concerned the users are invited to consult guide no. 15 (revised).

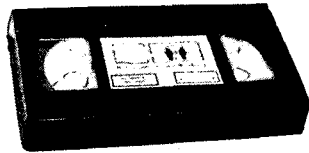


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.6.1	<p>VIDEO-CASSETTES, ELECTRICAL FUNDAMENTALS</p> <p>Set of video cassettes comprising:</p> <ul style="list-style-type: none">- fundamentals of electrical engineering- electrical measurements- resistors (standard, light and temperature dependent)- inductors- transformers <p>Complete with video manual.</p>	2	F M I C	
109.6.2	<p>VIDEO-CASSETTES, ELECTRONICS FUNDAMENTALS</p> <p>Set of video cassettes comprising:</p> <ul style="list-style-type: none">- diodes and rectifiers, zener diodes- half wave and full wave rectification- transistors, switching circuits, bistable circuits- testing and mounting transistors- transistor amplifiers, biasing, emitter follower, buffers, push-pull amplification- power supplies and stabilization (voltage, current) <p>Complete with video manual.</p>	2	F M I C	
109.6.3	<p>VIDEO-CASSETTES, DIGITAL FUNDAMENTALS</p> <p>Set of video-cassettes comprising:</p> <ul style="list-style-type: none">- digital circuits- flip-flops- pulse generators- operational amplifiers- inverters <p>Complete with video manual.</p>	2	F M I C	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page
191




Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.6.4	<p>VIDEO-CASSETTES, POWER CONTROL FUNDAMENTALS</p> <p>Set of video cassettes comprising:</p> <ul style="list-style-type: none">- thyristors- trigger circuits- unijunction transistor- triacs, diacs and quadracs- phase control- full wave controllers- motor control <p>Complete with video manual.</p>	2	F M I C	
109.6.5	<p>ELECTRICAL ENGINEERING HANDBOOK</p> <p>A comprehensive handbook to include:</p> <ul style="list-style-type: none">- electrical engineering fundamentals (units of measurements, properties of matter, etc.)- calculation methods in electro-technology- electrical power engineering (electric motors, generators, synchronous machines, power stations, power distribution, switch gear and measuring instruments)- electrical power engineering applications- control engineering and automation.	16	F M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 192</p>

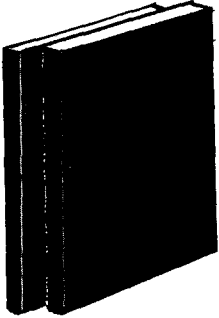


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.6.6	<p>APPLIED ELECTRICITY HANDBOOK</p> <p>covering the following subjects:</p> <ul style="list-style-type: none">- DC circuits- electrostatics- magnetism- electromagnetism- chemical and thermal effects of currents- DC machines- AC and polyphase currents- transformers- measurements and measuring instruments- AC machines- illumination <p>Besides theory the handbook may contain elaborated calculations, samples and solutions to electrical engineering problems.</p>	16	F M I C *	
109.6.7	<p>ELECTRICAL MEASUREMENTS HANDBOOK</p> <p>covering electrical measurements methods and measuring instruments for:</p> <ul style="list-style-type: none">- voltage, current, power, energy, speed, frequency, phase difference- measurement of resistance, inductance and capacitance- magnetic measurements- illumination measurements- high voltage measurements and testing- localization of cable faults- electrical methods of measuring temperature- eddy currents- wave-forms and their determination- transient phenomena.	16	F M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item		Page 193



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.6.8	<p>ELECTRICAL MACHINES BOOK(S)</p> <p>A book or set of books to cover the following subjects:</p> <ul style="list-style-type: none">- electromagnetism and permanent magnet theory- motors and generators (torque, losses and efficiency; DC, synchronous and AC commutator machines- transformers- equivalent circuits- transients.	2	F M I	
109.6.9	<p>TRANSFORMER HANDBOOK</p> <p>must contain and cover:</p> <ul style="list-style-type: none">- fundamental principles- characteristics, efficiency, loading- polyphase and star/delta connections- tapping and tap changing- testing, installation and maintenance- transient phenomena, abnormal conditions and third harmonics- causes of failure, protection, earthing.	2	F M I C	
109.6.10	<p>HIGH VOLTAGE ENGINEERING BOOK</p> <p>to cover:</p> <ul style="list-style-type: none">- generation of high voltages and measurements- electrical power transmission- electrostatic fields, calculation of electrical stress- mechanisms of electrical breakdown in gases, liquids and solids- non-destructive insulation test techniques.	2	F M I C	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item		Page 194



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.6.11	HANDBOOK, POWER ELECTRONICS to include theory and applications of thyristors and diodes in rectification, converters, smoothing, switching, commutation, overload protection and triggering.		F M I C	
109.6.12	SOLID STATE RELAYS HANDBOOK to include theory and practical applications of solid state relays in power switching, motor control, inductive loads, voltage sensing, phase sequence detection, driving power semiconductors, bounce suppression, temperature control, delay circuits, noise and surge problems.	2	F M I C	
109.6.13	ELECTROMECHANICAL DEVICES HANDBOOK to include theory, application and trouble-shooting approach and information to relays, contactors, solenoids, motors, generators, stepping motors and servo systems.	2	F M I C	
109.6.14	ELECTRICAL CABLES HANDBOOK up-to-date reference book on all types of mains and power cables for application in industry, power distribution and transmission. The book must contain cable specifications, basic-theory and protection problems.	2	F M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item		Page 195



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.6.15	ELECTRICAL FUSES HANDBOOK to cover industrial and domestic types of fuses including applications with motors, transformers and semiconductors; construction, low and high-voltage fuses, pre-arcing and arcing behaviour of cartridge fuselinks, international standards.	2	I M	
109.6.16	BATTERIES HANDBOOK to cover primary and secondary batteries, characteristics and properties of different kinds and types of batteries.	2	F M I C	
109.6.17	SOLDERING MANUAL HANDBOOK describing all possible variants of hand soldering of different metals.	16	F M I C *	
Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.		Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item		Page 196



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.6.18	<p>ELECTRICAL INSTALLATION HANDBOOK</p> <p>A guide on the installation of electricity in domestic, administrative, commercial and industrial buildings.</p> <p>The handbook is to include:</p> <ul style="list-style-type: none">- public electricity supply principles- general installation practice (low voltage installation, lightning protection, earthing, static electricity, protection)- installation of switch gear, transformers, cables, motors, generators, automatic control facilities- installation of lighting, heating, security systems- installation of lifts and escalators- commissioning.	16	I C *	
109.6.19	<p>HANDBOOK ON WIRING</p> <p>A reference book to contain:</p> <ul style="list-style-type: none">- wiring norms and systems (domestic and industrial)- distribution of supplies in buildings- design and arrangement of final circuits (2A, 15A, 30A)- emergency lighting- cables, electrical accessories- protection systems (protective conductors, shock protection, isolation)- overload; derating of conductors- voltage drop calculations (current ratings and maximum length for voltage drop)- short circuit current, maximum fault current, fuse characteristics, etc.- inspection and tests.	16	F M I C *	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page
197



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.6.20	<p>INDUSTRIAL WORKSHOP GUIDE</p> <p>to include:</p> <ul style="list-style-type: none">- safety in workshops- materials- drawing interpretation- measurement techniques- marking out- use of hand and bench tools- power tools (drilling machines, etc.)- soldering and jointing- adhesives guide and practical application.	16	F M I C	
109.6.21	<p>BOOK ON ELECTRICAL SAFETY ENGINEERING</p> <p>contents to include:</p> <ul style="list-style-type: none">- statistics and reliability- the nature of electrical injuries- failure of switch gear- transformers and cables- circuit protection (over-voltage, over-current, earthing, double insulation)- switches, controls and interlocks- fire and explosion hazards- industrial design.	16	F M I C *	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 198</p>



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.6.22	<p>BOOK(S) ON SAFETY AT WORK</p> <p>describing principles of safety in industrial communication, accident prevention, occupational diseases and hazards (flammable liquids, asbestos, toxic gases, noise, dust, scaffolding and harmful substances), safety at construction sites and safety regulations, safety equipment (protections, machine attendants, extinguishers, guards and alarms).</p>	16	F M I C *	
109.6.23	<p>BOOK ON THE STANDARD INTERNATIONAL SYSTEM</p> <p>This book contains full coverage of the Standard International System of Units, their relationship to different previous systems of units. It may also include characteristics and properties of materials related to electrical and electronic engineering.</p>	16	F M I C *	
109.6.24	<p>DATA BOOK ON POWER DIODES</p> <p>a comprehensive data book describing all electrical and mechanical data of power diodes in use.</p>	2	F M	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 199</p>



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.6.25	<p>DATA BOOK ON THYRISTORS</p> <p>a comprehensive data book describing all electrical and mechanical data of thyristors and triacs in use.</p>	2	F M	
109.6.26	<p>DATA BOOK ON POWER SEMICONDUCTORS</p> <p>a comprehensive data book describing all electrical and mechanical data of power semiconductors in use.</p>	2	F M	
109.6.27	<p>DATA BOOK ON VOLTAGE REGULATORS</p> <p>a comprehensive data book describing all electrical and mechanical data of voltage regulators, switches, serial passes, shunts, precision voltage regulators in use.</p>	2	F M	
109.6.28	<p>DATA BOOK ON RESISTORS</p> <p>a comprehensive data book describing electrical and mechanical data of all kinds of resistors.</p>	2	F M	
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 200</p>



Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.6.29	DATA BOOK ON ELECTROLYTIC CAPACITORS a comprehensive data book describing electrical and mechanical data of modern electrolytic capacitors.	2	F M	
109.6.30	DATA BOOK ON CERAMIC CAPACITORS a comprehensive data book describing electrical and mechanical data of modern ceramic capacitors.	2	F M C	

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page
201



SECTION 7 COMPUTER-AIDED INSTRUCTIONS (CAI)

This section deals with computer-aided instruction software packages. These packages cover basics of electricity and electronics, digital and industrial electronics, microprocessor operation and electrical installation activities.

The programmes are designed for the MS-DOS operating system with a minimum machine configuration of 256 KB of RAM, 2 floppy disk drives and a colour graphic adaptor.

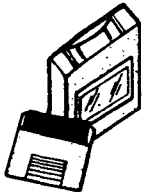
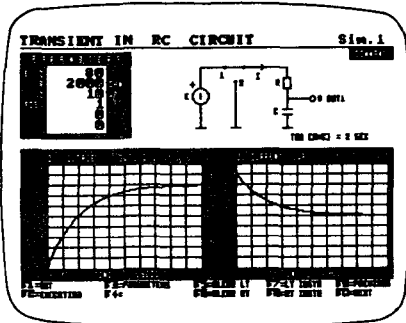
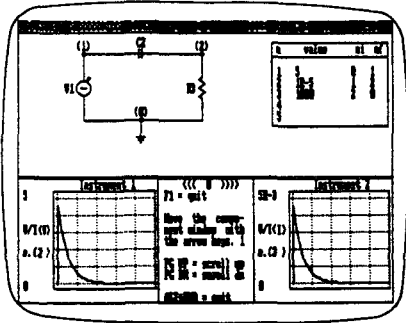


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.7.1	<p>CAI: FUNDAMENTALS OF ELECTRICITY</p> <p>for learning fundamentals of electricity utilizing a personal computer.</p> <p>The package should consist of a series of lessons, each characterized by:</p> <ul style="list-style-type: none">- a series of screens with theoretical explanations, drawings, tables, etc.- interactive simulations of devices, circuits and instruments;- questions with automatic evaluation of the learning level of the student;- guide for practical experiments on devices and circuits. <p>These programs should run under the MS-DOS Operating System, with a minimum machine configuration of 256 KB of RAM: 2 floppy disk drives, and a color graphics adapter.</p> <p>Lessons should cover the following topics:</p> <ul style="list-style-type: none">- analysis of DC circuits;- current and voltage; Ohm's law- Kirchoff's laws- Thevenin and Norton's theorems- capacity and inductance- transients in RLC circuits- steady-state circuit simulation <p>Analysis of AC circuits:</p> <ul style="list-style-type: none">- AC variables- resonant and coupled circuits <p>Complete with user's and reference manuals.</p>	2	F M I C	  

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

203


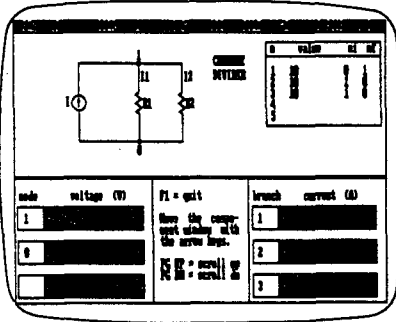
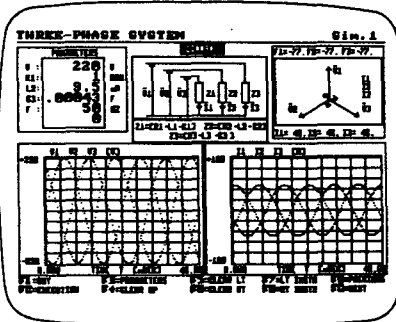


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.7.2	<p>CAI: ELECTRICITY, DC AND AC CIRCUITS</p> <p>for learning DC and AC circuits utilizing a personal computer.</p> <p>The package should consist of a series of lessons, each characterized by:</p> <ul style="list-style-type: none">- a series of screens with theoretical explanations, drawings, tables, etc.- interactive simulations of devices, circuits and instruments;- questions with automatic evaluation of the learning level of the student;- guide for practical experiments on devices and circuits. <p>These programs should run under the MS-DOS Operating System, with a minimum machine configuration of 256 KB RAM; two floppy disk drives and a Colour Graphics Adaptor. Lessons should cover the following topics:</p> <p>DC circuits:</p> <ul style="list-style-type: none">- Electrical quantities- Ohm's law and applications- Kirchoff's laws- Networks simulation in steady state- The electric field- The capacitor- Magnetism and Electromagnetism- Electromagnetic phenomena and Inductance- RC, RL and RLC circuits- Networks simulation in transient state <p>AC circuits:</p> <ul style="list-style-type: none">- Variable electric signals- Sinusoidal quantities- Impedance- A.C. circuits- Electromagnetic coupling- Poli-phase systems- Three-phase systems- Vector diagrams- Rotating magnetic field <p>Complete with user's and reference manuals.</p>	2	F M I C	  

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

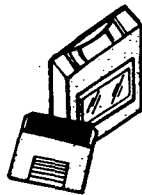
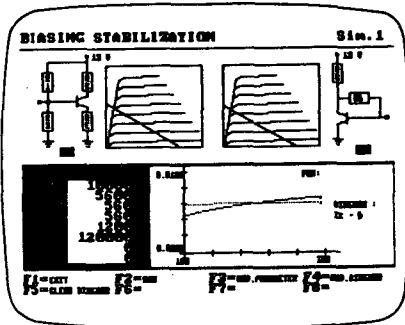
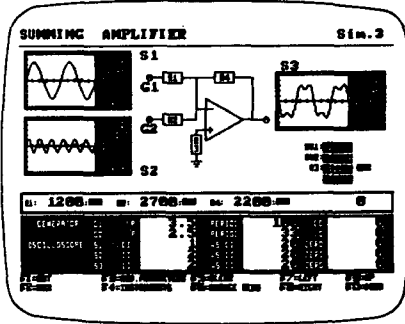


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.7.3	<p>CAI: BASIC ELECTRONICS</p> <p>for learning basic electronics utilizing a personal computer.</p> <p>The package should consist of a series of lessons, each characterized by:</p> <ul style="list-style-type: none">- a series of screens with theoretical explanations, drawings, tables, etc.- interactive simulations of devices, circuits and instruments;- questions with automatic evaluation of the learning level of the student;- guide for practical experiments on devices and circuits. <p>These programs should run under the MS-DOS Operating System, with a minimum machine configuration of 256 KB RAM; two floppy disk drives and a Colour Graphics Adapter. Lessons should cover the following topics:</p> <p>Electronic devices:</p> <ul style="list-style-type: none">- Diode, Zener diode- Varicap, UJT, PUT, SCR, DIAC, TRIAC- Fundamentals of a Transistor- Small signal amplifiers : CE, CB- Small signal amplifiers : CC, DL- J-FET and MOS-FET <p>Power supply circuits:</p> <ul style="list-style-type: none">- stabilization and protection amplifiers:- Differential amplifier- Feedback in amplifiers- Class A and B amplifiers <p>Oscillators:</p> <ul style="list-style-type: none">- Fundamentals of oscillators- Wien, RC oscillator- Meissner, Hartley, Colpitts oscillators- Crystal oscillator <p>Switching circuits:</p> <ul style="list-style-type: none">- Astable, Monostable, Bistable- Schmitt Trigger <p>Operational Amplifiers:</p> <ul style="list-style-type: none">- General characteristics- Basic configurations- Derivator and Integrator- Waveform generators- Active filters <p>Complete with user's and reference manuals.</p>	2	F M I	  

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page

205

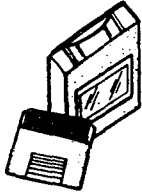
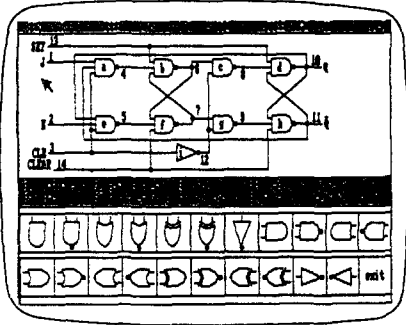
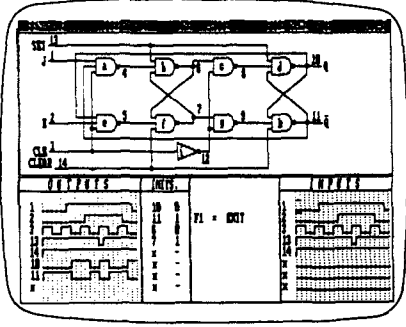


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.7.4	<p>CAI: DIGITAL ELECTRONICS</p> <p>for learning digital electronics utilizing a personal computer.</p> <p>The package should consist of a series of lessons, each characterized by:</p> <ul style="list-style-type: none">- a series of screens with theoretical explanations, drawings, tables, etc.- interactive simulations of devices, circuits and instruments;- questions with automatic evaluation of the learning level of the student;- guide for practical experiments on devices and circuits. <p>These programs should run under the MS-DOS Operating System, with a minimum machine configuration of 256 KB RAM; two floppy disk drives and a Colour Graphics Adapter.</p> <p>Lessons should cover the following topics:</p> <p>Fundamentals of Logic:</p> <ul style="list-style-type: none">- Boolean Algebra- Logic functions- Function minimization (Karnaugh) <p>Logic families:</p> <ul style="list-style-type: none">- Logic circuits- ITL- CMOS <p>Combinational Logic:</p> <ul style="list-style-type: none">- Fundamentals of Combinational Logic- Combinational circuits- Combinational circuits simulation <p>Sequential logic:</p> <ul style="list-style-type: none">- Sequential circuits and Flip-flop- Shift Registers- Counters- Sequential circuits simulation <p>MSI circuits:</p> <ul style="list-style-type: none">- Decoders and comparators- Shift register, Multiplexer- Decade/binary counters <p>Complete with user's and reference manuals.</p>	2	F M I	  
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing *Basic item</p>		<p>Page 206</p>

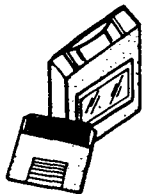
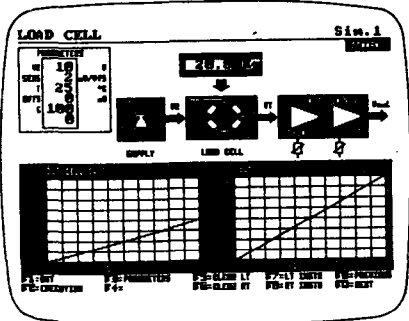
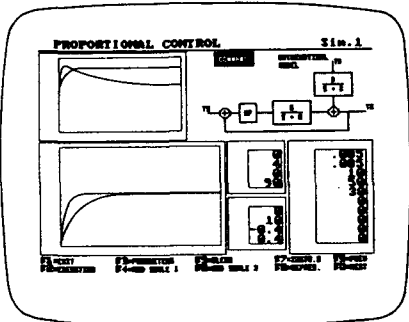


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.7.5	<p>CAI: INDUSTRIAL ELECTRONICS</p> <p>for learning industrial electronics utilizing a personal computer.</p> <p>The package should consist of a series of lessons, each characterized by:</p> <ul style="list-style-type: none">- a series of screens with theoretical explanations, drawings, tables, etc.- interactive simulations of devices, circuits and instruments;- questions with automatic evaluation of the learning level of the student;- guide for practical experiments on devices and circuits. <p>These programs should run under the MS-DOS Operating System, with a minimum machine configuration of 256 KB RAM; two floppy disk drives and a Colour Graphics Adaptor.</p> <p>Lessons should cover the following topics:</p> <p>TRANSDUCERS:</p> <ul style="list-style-type: none">- Temperature transducers- Luminosity transducers- Angular position transducer- Linear position transducers- Pressure transducer- Strength transducer- Speed transducer- Acceleration transducer- Proximity transducer- Flow rate transducer- Level transducers <p>Power Control:</p> <ul style="list-style-type: none">- Phase control power regulation- Zero-voltage power regulation <p>Process Control:</p> <ul style="list-style-type: none">- Control systems- Process regulation- Process simulation- Open loop process control- Non linear processes <p>Industrial controls:</p> <ul style="list-style-type: none">- Luminosity control- Temperature control- DC motor control- Stepper motor control <p>Complete with user's and reference manuals.</p>	2	F M I	  

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

Page

207


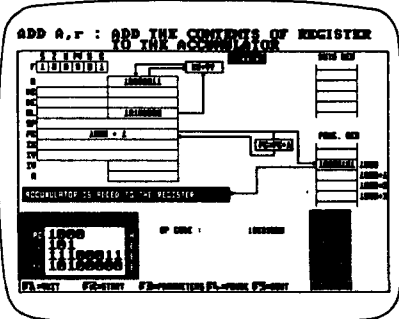
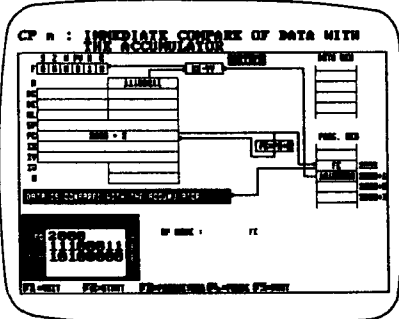


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.7.6	<p>CAI: MICROPROCESSOR</p> <p>for learning microprocessor operation and its use utilizing a personal computer.</p> <p>The package should consist of a series of lessons, each characterised by:</p> <ul style="list-style-type: none">- a series of screens with theoretical explanations, drawings, tables, etc.- interactive simulations of devices, circuits and instruments;- questions with automatic evaluation of the learning level of the student;- guide for practical experiments on devices and circuits. <p>These programs should run under the MS-DOS Operating System, with a minimum machine configuration of 256 KB RAM; two floppy disks and a Colour Graphics Adapter.</p> <p>Lessons should cover the following topics:</p> <p>The Microprocessor:</p> <ul style="list-style-type: none">- Microprocessor and Microcomputer- Numerical systems- Inside the Microprocessor- Microcomputer <p>Programming:</p> <ul style="list-style-type: none">- Introduction to programming- Data transfer instructions- Logical/arithmetical instructions- Jump and Call- I/O instructions- Polling, Interrupt, etc.- Instructions simulation <p>Hardware and Interfaces:</p> <ul style="list-style-type: none">- Decoder, Latch, Buffer, Clock- Memories- Parallel Interface- Serial Interface- Analog Interface (D/A-A/D)- Applications: stepper motor, shaft encoder. <p>Complete with user's and reference manuals.</p>	2	F M	  

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
* Basic item

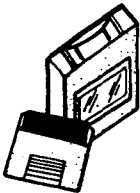
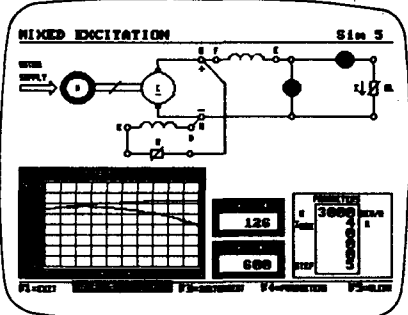
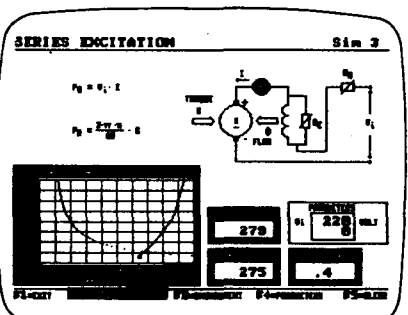


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.7.7	<p>CAI: ELECTRICAL MEASUREMENTS AND MACHINES</p> <p>for learning electrical measurements and machines utilizing a personal computer</p> <p>The package should consist of a series of lessons, each characterised by:</p> <ul style="list-style-type: none">- a series of screens with theoretical explanations, drawings, tables etc.- interactive simulations of devices, circuits and instruments- questions with automatic evaluation of the learning level of the student;- guide for practical experiments on devices and circuits. <p>These programs should run under the MS-DOS Operating System, with a minimum machine configuration of 256 KB RAM; two floppy disk drives and a Colour Graphics Adapter.</p> <p>Lessons should cover the following topics:</p> <ul style="list-style-type: none">- Fundamentals of electric measurements.- Measurements on single-phase systems.- Measurements on three-phase systems.- Fundamentals of electric machines- D.C machines : the generator- D.C machines : the motor- Synchronous machines : the generator- Synchronous machines : the motor- Three-phase cage asynchronous machines- Three-phase ring asynchronous machines- Single-phase asynchronous machines- Special machines- Single-phase transformer- Three-phase transformer <p>Complete with user's and reference manuals.</p>	2	F M I C	  
<p>Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.</p>		<p>Legend: F = Electrical fitting, M = Electrical maintenance, I = Electrical installation work, C = Cable jointing * Basic item</p>		<p>Page 209</p>

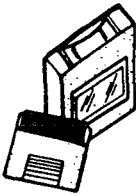
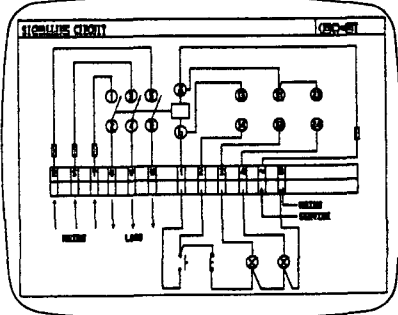
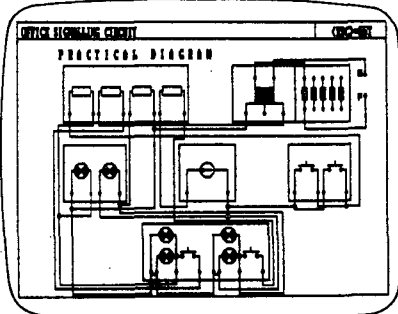


Equipment guide list

List number: 9

Technical field: Electrical occupations

Date of issue
January 1988

Item	Description	Quant.	Use	Illustration
109.7.8	<p>CAI: ELECTRICAL INSTALLATIONS</p> <p>for learning electrical installations utilizing a personal computer.</p> <p>The package should consist of a series of lessons, each characterised by:</p> <ul style="list-style-type: none">- a series of screens with theoretical explanations, drawings, tables, etc.- interactive simulations of devices, circuits and instruments;- questions with automatic evaluation of the learning level of the student.- guide for practical experiments on devices and circuits. <p>The program should run under the MS-DOS Operating System, with a minimum machine configuration of 256 KB RAM; two floppy disk drives and a Colour Graphics Adapter.</p> <p>Lessons should cover the following topics.</p> <p>Domestic Installations:</p> <ul style="list-style-type: none">- Lighting systems- Signalling systems- Interphone systems <p>Industrial Installations:</p> <ul style="list-style-type: none">- Remote Control Techniques- Starting systems- Complex systems- Electro-pneumatic systems <p>Automation using Programmable Logic Controllers (PLC):</p> <ul style="list-style-type: none">- The PLC : theory- The PLC : programming- The PLC : applications <p>Complete with user's and reference manuals.</p>	2	I	  

Note: Any similarity in above item descriptions and illustrations with specific makes or models is purely coincidental.

Legend: F = Electrical fitting,
M = Electrical maintenance, I = Electrical installation work,
C = Cable jointing
*Basic item

Page
210



ELECTRICAL ENGINEERING LABORATORIES AND WORKSHOPS LAYOUTS

1. Generally, at least one workshop and one laboratory is recommended.

However, the required number of workshops and laboratories as well as their layouts depend entirely on the local conditions and the project objectives, such as:

- actual equipment available and planned;
- accomodation facilites at site (physical dimension of rooms, number of rooms, placement of utilities, etc.);
- training programme and its schedule; number of trainees and classes;
- plans for future upgrading;
- climate conditions etc.

Therefore, no specific layouts are attached to this planning guide leaving the layout design to the team of specialists preparing each particular project.

2. Electrical safety norms require that workbenches should be provided with safe electrical fittings and the entire workshop should be powered via a common switch box, equipped with safety protection devices. It is further recommended that each bench be equipped with an isolating transformer (of adequate power) to ensure safe working conditions on AC mains voltage. For electrical safety, it is also highly recommended that the workshop floor be covered with insulating material (wood, plastic, etc.), especially when the workbenches are supplied directly from an AC mains line.

3. In areas where the AC mains voltage fluctuates above a tolerance of plus/minus 10%, a suitable AC voltage stabiliser should be used.

A L P H A B E T I C A L I N D E X

	Item no.
AC MOTOR CONSTRUCTION KIT	109.1.33
AC MOTOR SPEED CONTROL UNIT	109.1.22
AC POWER SUPPLY, THREE-PHASE	109.1.51
AC RESISTIVE LOADING UNIT	109.1.47
AC VOLTAGE STABILIZER, 1 KVA	109.1.56
AC VOLTAGE STABILIZER, 2 KVA	109.1.57
AC VOLTAGE STABILIZER, 4 KVA	109.1.58
AC VOLTAGE/CURRENT STANDARD	109.2.70
ADJUSTABLE DC POWER SUPPLY, 0-20 V	109.1.55
ALLEN KEY SET 2 TO 10 MM	109.4.72
ALLEN KEY SET 3/64 TO 1/4 INCH AF	109.4.73
AMPLIFIER	109.2.53C
ANALOG DEMO POWER METER	109.2.72
ANALOG DEMONSTRATION MULTIMETER	109.2.71
ANGLE GRINDER - 115 MM	109.4.7
APPLIED ELECTRICITY HANDBOOK	109.6.6
ARMATURE LATHE AND UNDERCUTTER, 200MM	109.3.20
ARMATURE/STATOR COIL WINDING MACHINE	109.3.2
AUGER BITS SET, 3 TO 30 MM DIA	109.4.92A
AUTOMATIC CENTRE PUNCH, 120 MM	109.4.60
AUTOMATIC SYNCHRONOUS MOTOR STARTER	109.1.30
AUTONOMOUS DATA ACQUISITION SYSTEM	109.2.54
BALL PEIN HAMMER, 150 G	109.4.77
BALL PEIN HAMMER, 500 G	109.4.76
BASIC ELECTRICITY TRAINER	109.1.1
BATTERIES HANDBOOK	109.6.16
BEARING PULLER	109.4.18
BENCH BRUSH - 300 mm	109.4.96
BENCH DRILLING MACHINE - 13 mm	109.4.1
BENCH SHEAR, 8 MM	109.4.10
BENCH VICE	109.4.20
BINDING YARN SET	109.5.145
BITUMEN	109.5.84
BLOWLAMP, 0.75 L	109.4.120
BOLT CUTTER - 16 MM	109.4.11
BOOK ON ELECTRICAL SAFETY ENGINEERING	109.6.21
BOOK ON THE STANDARD INTERNATIONAL SYSTEM	109.6.23
BOOK(S) ON SAFETY AT WORK	109.6.22
BRASS FLAT	109.5.150
BRASS SHEET	109.5.149
CABLE CONNECTORS, 1.5 MM	109.5.70
CABLE CONNECTORS, 16 MM	109.5.73
CABLE CONNECTORS, 2.5 MM	109.5.71
CABLE CONNECTORS, 35 MM	109.5.74
CABLE CONNECTORS, 4.0 MM	109.5.72
CABLE CUTTER	109.4.106
CABLE END SEAL	109.5.76
CABLE END SEAL	109.5.78
CABLE END SEAL	109.5.81
CABLE ENTRY BOX	109.5.85
CABLE FAULT LOCATOR	109.2.34
CABLE JOINT STRAIGHT, PVC	109.5.75
CABLE KNIFE	109.4.103
CABLE MEASURING BRIDGE	109.2.33

A L P H A B E T I C A L I N D E X

	Item no.
CABLE TERMINALS, 1.5 MM	109.5.65
CABLE TERMINALS, 16 MM	109.5.68
CABLE TERMINALS, 2.5 MM	109.5.66
CABLE TERMINALS, 35 MM	109.5.69
CABLE TERMINALS, 4 MM	109.5.67
CABLE WINDER	109.4.102
CABLE 3 X 1.5 MM SQ.	109.5.26
CABLE 3 X 2.5 MM SQ.	109.5.28
CABLE 3 X 35 MM SQ.	109.5.33
CABLE 3 X 4 MM SQ.	109.5.30
CABLE 4 X 1.5 MM SQ.	109.5.27
CABLE 4 X 16 MM SQ.	109.5.32
CABLE 4 X 2.5 MM SQ.	109.5.29
CABLE 4 X 4 MM SQ.	109.5.31
CAI: BASIC ELECTRONICS	109.7.3
CAI: DIGITAL ELECTRONICS	109.7.4
CAI: ELECTRICAL INSTALLATIONS	109.7.8
CAI: ELECTRICAL MEASUREMENTS AND MACHINES	109.7.7
CAI: ELECTRICITY, DC AND AC CIRCUITS	109.7.2
CAI: FUNDAMENTALS OF ELECTRICITY	109.7.1
CAI: INDUSTRIAL ELECTRONICS	109.7.5
CAI: MICROPROCESSOR	109.7.6
CAPACITIVE LOADING UNIT	109.1.49
CAPACITOR-RUN MOTOR	109.1.8
CAPACITOR-START MOTOR	109.1.7
CENTRE PUNCH - 125 MM	109.4.61
CHEMICAL	109.5.160
CHISEL SET	109.4.81
CIRCLIP PLIERS SET, EXTERNAL	109.4.56
CIRCLIP PLIERS SET, INTERNAL	109.4.55
CLEANING BENCH	109.4.132
CLIMBING IRONS	109.4.115
CLIP-ON AMMETER AND VOLTMETER	109.2.9
CLIP-ON AMMETER AND VOLTMETER	109.2.10
CLIP-ON AVOMETER	109.2.11
CLIP-ON CURRENT TRANSFORMER	109.2.1D
CLIP-ON POWER-FACTOR METER	109.2.17
CLIP-ON WATTMETER	109.2.12
COIL IMPREGNATION PLANT	109.3.13
COIL INSERTING APPARATUS	109.3.14
COIL REMOVING APPARATUS	109.3.8
COIL WINDING MACHINE-AUTOMATIC	109.3.1
COMBINATION CENTRE DRILL SET	109.4.93
COMBINATION PLIERS	109.4.49
COMPASS SAW	109.4.32
COMPOUND FOR POWER CABLE JOINTS	109.5.83
CONTACT SPRING BALANCE - 5 G	109.4.161
CONTACT SPRING BALANCE-5 TO 50 G	109.4.162
CONTACT SPRING BALANCE-50 TO 500 G	109.4.163
COPPER HAMMER, 2 KG	109.4.79
COPPER SHEET	109.5.147
COPPER SHEET	109.5.148
COPPER WIRE	109.5.1
COTTON TAPE SET	109.5.144
COUNTERSINK CUTTER, 90 deg.	109.4.1B
CRADLES AND CLIPS 11 MM DIA	109.5.39
CRADLES AND CLIPS 14 MM DIA	109.5.40
CRADLES AND CLIPS 18 MM DIA.	109.5.41
CRADLES AND CLIPS 25 MM DIA	109.5.42
CRADLES AND CLIPS 8 MM DIA	109.5.38

A L P H A B E T I C A L I N D E X

	Item no.
CRIMPING SET	109.4.114
CROCODILE CLIPS, SET	109.5.118
CURRENT TRANSFORMER 10/5 TO 1500/5	109.2.20
CURRENT TRANSFORMER 2.5-25/5	109.2.19
CUTAWAY MODEL OF DC MACHINE	109.1.36D
CUTAWAY MODEL OF INDUCTION MOTOR	109.1.36A
CUTAWAY MODEL OF SLIP-RING MOTOR	109.1.36B
CUTAWAY MODEL OF SYNCHRONOUS MACHINE	109.1.36C
CYLINDER HEAD SCREW KIT	109.5.165
DATA BOOK ON CERAMIC CAPACITORS	109.6.30
DATA BOOK ON ELECTROLYTIC CAPACITORS	109.6.29
DATA BOOK ON POWER DIODES	109.6.24
DATA BOOK ON POWER SEMICONDUCTORS	109.6.26
DATA BOOK ON RESISTORS	109.6.28
DATA BOOK ON THYRISTORS	109.6.25
DATA BOOK ON VOLTAGE REGULATORS	109.6.27
DC CURRENT CALIBRATOR/STANDARD-1A	109.2.68
DC CURRENT CALIBRATOR, 100 MA	109.2.67
DC CURRENT STANDARD - 30 A	109.2.69
DC MOTOR SPEED CONTROL UNIT	109.1.21
DC POWER SUPPLY, 250 V, 10 A	109.1.52
DC RESISTIVE LOADING UNIT	109.1.46
DC VOLTAGE CALIBRATOR, 1000V	109.2.66
DECADE CAPACITORS	109.2.32B
DECADE INDUCTANCE SET	109.2.32C
DIAGONAL CUTTING PLIERS	109.4.50
DIAL GAUGE, 0-50-0	109.4.150
DIES AND TAPS SET - M4 TO M12	109.4.89
DIGITAL CALIPER, 0-150 MM	109.4.149
DIGITAL MICROMETER, 0-25 MM	109.4.148
DIGITAL TIMER - MAINS TIMEBASE	109.2.46
DIGITAL TIMER-QUARTZ TIMEBASE	109.2.47
DIRECT CURRENT MACHINE	109.1.3
DRAW TONG, PAIR	109.4.118
DRAW-IN SPIRAL	109.4.113
DRAW-IN TAPE	109.4.112
DRAWING REFIL	109.2.52B
DRILL SHARPENING DEVICE	109.4.6D
DUSTING BRUSH	109.4.98
EARTH TESTER	109.2.21
EDDY-CURRENT BRAKE	109.1.17
ELECTRIC NORMAL/IMPACT DRILL 13mm	109.4.2
ELECTRIC NORMAL/IMPACT DRILL-8 MM	109.4.3
ELECTRIC ROTARY/STRAIGHT HAMMER	109.4.5
ELECTRICAL CABLES HANDBOOK	109.6.14
ELECTRICAL ENGINEERING HANDBOOK	109.6.5
ELECTRICAL FUSES HANDBOOK	109.6.15
ELECTRICAL INSTALLATION HANDBOOK	109.6.18
ELECTRICAL MACHINES BOOK(S)	109.6.8
ELECTRICAL MACHINES LABORATORY, 1-3 KVA	109.1.38
ELECTRICAL MACHINES TEST UNIT	109.1.14
ELECTRICAL MACHINES, LABORATORY, 0.5 KVA	109.1.37
ELECTRICAL MEASUREMENTS HANDBOOK	109.6.7
ELECTRODYNAMOMETER	109.1.15
ELECTROMECHANICAL DEVICES HANDBOOK	109.6.13
EXPERIMENT TABLE, 1600x800x800 MM	109.4.133

A L P H A B E T I C A L I N D E X

	Item no.
EXTRA FLEXIBLE WIRE	109.5.23
EYE WASH UNIT	109.4.147
FEELER GAUGE SET - METRIC	109.4.153
FILE SET - 250 MM	109.4.85
FILECARD BRUSH	109.4.94
FILLING FOR PVC JOINTS	109.5.82
FIRE EXTINGUISHER - CLASS B, E	109.4.146
FIRST AID KIT	109.4.145
FLAT BUILDING WIRE	109.5.24
FLAT BUILDING WIRE	109.5.25
FLAT NOSE PLIERS	109.4.51
FLEXIBLE WIRE, SET	109.5.20
FLEXIBLE WIRE, SET	109.5.21
FLEXIBLE WIRE, SET	109.5.22
FLUX DENSITY METER	109.2.36
FLUXMETER	109.2.35
FREQUENCY METER, CLASS 1.5	109.2.18
FUSE BASE, SINGLE, 25 A	109.5.109
FUSE BASE, SINGLE, 60 A	109.5.110
FUSE BASE, TRIPLE, 25 A	109.5.111
FUSE BASE, TRIPLE, 60 A	109.5.112
FUSE CAP WITH TERMINALS	109.2.30
FUSE, DIAZED, 10 A	109.5.113
FUSE, DIAZED, 15 A	109.5.114
FUSE, DIAZED, 25 A	109.5.115
FUSE, DIAZED, 35 A	109.5.116
FUSE, DIAZED, 60 A	109.5.117
G-CLAMP SWIVEL VICE	109.4.21
GLOVES, RUBBER, ELECTRICAL WORK	109.4.141
GREASE GUN - LEVER TYPE	109.4.100
GRINDING WHEEL-200 MM DIA-36 GRIT	109.4.6A
GRINDING WHEEL-200 MM DIA-60 GRIT	109.4.6B
HACKSAW BLADE - 18 TPI	109.4.29A
HACKSAW BLADE - 24 TPI	109.4.29B
HACKSAW BLADE, 32 TPI	109.4.29C
HACKSAW BLADES, 150 MM	109.4.30A
HACKSAW FRAME - 300 MM	109.4.29
HAND DRILL, 10 MM	109.4.91
HAND HELD PIN VICE	109.4.23
HAND SAW CROSS CUT	109.4.31
HAND VICE	109.4.22
HANDBOOK ON WIRING	109.6.19
HANDBOOK, POWER ELECTRONICS	109.6.11
HIGH VALUE RESISTANCE BOX	109.2.64
HIGH VOLTAGE ENGINEERING BOOK	109.6.10
HIGH VOLTAGE INSULATION TESTER 5 KV	109.2.28
HIGH VOLTAGE PROBE - 3 kV	109.2.1A
HIGH VOLTAGE PROBE - 30 KV	109.2.1B
HOLDER	109.4.130
ILLUMINATION METER	109.2.38
INDUCTIVE LOADING UNIT	109.1.48
INDUSTRIAL CONTROLS TRAINER	109.1.19

A L P H A B E T I C A L I N D E X

	Item no.
INDUSTRIAL SCISSORS, 210 MM	109.4.26
INDUSTRIAL WORKSHOP GUIDE	109.6.20
INSTALLATION KIT FOR CONDUIT WIRING	109.1.39B
INSTALLATION KIT FOR LIGHTING WIRING	109.1.39C
INSTALLATION KIT FOR SURFACE WIRING	109.1.39A
INSTALLATION OUTLET, SINGLE, 15 A	109.5.86
INSTALLATION OUTLET, SINGLE, 15 A	109.5.87
INSTALLATION OUTLET, 3-PHASE, 15 A	109.5.88
INSTALLATION OUTLET, 3-PHASE, 35 A	109.5.89
INSTALLATION SWITCH	109.5.120
INSTALLATION SWITCH	109.5.121
INSTALLATION SWITCH	109.5.122
INSTALLATION SWITCH	109.5.123
INSTALLATION SWITCH	109.5.124
INSTALLATION SWITCH	109.5.125
INSTALLATION SWITCH	109.5.126
INSTALLATION SWITCH	109.5.127
INSTALLATION SWITCH	109.5.119
INSTRUCTOR'S DESK	109.4.136
INSULATION CREASING MACHINE	109.3.9
INSULATION SLEEVING SET	109.5.146
INSULATION TESTER 0-2000/5000 MOHM	109.2.25
INSULATION TESTER, 0-10 GOHM	109.2.26
INSULATION TESTER, 0-100 MOHM	109.2.22
INSULATION TESTER, 0-1000 MOHM	109.2.24
INSULATION TESTER, 0-500 MOHM	109.2.23
IRON LOSS TEST SET	109.2.37
JUNIOR HACKSAW, 230 MM	109.4.30
LACING CORD	109.5.46
LAMINATED PAPER	109.5.131
LAMINATED PAPER	109.5.132
LEAD DRESSER	109.4.108
LIGHT-BEAM GALVANOMETER	109.2.53B
LIGTH-BEAM OSCILLOGRAPH	109.2.53
LINESMAN'S BLOCK AND FALLS SET	109.4.117
LINESMAN'S SAFETY BELT	109.4.116
LONG CHAIN NOSE PLIERS 200 MM CURVED	109.4.58
LONG CHAIN-NOSE PLIERS, STRAIGHT	109.4.57
MACHINES ASSEMBLING TRAINER	109.1.32
MAGNETIC AMPLIFIER MODULE	109.1.23
MAGNETIC BASE FOR DIAL GAUGE	109.4.151
MAGNETIC POWDER BRAKE	109.1.16
MAGNETO SPANNER SET 4 TO 7.5 MM	109.4.68
MANUAL SMALL WINDING MACHINE	109.3.4
MARKING PUNCHES, ALPHA-NUMERICAL, SET	109.4.64
MASONRY DRILL SET	109.4.83
MASONRY DRILL SET	109.4.84
MATERIAL STORAGE CABINET	109.4.135
MEASURING TAPE, 3 M	109.4.159
MEDIUM VALUE RESISTANCE BOX	109.2.63
MELTING POT, ELECTRIC	109.4.122
MERCURY VAPOUR LAMP	109.2.53D
MINIATURE DRILLING MACHINE SET	109.4.4
MOMENTARY CONTACT SWITCH	109.5.128

A L P H A B E T I C A L I N D E X

	Item no.
MOMENTARY CONTACT SWITCH	109.5.129
MOTOR CONTROL AND PROTECTION TRAINER	109.1.13
MULTIMETER, CLASS 1-1.5	109.2.1
MULTIMETER, CLASS 1-1.5	109.2.3
MULTIMETER, CLASS 1-1.5	109.2.4
MULTIMETER, CLASS 2.0-3.0	109.2.5
MULTIMETER, CLASS 2.5-3.0	109.2.6
NEEDLE FILE SET	109.4.86
NUT ASSORTMENT	109.5.59
OFFICE INSTRUCTOR'S CHAIR	109.4.137
OIL CAN - 0.25 l	109.4.99
OPEN-ENDED SPANNER SET, WHITWORTH	109.4.67
OPEN-ENDED SPANNERS 6 TO 32 MM	109.4.66
OPTICAL TACHOMETER	109.2.41
PAINT BRUSH SET	109.4.97
PEDESTAL GRINDER - 200 MM	109.4.6
PERMANENT CABLE TIES	109.5.45
PHASE METER	109.2.44
PHASE SEQUENCE INDICATOR	109.2.29
PIPE CUTTER	109.4.13
PIPE CUTTER, 50 mm	109.4.14
PIPE REAMER	109.4.17
PIPE VICE, SELF-LOCKING	109.4.12
PIPE-BENDING PLIERS	109.4.16
PLAIN WASHERS	109.5.60
PLASTIC INSULATION TAPE	109.5.141
PLUG, SINGLE PHASE, 15 A	109.5.90
PLUG, 3-PHASE, 15 A	109.5.91
PLUG, 3-PHASE, 35 A	109.5.92
PLUG, 4 MM, BLACK	109.5.98
PLUG, 4 MM, BLUE	109.5.102
PLUG, 4 MM, GREEN	109.5.100
PLUG, 4 MM, RED	109.5.99
PLUG, 4 MM, YELLOW	109.5.101
PLUMBER'S KNIFE	109.4.104
PLUMBER'S MIRRORS, SET	109.4.111
PLUMBERS METAL	109.5.154
PLUMBERS WIPER	109.4.109
POCKET OHM-CAPACITANCE METER	109.2.8
POCKET VOLT-OHM METER	109.2.7
POINTER GALVANOMETER	109.2.61
PORTABLE BALANCING/TESTING FACILITY	109.3.18
PORTABLE CONDUIT BENDER	109.4.15
PORTABLE DIGITAL AVOMETER	109.2.2
PORTABLE FURNACE SET	109.4.119
PORTABLE LAMP	109.4.101
PORTABLE OSCILLOSCOPE, 10 MHZ	109.2.45
PORTABLE POWER FACTOR METER	109.2.16
POTENTIOMETER, DC VOLTAGE/CURRENT	109.2.65
POWER ELECTRONICS TRAINER	109.1.2
POWER SUPPLY DISTRIBUTION BOARD	109.1.43
POWER SYSTEM SIMULATION LABORATORY	109.1.41
PRECISION AMMETER AC/DC	109.2.55
PRECISION POWER MEASURING SET	109.2.60

A L P H A B E T I C A L I N D E X

	Item no.
PRECISION RESISTORS, SET	109.2.62
PRECISION VOLTAMMETER AC/DC	109.2.57
PRECISION VOLTMETER AC/DC	109.2.56
PRECISION WATTMETER AC/DC	109.2.58
PRECISION WATTMETER-DOUBLE MECHANISM	109.2.59
PRIMARY BAR, 500 A	109.2.19C
PRIMARY CABLE, 100 A	109.2.19A
PRIMARY CABLE, 250 A	109.2.19B
PROGRAMMABLE POWER SUPPLY 0-40V, 3A	109.1.54
PUNCH SET	109.4.62
PVC ADHESIVE	109.5.58
PVC CABLE JOINT, STRAIGHT	109.5.77
PVC CONDUIT COUPLER	109.5.55
PVC FEMALE ADAPTER	109.5.57
PVC INSPECTION BEND	109.5.52
PVC INSPECTION ELBOW	109.5.53
PVC INSPECTION TEE	109.5.54
PVC INTERSECT BOX	109.5.51
PVC MALE ADAPTER	109.5.56
PVC TEE BOX	109.5.50
PVC TERMINAL BOX	109.5.48
PVC THROUGH BOX	109.5.49
RADIUS GAUGE SET	109.4.152
RATCHET BRACE, 200 MM, SWEEP	109.4.92
RECEPTACLE, 4 MM, BLACK	109.5.93
RECEPTACLE, 4 MM, BLUE	109.5.97
RECEPTACLE, 4 MM, GREEN	109.5.95
RECEPTACLE, 4 MM, RED	109.5.94
RECEPTACLE, 4 MM, YELLOW	109.5.96
RECORDING PAPER ROLL	109.2.52A
REEL HOLDER	109.3.6
REGULATED DC POWER SUPPLY, 60 V	109.1.53
RELEASABLE CABLE TIES	109.5.44
RELEASABLE WIRE CLAMP	109.5.43
REPULSION INDUCTION MOTOR	109.1.10
RESIDENTIAL WIRING TRAINER	109.1.40
RESIN CORE SOLDER	109.5.151
RESISTIVE DC MOTOR STARTER	109.1.26
RESISTORS BOX FOR AC AND DC	109.2.32A
RIGID CONDUIT, PVC, 20 MM	109.5.47
RIGID SOLID CONDUCTOR, SET	109.5.2
RIGID SOLID CONDUCTOR, SET	109.5.3
RIGID SOLID CONDUCTOR, SET	109.5.4
RIGID STRANDED CONDUCTOR, SET	109.5.5
RIGID STRANDED CONDUCTOR, SET	109.5.6
RIGID STRANDED CONDUCTOR, SET	109.5.7
RIVET PUNCH SET, 2 TO 10 MM	109.4.63
RIVETTING HAMMER, 500 G	109.4.75
RLC METER, AUTOMATIC, DIGITAL	109.2.32
ROSEHEAD COUNTERSINK BIT	109.4.92B
ROUND NOSE PLIERS	109.4.52
RULER, 300 MM	109.4.158
SADDLE 18-25 MM DIA	109.5.36
SADDLE 18-25 MM DIA	109.5.37
SADDLE 9-18 MM DIA	109.5.34
SADDLE 9-18 MM DIA	109.5.35

A L P H A B E T I C A L I N D E X

	Item no.
SAFETY HELMET	109.4.140
SAFETY SPECTACLES	109.4.143
SCRAPER/SHAVE HOOKS	109.4.110
SCREW EXTRACTORS SET	109.4.65
SCREW PITCH GAUGE SET - BSW, BSF	109.4.155
SCREW PITCH GAUGE SET - METRIC	109.4.154
SCREW PITCH GAUGES SET - BA	109.4.156
SCREWDRIVER INSULATED 4x100 MM	109.4.35
SCREWDRIVER PHILLIPS No.2	109.4.43
SCREWDRIVER SET	109.4.46
SCREWDRIVER SET, OFF-SET	109.4.47
SCREWDRIVER SET, PHILLIPS, OFF-SET	109.4.48
SCREWDRIVER 10 x 175 MM	109.4.38
SCREWDRIVER 12 x 200 MM	109.4.39
SCREWDRIVER 6 x 125 MM	109.4.36
SCREWDRIVER 6 x 25 MM	109.4.40
SCREWDRIVER 8 x 150 MM	109.4.37
SCREWDRIVER, PHILLIPS No. 4	109.4.45
SCREWDRIVER, PHILLIPS No.1	109.4.42
SCREWDRIVER, PHILLIPS No.3	109.4.44
SCREWDRIVER, TESTING	109.4.41
SCREWDRIVER, 2.5 x 60 MM	109.4.33
SCREWDRIVER, 3 x 80 MM	109.4.34
SCRIBER	109.4.59
SELF-AMALGAMATING TAPE	109.5.143
SEPARATOR	109.4.19
SET OF DRILLS 0.8 - 3 MM	109.4.4A
SHEARS, 190 MM	109.4.27
SHEATH-CUTTING KNIFE	109.4.105
SHEET METAL SHEARING MACHINE	109.4.9
SHEETMETAL CUTTER - NIBBLER	109.4.24
SIGNAL LAMP SOCKET	109.5.103
SIGNAL LAMP SOCKET	109.5.104
SIGNAL LAMP SOCKET	109.5.105
SIMPLIFIED DYNAMIC BALANCING MACHINE	109.3.19
SINGLE COMPONENT STRONG ADHESIVE	109.5.161
SINGLE PHASE MOTOR WIRING KIT	109.1.39D
SINGLE-PHASE BENCH POWER BOARD	109.1.44
SINGLE-PHASE RECORDING WATTMETER	109.2.49
SLOT INSULATION MATERIAL	109.5.133
SLOT INSULATION MATERIAL	109.5.134
SLOT INSULATION MATERIAL	109.5.135
SLOT INSULATION MATERIAL	109.5.136
SLOT INSULATION MATERIAL	109.5.137
SLOT INSULATION MATERIAL	109.5.138
SLOT INSULATION MATERIAL	109.5.139
SLOT INSULATION MATERIAL	109.5.140
SLOT WEDGE CUTTER	109.3.12
SOCKET	109.5.106
SOCKET	109.5.107
SOCKET SET, 3/6 TO 7/8 INCH	109.4.70
SOCKET SPANNER SET	109.4.74
SOCKET WITH STARTER AND CHOKE, SET	109.5.108
SOCKETS - WRENCH SET	109.4.69
SOCKETS-METRIC	109.4.71
SOFT HAMMER, 750 G	109.4.80
SOFT SOLDERING FLUX	109.5.156
SOLAR POWER UNIT	109.1.59
SOLDER BATH, ELECTRIC	109.4.123
SOLDER TINMEN'S	109.5.153

A L P H A B E T I C A L I N D E X

	Item no.
SOLDER, ALL PURPOSE	109.5.152
SOLDERING AMMONIAC STONE	109.5.155
SOLDERING FLUID	109.5.157
SOLDERING GUN - 80W	109.4.129
SOLDERING IRON - 100 W	109.4.126
SOLDERING IRON - 300 W	109.4.127
SOLDERING IRON - 400 G	109.4.124
SOLDERING IRON - 450 W	109.4.128
SOLDERING IRON, 30 W	109.4.125
SOLDERING MANUAL HANDBOOK	109.6.17
SOLDERING POT, ELECTRIC	109.4.121
SOLID STATE RELAYS HANDBOOK	109.6.12
SOUND LEVEL METER	109.2.39
SPRING WASHERS	109.5.61
SQUIRREL - CAGE INDUCTION MOTOR	109.1.4
STAR DRILL SET	109.4.82
STATOR AND ARMATURE TEST SET	109.3.15
STATOR HOLDING RING 350MM	109.3.11
STATOR HOLDING RING, 200 MM	109.3.10
STEEL BRUSH	109.4.95
STEEL MEASURING TAPE, METRIC - 30 M	109.4.160
STEEL PIN ASSORTMENT	109.5.162
STEEL SPIRAL SET	109.4.107
STRAIGHT CABLE JOINT	109.5.79
STROBOSCOPE	109.1.25
SURFACE THERMOMETER	109.2.42
SWITCH, TIME CONTROL	109.5.130
SYNCHRONIZING MODULE	109.1.24
SYNCHRONOUS MACHINE	109.1.6
T-TYPE CABLE JOINT	109.5.80
TABLE, 2000 x 1000 x 500 MM	109.4.131
TACHOMETER-CONTACT TIP	109.2.40
TEMPERATURE METER	109.2.43
TEMPERATURE SENSOR	109.2.1C
TERAOHMMETER	109.2.27
TERMINAL STRIP, 2 WIRE	109.5.62
TERMINAL STRIP, 3 WIRE	109.5.63
TERMINAL STRIP, 4 WIRE	109.5.64
TEXTILE INSULATION TAPE	109.5.142
THREE PHASE MOTOR WIRING KIT	109.1.39E
THREE-PHASE BENCH POWER BOARD	109.1.45
THREE-PHASE MAGNETIC STARTER	109.1.29
THREE-PHASE RECORDING VARMETER	109.2.51
THREE-PHASE RECORDING WATTMETER	109.2.50
THREE-PHASE RHEOSTAT	109.1.31
THREE-PHASE STARTER (RESISTOR)	109.1.27
THREE-PHASE STARTER (TRANSFORMER)	109.1.28
THYRISTOR CONTROL TRAINER	109.1.20
TINMAN'S Mallet, 50 MM DIA	109.4.78
TINMEN'S SNIPS, STRAIGHT 300 MM	109.4.25
TOOL STORAGE CABINET	109.4.134
TOOLBOX	109.4.90
TRAINEE STOOL	109.4.139
TRANSFORMER CONSTRUCTION KIT	109.1.35
TRANSFORMER HANDBOOK	109.6.9
TRANSFORMERS TEST UNIT	109.1.18
TRANSMISSION LINE TRAINER	109.1.42
TRIANGULAR SCRAPER	109.4.87

A L P H A B E T I C A L I N D E X

	Item no.
TRIMMING KNIFE, 160 MM	109.4.28
TRIPLE SURFACE INSTALLATION CABLE	109.5.12
TRIPLE SURFACE INSTALLATION CABLE	109.5.13
TWEEZERS	109.4.88
TWIN SURFACE INSTALLATION CABLE	109.5.8
TWIN SURFACE INSTALLATION CABLE	109.5.9
TWIN SURFACE INSTALLATION CABLE	109.5.10
TWIN SURFACE INSTALLATION CABLE	109.5.11
TWIST DRILL SET - 1 TO 13 mm	109.4.1A
TWIST DRILL SET, MASONRY	109.4.2A
TWIST DRILL SET, 2-8 MM	109.4.3A
TWO-TRAINEE TABLE	109.4.138
UNIVERSAL BALANCING MACHINE - 10KG	109.3.17
UNIVERSAL BALANCING MACHINE-75KG	109.3.16
UNIVERSAL CIRCULAR TABLE SAW	109.4.8
UNIVERSAL MANUAL COIL WINDER	109.3.5
UNIVERSAL MOTOR AC/DC	109.1.9
UNIVERSAL WINDING FIXTURE SET	109.3.7
UNIVERSAL WINDING MACHINE	109.3.3
UV RECORDING PAPER ROLL	109.2.53A
VARIABLE RESISTOR SET	109.1.50
VARIABLE SPEED MOTOR	109.1.11
VARMETER, 480 V	109.2.15
VARNISH	109.5.158
VARNISH	109.5.159
VIBROMETER	109.2.48
VIDEO-CASSETTES, DIGITAL FUNDAMENTALS	109.6.3
VIDEO-CASSETTES, ELECTRICAL FUNDAMENTALS	109.6.1
VIDEO-CASSETTES, ELECTRONICS FUNDAMENTALS	109.6.2
VIDEO-CASSETTES, POWER CONTROL FUNDAMENTALS	109.6.4
VOLTAGE PHASE SHIFT REGULATOR	109.1.12
WALL PLUG KIT	109.5.164
WATER PUMP PLIERS - 240 MM	109.4.54
WATTMETER CLASS 1.5/480V	109.2.14
WATTMETER, CLASS 1.5 240V	109.2.13
WELDER'S GLOVES	109.4.142
WHEEL DRESSER - 30 MM	109.4.6C
WINDING KIT-TRAINER	109.1.34
WIRE GAUGE	109.4.157
WIRE STRIPPING PLIERS	109.4.53
WIRING ASSEMBLY FRAME	109.1.39
WIRING TESTER	109.2.31
WOOD SCREW KIT	109.5.163
WORK STATION ANTI-STATIC KIT	109.4.144
WOUND ROTOR MACHINE	109.1.5
2-CORE FLEXIBLE MAINS CABLE	109.5.19
3-CORE FLEXIBLE MAINS CABLE	109.5.14
3-CORE FLEXIBLE MAINS CABLE	109.5.15

ALPHABETICAL INDEX

	Item no.
4-CORE FLEXIBLE MAINS CABLE	109.5.16
4-CORE FLEXIBLE MAINS CABLE	109.5.17
4-CORE FLEXIBLE MAINS CABLE	109.5.18

N U M E R I C A L I N D E X

E N G L I S H

Item no.

BASIC ELECTRICITY TRAINER	109.1.1
POWER ELECTRONICS TRAINER	109.1.2
DIRECT CURRENT MACHINE	109.1.3
SQUIRREL - CAGE INDUCTION MOTOR	109.1.4
WOUND ROTOR MACHINE	109.1.5
SYNCHRONOUS MACHINE	109.1.6
CAPACITOR-START MOTOR	109.1.7
CAPACITOR-RUN MOTOR	109.1.8
UNIVERSAL MOTOR AC/DC	109.1.9
REPULSION INDUCTION MOTOR	109.1.10
VARIABLE SPEED MOTOR	109.1.11
VOLTAGE PHASE SHIFT REGULATOR	109.1.12
MOTOR CONTROL AND PROTECTION TRAINER	109.1.13
ELECTRICAL MACHINES TEST UNIT	109.1.14
ELECTRODYNAMOMETER	109.1.15
MAGNETIC POWDER BRAKE	109.1.16
EDDY-CURRENT BRAKE	109.1.17
TRANSFORMERS TEST UNIT	109.1.18
INDUSTRIAL CONTROLS TRAINER	109.1.19
THYRISTOR CONTROL TRAINER	109.1.20
DC MOTOR SPEED CONTROL UNIT	109.1.21
AC MOTOR SPEED CONTROL UNIT	109.1.22
MAGNETIC AMPLIFIER MODULE	109.1.23
SYNCHRONIZING MODULE	109.1.24
STROBOSCOPE	109.1.25
RESISTIVE DC MOTOR STARTER	109.1.26
THREE-PHASE STARTER (RESISTOR)	109.1.27
THREE-PHASE STARTER (TRANSFORMER)	109.1.28
THREE-PHASE MAGNETIC STARTER	109.1.29
AUTOMATIC SYNCHRONOUS MOTOR STARTER	109.1.30
THREE-PHASE RHEOSTAT	109.1.31
MACHINES ASSEMBLING TRAINER	109.1.32
AC MOTOR CONSTRUCTION KIT	109.1.33
WINDING KIT-TRAINER	109.1.34
TRANSFORMER CONSTRUCTION KIT	109.1.35
CUTAWAY MODEL OF INDUCTION MOTOR	109.1.36A
CUTAWAY MODEL OF SLIP-RING MOTOR	109.1.36B
CUTAWAY MODEL OF SYNCHRONOUS MACHINE	109.1.36C
CUTAWAY MODEL OF DC MACHINE	109.1.36D
ELECTRICAL MACHINES, LABORATORY, 0.5 KVA	109.1.37
ELECTRICAL MACHINES LABORATORY, 1-3 KVA	109.1.38
WIRING ASSEMBLY FRAME	109.1.39
INSTALLATION KIT FOR SURFACE WIRING	109.1.39A
INSTALLATION KIT FOR CONDUIT WIRING	109.1.39B
INSTALLATION KIT FOR LIGHTING WIRING	109.1.39C
SINGLE PHASE MOTOR WIRING KIT	109.1.39D
THREE PHASE MOTOR WIRING KIT	109.1.39E
RESIDENTIAL WIRING TRAINER	109.1.40
POWER SYSTEM SIMULATION LABORATORY	109.1.41
TRANSMISSION LINE TRAINER	109.1.42
POWER SUPPLY DISTRIBUTION BOARD	109.1.43
SINGLE-PHASE BENCH POWER BOARD	109.1.44
THREE-PHASE BENCH POWER BOARD	109.1.45
DC RESISTIVE LOADING UNIT	109.1.46
AC RESISTIVE LOADING UNIT	109.1.47

NUMERICAL INDEX

ENGLISH

	Item no.
INDUCTIVE LOADING UNIT	109.1.48
CAPACITIVE LOADING UNIT	109.1.49
VARIABLE RESISTOR SET	109.1.50
AC POWER SUPPLY, THREE-PHASE	109.1.51
DC POWER SUPPLY, 250 V, 10 A	109.1.52
REGULATED DC POWER SUPPLY, 60 V	109.1.53
PROGRAMMABLE POWER SUPPLY 0-40V, 3A	109.1.54
ADJUSTABLE DC POWER SUPPLY, 0-20 V	109.1.55
AC VOLTAGE STABILIZER, 1 KVA	109.1.56
AC VOLTAGE STABILIZER, 2 KVA	109.1.57
AC VOLTAGE STABILIZER, 4 KVA	109.1.58
SOLAR POWER UNIT	109.1.59
MULTIMETER, CLASS 1-1.5	109.2.1
HIGH VOLTAGE PROBE - 3 kV	109.2.1A
HIGH VOLTAGE PROBE - 30 KV	109.2.1B
TEMPERATURE SENSOR	109.2.1C
CLIP-ON CURRENT TRANSFORMER	109.2.1D
PORTABLE DIGITAL AVOMETER	109.2.2
MULTIMETER, CLASS 1-1.5	109.2.3
MULTIMETER, CLASS 1-1.5	109.2.4
MULTIMETER, CLASS 2.0-3.0	109.2.5
MULTIMETER, CLASS 2.5-3.0	109.2.6
POCKET VOLT-OHM METER	109.2.7
POCKET OHM-CAPACITANCE METER	109.2.8
CLIP-ON AMMETER AND VOLTMETER	109.2.9
CLIP-ON AMMETER AND VOLTMETER	109.2.10
CLIP-ON AVOMETER	109.2.11
CLIP-ON WATTMETER	109.2.12
WATTMETER, CLASS 1.5 240V	109.2.13
WATTMETER CLASS 1.5/480V	109.2.14
VARMETER, 480 V	109.2.15
PORTABLE POWER FACTOR METER	109.2.16
CLIP-ON POWER-FACTOR METER	109.2.17
FREQUENCY METER, CLASS 1.5	109.2.18
CURRENT TRANSFORMER 2.5-25/5	109.2.19
PRIMARY CABLE, 100 A	109.2.19A
PRIMARY CABLE, 250 A	109.2.19B
PRIMARY BAR, 500 A	109.2.19C
CURRENT TRANSFORMER 10/5 TO 1500/5	109.2.20
EARTH TESTER	109.2.21
INSULATION TESTER, 0-100 MOHM	109.2.22
INSULATION TESTER, 0-500 MOHM	109.2.23
INSULATION TESTER, 0-1000 MOHM	109.2.24
INSULATION TESTER 0-2000/5000 MOHM	109.2.25
INSULATION TESTER, 0-10 GOHM	109.2.26
TERAOHMMETER	109.2.27
HIGH VOLTAGE INSULATION TESTER 5 KV	109.2.28
PHASE SEQUENCE INDICATOR	109.2.29
FUSE CAP WITH TERMINALS	109.2.30
WIRING TESTER	109.2.31
RLC METER, AUTOMATIC, DIGITAL	109.2.32
RESISTORS BOX FOR AC AND DC	109.2.32A
DECADE CAPACITORS	109.2.32B
DECADE INDUCTANCE SET	109.2.32C

N U M E R I C A L I N D E X

E N G L I S H

	Item no.
CABLE MEASURING BRIDGE	109.2.33
CABLE FAULT LOCATOR	109.2.34
FLUXMETER	109.2.35
FLUX DENSITY METER	109.2.36
IRON LOSS TEST SET	109.2.37
ILLUMINATION METER	109.2.38
SOUND LEVEL METER	109.2.39
TACHOMETER-CONTACT TIP	109.2.40
OPTICAL TACHOMETER	109.2.41
SURFACE THERMOMETER	109.2.42
TEMPERATURE METER	109.2.43
PHASE METER	109.2.44
PORTABLE OSCILLOSCOPE, 10 MHZ	109.2.45
DIGITAL TIMER - MAINS TIMEBASE	109.2.46
DIGITAL TIMER-QUARTZ TIMEBASE	109.2.47
VIBROMETER	109.2.48
SINGLE-PHASE RECORDING WATTMETER	109.2.49
THREE-PHASE RECORDING WATTMETER	109.2.50
THREE-PHASE RECORDING VARMETER	109.2.51
RECORDING PAPER ROLL	109.2.52A
DRAWING REFIL	109.2.52B
LIGHT-BEAM OSCILLOGRAPH	109.2.53
UV RECORDING PAPER ROLL	109.2.53A
LIGHT-BEAM GALVANOMETER	109.2.53B
AMPLIFIER	109.2.53C
MERCURY VAPOUR LAMP	109.2.53D
AUTONOMOUS DATA ACQUISITION SYSTEM	109.2.54
PRECISION AMMETER AC/DC	109.2.55
PRECISION VOLTMETER AC/DC	109.2.56
PRECISION VOLTAMMETER AC/DC	109.2.57
PRECISION WATTMETER AC/DC	109.2.58
PRECISION WATTMETER-DOUBLE MECHANISM	109.2.59
PRECISION POWER MEASURING SET	109.2.60
POINTER GALVANOMETER	109.2.61
PRECISION RESISTORS, SET	109.2.62
MEDIUM VALUE RESISTANCE BOX	109.2.63
HIGH VALUE RESISTANCE BOX	109.2.64
POTENTIOMETER, DC VOLTAGE/CURRENT	109.2.65
DC VOLTAGE CALIBRATOR, 1000V	109.2.66
DC CURRENT CALIBRATOR, 100 MA	109.2.67
DC CURRENT CALIBRATOR/STANDARD-1A	109.2.68
DC CURRENT STANDARD - 30 A	109.2.69
AC VOLTAGE/CURRENT STANDARD	109.2.70
ANALOG DEMONSTRATION MULTIMETER	109.2.71
ANALOG DEMO POWER METER	109.2.72
COIL WINDING MACHINE-AUTOMATIC	109.3.1
ARMATURE/STATOR COIL WINDING MACHINE	109.3.2
UNIVERSAL WINDING MACHINE	109.3.3
MANUAL SMALL WINDING MACHINE	109.3.4
UNIVERSAL MANUAL COIL WINDER	109.3.5
REEL HOLDER	109.3.6
UNIVERSAL WINDING FIXTURE SET	109.3.7
COIL REMOVING APPARATUS	109.3.8
INSULATION CREASING MACHINE	109.3.9

N U M E R I C A L I N D E X

E N G L I S H

	Item no.
STATOR HOLDING RING, 200 MM	109.3.10
STATOR HOLDING RING 350MM	109.3.11
SLOT WEDGE CUTTER	109.3.12
COIL IMPREGNATION PLANT	109.3.13
COIL INSERTING APPARATUS	109.3.14
STATOR AND ARMATURE TEST SET	109.3.15
UNIVERSAL BALANCING MACHINE-75KG	109.3.16
UNIVERSAL BALANCING MACHINE - 10KG	109.3.17
PORTABLE BALANCING/TESTING FACILITY	109.3.18
SIMPLIFIED DYNAMIC BALANCING MACHINE	109.3.19
ARMATURE LATHE AND UNDERCUTTER, 200MM	109.3.20
BENCH DRILLING MACHINE - 13 mm	109.4.1
TWIST DRILL SET - 1 TO 13 mm	109.4.1A
COUNTERSINK CUTTER, 90 deg.	109.4.1B
ELECTRIC NORMAL/IMPACT DRILL 13mm	109.4.2
TWIST DRILL SET, MASONRY	109.4.2A
ELECTRIC NORMAL/IMPACT DRILL-8 MM	109.4.3
TWIST DRILL SET, 2-8 MM	109.4.3A
MINIATURE DRILLING MACHINE SET	109.4.4
SET OF DRILLS 0.8 - 3 MM	109.4.4A
ELECTRIC ROTARY/STRAIGHT HAMMER	109.4.5
PEDESTAL GRINDER - 200 MM	109.4.6
GRINDING WHEEL-200 MM DIA-36 GRIT	109.4.6A
GRINDING WHEEL-200 MM DIA-60 GRIT	109.4.6B
WHEEL DRESSER - 30 MM	109.4.6C
DRILL SHARPENING DEVICE	109.4.6D
ANGLE GRINDER - 115 MM	109.4.7
UNIVERSAL CIRCULAR TABLE SAW	109.4.8
SHEET METAL SHEARING MACHINE	109.4.9
BENCH SHEAR, 8 MM	109.4.10
BOLT CUTTER - 16 MM	109.4.11
PIPE VICE, SELF-LOCKING	109.4.12
PIPE CUTTER	109.4.13
PIPE CUTTER, 50 mm	109.4.14
PORTABLE CONDUIT BENDER	109.4.15
PIPE-BENDING PLIERS	109.4.16
PIPE REAMER	109.4.17
BEARING PULLER	109.4.18
SEPARATOR	109.4.19
BENCH VICE	109.4.20
G-CLAMP SWIVEL VICE	109.4.21
HAND VICE	109.4.22
HAND HELD PIN VICE	109.4.23
SHEETMETAL CUTTER - NIBBLER	109.4.24
TINMEN'S SNIPS, STRAIGHT 300 MM	109.4.25
INDUSTRIAL SCISSORS, 210 MM	109.4.26
SHEARS, 190 MM	109.4.27
TRIMMING KNIFE, 160 MM	109.4.28
HACKSAW FRAME - 300 MM	109.4.29
HACKSAW BLADE - 18 TPI	109.4.29A
HACKSAW BLADE - 24 TPI	109.4.29B
HACKSAW BLADE, 32 TPI	109.4.29C
JUNIOR HACKSAW, 230 MM	109.4.30
HACKSAW BLADES, 150 MM	109.4.30A

N U M E R I C A L I N D E X

ENGLISH

Item no.	
109.4.31	HAND SAW CROSS CUT
109.4.32	COMPASS SAW
109.4.33	SCREWDRIVER, 2.5 x 60 MM
109.4.33	SCREWDRIVER, 3 x 80 MM
109.4.34	SCREWDRIVER INSULATED 4x100 MM
109.4.35	SCREWDRIVER 6 x 125 MM
109.4.36	SCREWDRIVER 8 x 150 MM
109.4.37	SCREWDRIVER 10 x 175 MM
109.4.38	SCREWDRIVER 12 x 200 MM
109.4.39	SCREWDRIVER 6 x 25 MM
109.4.40	SCREWDRIVER, TESTING
109.4.41	SCREWDRIVER, PHILLIPS No.1
109.4.42	SCREWDRIVER PHILLIPS No.2
109.4.43	SCREWDRIVER, PHILLIPS No.3
109.4.44	SCREWDRIVER, PHILLIPS No. 4
109.4.45	SCREWDRIVER SET
109.4.46	SCREWDRIVER SET, OFF-SET
109.4.47	SCREWDRIVER SET, PHILLIPS, OFF-SET
109.4.48	COMBINATION PLIERS
109.4.49	DIAGONAL CUTTING PLIERS
109.4.50	FLAT NOSE PLIERS
109.4.51	ROUND NOSE PLIERS
109.4.52	WIRE STRIPPING PLIERS
109.4.53	WATER PUMP PLIERS - 240 MM
109.4.54	CIRCLIP PLIERS SET, INTERNAL
109.4.55	CIRCLIP PLIERS SET, EXTERNAL
109.4.56	LONG CHAIN-NOSE PLIERS, STRAIGHT
109.4.57	LONG CHAIN NOSE PLIERS 200 MM CURVED
109.4.58	SCRIBER
109.4.59	AUTOMATIC CENTRE PUNCH, 120 MM
109.4.60	CENTRE PUNCH - 125 MM
109.4.61	PUNCH SET
109.4.62	RIVET PUNCH SET, 2 TO 10 MM
109.4.63	MARKING PUNCHES, ALPHA-NUMERICAL, SET
109.4.64	SCREW EXTRACTORS SET
109.4.65	OPEN-ENDED SPANNERS 6 TO 32 MM
109.4.66	OPEN-ENDED SPANNER SET, WHITWORTH
109.4.67	MAGNETO SPANNER SET 4 TO 7.5 MM
109.4.68	SOCKETS - WRENCH SET
109.4.69	SOCKET SET, 3/6 TO 7/8 INCH
109.4.70	SOCKETS-METRIC
109.4.71	ALLEN KEY SET 2 TO 10 MM
109.4.72	ALLEN KEY SET 3/64 TO 1/4 INCH AF
109.4.73	SOCKET SPANNER SET
109.4.74	RIVETING HAMMER, 500 G
109.4.75	BALL PEIN HAMMER, 500 G
109.4.76	BALL PEIN HAMMER, 150 G
109.4.77	TINMAN'S MALLET, 50 MM DIA
109.4.78	COPPER HAMMER, 2 KG
109.4.79	SOFT HAMMER, 750 G
109.4.80	CHISEL SET
109.4.81	STAR DRILL SET
109.4.82	MASONRY DRILL SET
109.4.83	MASONRY DRILL SET
109.4.84	FILE SET - 250 MM
109.4.85	NEEDLE FILE SET
109.4.86	TRIANGULAR SCRAPER
109.4.87	TWEEZERS
109.4.88	DIES AND TAPS SET - M4 TO M12
109.4.89	

NUMERICAL INDEX

ENGLISH

	Item no.
TOOLBOX	109.4.90
HAND DRILL, 10 MM	109.4.91
RATCHET BRACE, 200 MM, SWEEP	109.4.92
AUGER BITS SET, 3 TO 30 MM DIA	109.4.92A
ROSEHEAD COUNTERSINK BIT	109.4.92B
COMBINATION CENTRE DRILL SET	109.4.93
FILECARD BRUSH	109.4.94
STEEL BRUSH	109.4.95
BENCH BRUSH - 300 mm	109.4.96
PAINT BRUSH SET	109.4.97
DUSTING BRUSH	109.4.98
OIL CAN - 0.25 l	109.4.99
GREASE GUN - LEVER TYPE	109.4.100
PORTABLE LAMP	109.4.101
CABLE WINDER	109.4.102
CABLE KNIFE	109.4.103
PLUMBER'S KNIFE	109.4.104
SHEATH-CUTTING KNIFE	109.4.105
CABLE CUTTER	109.4.106
STEEL SPIRAL SET	109.4.107
LEAD DRESSER	109.4.108
PLUMBERS WIPER	109.4.109
SCRAPER/SHAVE HOOKS	109.4.110
PLUMBER'S MIRRORS, SET	109.4.111
DRAW-IN TAPE	109.4.112
DRAW-IN SPIRAL	109.4.113
CRIMPING SET	109.4.114
CLIMBING IRONS	109.4.115
LINESMAN'S SAFETY BELT	109.4.116
LINESMAN'S BLOCK AND FALLS SET	109.4.117
DRAW TONG, PAIR	109.4.118
PORTABLE FURNACE SET	109.4.119
BLOWLAMP, 0.75 L	109.4.120
SOLDERING POT, ELECTRIC	109.4.121
MELTING POT, ELECTRIC	109.4.122
SOLDER BATH, ELECTRIC	109.4.123
SOLDERING IRON - 400 G	109.4.124
SOLDERING IRON, 30 W	109.4.125
SOLDERING IRON - 100 W	109.4.126
SOLDERING IRON - 300 W	109.4.127
SOLDERING IRON - 450 W	109.4.128
SOLDERING GUN - 80W	109.4.129
HOLDER	109.4.130
TABLE, 2000 x 1000 x 500 MM	109.4.131
CLEANING BENCH	109.4.132
EXPERIMENT TABLE, 1600x800x800 MM	109.4.133
TOOL STORAGE CABINET	109.4.134
MATERIAL STORAGE CABINET	109.4.135
INSTRUCTOR'S DESK	109.4.136
OFFICE INSTRUCTOR'S CHAIR	109.4.137
TWO-TRAINEE TABLE	109.4.138
TRAINEE STOOL	109.4.139
SAFETY HELMET	109.4.140
GLOVES, RUBBER, ELECTRICAL WORK	109.4.141
WELDER'S GLOVES	109.4.142
SAFETY SPECTACLES	109.4.143
WORK STATION ANTI-STATIC KIT	109.4.144
FIRST AID KIT	109.4.145
FIRE EXTINGUISHER - CLASS B, E	109.4.146

NUMERICAL INDEX

ENGLISH

	Item no.
EYE WASH UNIT	109.4.147
DIGITAL MICROMETER, 0-25 MM	109.4.148
DIGITAL CALIPER, 0-150 MM	109.4.149
DIAL GAUGE, 0-50-0	109.4.150
MAGNETIC BASE FOR DIAL GAUGE	109.4.151
RADIUS GAUGE SET	109.4.152
FEELER GAUGE SET - METRIC	109.4.153
SCREW PITCH GAUGE SET - METRIC	109.4.154
SCREW PITCH GAUGE SET - BSW, BSF	109.4.155
SCREW PITCH GAUGES SET - BA	109.4.156
WIRE GAUGE	109.4.157
RULER, 300 MM	109.4.158
MEASURING TAPE, 3 M	109.4.159
STEEL MEASURING TAPE, METRIC - 30 M	109.4.160
CONTACT SPRING BALANCE - 5 G	109.4.161
CONTACT SPRING BALANCE-5 TO 50 G	109.4.162
CONTACT SPRING BALANCE-50 TO 500 G	109.4.163

COPPER WIRE	109.5.1
RIGID SOLID CONDUCTOR, SET	109.5.2
RIGID SOLID CONDUCTOR, SET	109.5.3
RIGID SOLID CONDUCTOR, SET	109.5.4
RIGID STRANDED CONDUCTOR, SET	109.5.5
RIGID STRANDED CONDUCTOR, SET	109.5.6
RIGID STRANDED CONDUCTOR, SET	109.5.7
TWIN SURFACE INSTALLATION CABLE	109.5.8
TWIN SURFACE INSTALLATION CABLE	109.5.9
TWIN SURFACE INSTALLATION CABLE	109.5.10
TWIN SURFACE INSTALLATION CABLE	109.5.11
TRIPLE SURFACE INSTALLATION CABLE	109.5.12
TRIPLE SURFACE INSTALLATION CABLE	109.5.13
3-CORE FLEXIBLE MAINS CABLE	109.5.14
3-CORE FLEXIBLE MAINS CABLE	109.5.15
4-CORE FLEXIBLE MAINS CABLE	109.5.16
4-CORE FLEXIBLE MAINS CABLE	109.5.17
4-CORE FLEXIBLE MAINS CABLE	109.5.18
2-CORE FLEXIBLE MAINS CABLE	109.5.19
FLEXIBLE WIRE, SET	109.5.20
FLEXIBLE WIRE, SET	109.5.21
FLEXIBLE WIRE, SET	109.5.22
EXTRA FLEXIBLE WIRE	109.5.23
FLAT BUILDING WIRE	109.5.24
FLAT BUILDING WIRE	109.5.25
CABLE 3 X 1.5 MM SQ.	109.5.26
CABLE 4 X 1.5 MM SQ.	109.5.27
CABLE 3 X 2.5 MM SQ.	109.5.28
CABLE 4 X 2.5 MM SQ.	109.5.29
CABLE 3 X 4 MM SQ.	109.5.30
CABLE 4 X 4 MM SQ.	109.5.31
CABLE 4 X 16 MM SQ.	109.5.32
CABLE 3 X 35 MM SQ.	109.5.33
SADDLE 9-18 MM DIA	109.5.34
SADDLE 9-18 MM DIA	109.5.35
SADDLE 18-25 MM DIA	109.5.36
SADDLE 18-25 MM DIA	109.5.37

N U M E R I C A L I N D E X

ENGLISH

	Item no.
CRADLES AND CLIPS 8 MM DIA	109.5.38
CRADLES AND CLIPS 11 MM DIA	109.5.39
CRADLES AND CLIPS 14 MM DIA	109.5.40
CRADLES AND CLIPS 18 MM DIA.	109.5.41
CRADLES AND CLIPS 25 MM DIA	109.5.42
RELEASABLE WIRE CLAMP	109.5.43
RELEASABLE CABLE TIES	109.5.44
PERMANENT CABLE TIES	109.5.45
LACING CORD	109.5.46
RIGID CONDUIT, PVC, 20 MM	109.5.47
PVC TERMINAL BOX	109.5.48
PVC THROUGH BOX	109.5.49
PVC TEE BOX	109.5.50
PVC INTERSECT BOX	109.5.51
PVC INSPECTION BEND	109.5.52
PVC INSPECTION ELBOW	109.5.53
PVC INSPECTION TEE	109.5.54
PVC CONDUIT COUPLER	109.5.55
PVC MALE ADAPTER	109.5.56
PVC FEMALE ADAPTER	109.5.57
PVC ADHESIVE	109.5.58
NUT ASSORTMENT	109.5.59
PLAIN WASHERS	109.5.60
SPRING WASHERS	109.5.61
TERMINAL STRIP, 2 WIRE	109.5.62
TERMINAL STRIP, 3 WIRE	109.5.63
TERMINAL STRIP, 4 WIRE	109.5.64
CABLE TERMINALS, 1.5 MM	109.5.65
CABLE TERMINALS, 2.5 MM	109.5.66
CABLE TERMINALS, 4 MM	109.5.67
CABLE TERMINALS, 16 MM	109.5.68
CABLE TERMINALS, 35 MM	109.5.69
CABLE CONNECTORS, 1.5 MM	109.5.70
CABLE CONNECTORS, 2.5 MM	109.5.71
CABLE CONNECTORS, 4.0 MM	109.5.72
CABLE CONNECTORS, 16 MM	109.5.73
CABLE CONNECTORS, 35 MM	109.5.74
CABLE JOINT STRAIGHT, PVC	109.5.75
CABLE END SEAL	109.5.76
PVC CABLE JOINT, STRAIGHT	109.5.77
CABLE END SEAL	109.5.78
STRAIGHT CABLE JOINT	109.5.79
T-TYPE CABLE JOINT	109.5.80
CABLE END SEAL	109.5.81
FILLING FOR PVC JOINTS	109.5.82
COMPOUND FOR POWER CABLE JOINTS	109.5.83
BITUMEN	109.5.84
CABLE ENTRY BOX	109.5.85
INSTALLATION OUTLET, SINGLE, 15 A	109.5.86
INSTALLATION OUTLET, SINGLE, 15 A	109.5.87
INSTALLATION OUTLET, 3-PHASE, 15 A	109.5.88
INSTALLATION OUTLET, 3-PHASE, 35 A	109.5.89
PLUG, SINGLE PHASE, 15 A	109.5.90
PLUG, 3-PHASE, 15 A	109.5.91
PLUG, 3-PHASE, 35 A	109.5.92
RECEPTACLE, 4 MM, BLACK	109.5.93
RECEPTACLE, 4 MM, RED	109.5.94
RECEPTACLE, 4 MM, GREEN	109.5.95
RECEPTACLE, 4 MM, YELLOW	109.5.96

N U M E R I C A L I N D E X

E N G L I S H

	Item no.
RECEPTACLE, 4 MM, BLUE	109.5.97
PLUG, 4 MM, BLACK	109.5.98
PLUG, 4 MM, RED	109.5.99
PLUG, 4 MM, GREEN	109.5.100
PLUG, 4 MM, YELLOW	109.5.101
PLUG, 4 MM, BLUE	109.5.102
SIGNAL LAMP SOCKET	109.5.103
SIGNAL LAMP SOCKET	109.5.104
SIGNAL LAMP SOCKET	109.5.105
SOCKET	109.5.106
SOCKET	109.5.107
SOCKET WITH STARTER AND CHOKE, SET	109.5.108
FUSE BASE, SINGLE, 25 A	109.5.109
FUSE BASE, SINGLE, 60 A	109.5.110
FUSE BASE, TRIPLE, 25 A	109.5.111
FUSE BASE, TRIPLE, 60 A	109.5.112
FUSE, DIAZED, 10 A	109.5.113
FUSE, DIAZED, 15 A	109.5.114
FUSE, DIAZED, 25 A	109.5.115
FUSE, DIAZED, 35 A	109.5.116
FUSE, DIAZED, 60 A	109.5.117
CROCODILE CLIPS, SET	109.5.118
INSTALLATION SWITCH	109.5.119
INSTALLATION SWITCH	109.5.120
INSTALLATION SWITCH	109.5.121
INSTALLATION SWITCH	109.5.122
INSTALLATION SWITCH	109.5.123
INSTALLATION SWITCH	109.5.124
INSTALLATION SWITCH	109.5.125
INSTALLATION SWITCH	109.5.126
INSTALLATION SWITCH	109.5.127
MOMENTARY CONTACT SWITCH	109.5.128
MOMENTARY CONTACT SWITCH	109.5.129
SWITCH, TIME CONTROL	109.5.130
LAMINATED PAPER	109.5.131
LAMINATED PAPER	109.5.132
SLOT INSULATION MATERIAL	109.5.133
SLOT INSULATION MATERIAL	109.5.134
SLOT INSULATION MATERIAL	109.5.135
SLOT INSULATION MATERIAL	109.5.136
SLOT INSULATION MATERIAL	109.5.137
SLOT INSULATION MATERIAL	109.5.138
SLOT INSULATION MATERIAL	109.5.139
SLOT INSULATION MATERIAL	109.5.140
PLASTIC INSULATION TAPE	109.5.141
TEXTILE INSULATION TAPE	109.5.142
SELF-AMALGAMATING TAPE	109.5.143
COTTON TAPE SET	109.5.144
BINDING YARN SET	109.5.145
INSULATION SLEEVING SET	109.5.146
COPPER SHEET	109.5.147
COPPER SHEET	109.5.148
BRASS SHEET	109.5.149
BRASS FLAT	109.5.150
RESIN CORE SOLDER	109.5.151
SOLDER, ALL PURPOSE	109.5.152
SOLDER TINMEN'S	109.5.153
PLUMBERS METAL	109.5.154
SOLDERING AMMONIAC STONE	109.5.155

N U M E R I C A L I N D E X

E N G L I S H

	Item no.
SOFT SOLDERING FLUX	109.5.156
SOLDERING FLUID	109.5.157
VARNISH	109.5.158
VARNISH	109.5.159
CHEMICAL	109.5.160
SINGLE COMPONENT STRONG ADHESIVE	109.5.161
STEEL PIN ASSORTMENT	109.5.162
WOOD SCREW KIT	109.5.163
WALL PLUG KIT	109.5.164
CYLINDER HEAD SCREW KIT	109.5.165

VIDEO-CASSETTES, ELECTRICAL FUNDAMENTALS	109.6.1
VIDEO-CASSETTES, ELECTRONICS FUNDAMENTALS	109.6.2
VIDEO-CASSETTES, DIGITAL FUNDAMENTALS	109.6.3
VIDEO-CASSETTES, POWER CONTROL FUNDAMENTALS	109.6.4
ELECTRICAL ENGINEERING HANDBOOK	109.6.5
APPLIED ELECTRICITY HANDBOOK	109.6.6
ELECTRICAL MEASUREMENTS HANDBOOK	109.6.7
ELECTRICAL MACHINES BOOK(S)	109.6.8
TRANSFORMER HANDBOOK	109.6.9
HIGH VOLTAGE ENGINEERING BOOK	109.6.10
HANDBOOK, POWER ELECTRONICS	109.6.11
SOLID STATE RELAYS HANDBOOK	109.6.12
ELECTROMECHANICAL DEVICES HANDBOOK	109.6.13
ELECTRICAL CABLES HANDBOOK	109.6.14
ELECTRICAL FUSES HANDBOOK	109.6.15
BATTERIES HANDBOOK	109.6.16
SOLDERING MANUAL HANDBOOK	109.6.17
ELECTRICAL INSTALLATION HANDBOOK	109.6.18
HANDBOOK ON WIRING	109.6.19
INDUSTRIAL WORKSHOP GUIDE	109.6.20
BOOK ON ELECTRICAL SAFETY ENGINEERING	109.6.21
BOOK(S) ON SAFETY AT WORK	109.6.22
BOOK ON THE STANDARD INTERNATIONAL SYSTEM	109.6.23
DATA BOOK ON POWER DIODES	109.6.24
DATA BOOK ON THYRISTORS	109.6.25
DATA BOOK ON POWER SEMICONDUCTORS	109.6.26
DATA BOOK ON VOLTAGE REGULATORS	109.6.27
DATA BOOK ON RESISTORS	109.6.28
DATA BOOK ON ELECTROLYTIC CAPACITORS	109.6.29
DATA BOOK ON CERAMIC CAPACITORS	109.6.30

CAI: FUNDAMENTALS OF ELECTRICITY	109.7.1
CAI: ELECTRICITY, DC AND AC CIRCUITS	109.7.2
CAI: BASIC ELECTRONICS	109.7.3
CAI: DIGITAL ELECTRONICS	109.7.4
CAI: INDUSTRIAL ELECTRONICS	109.7.5
CAI: MICROPROCESSOR	109.7.6
CAI: ELECTRICAL MEASUREMENTS AND MACHINES	109.7.7
CAI: ELECTRICAL INSTALLATIONS	109.7.8

BANC DE FORMATION: ELECTRICITE DE BASE	109.1.1
BANC DE FORMATION: ELECTRONIQUE DE PUISSANCE	109.1.2
MACHINE A COURANT CONTINU	109.1.3
MOTEUR A CAGE D'ECUREUIL	109.1.4
MOTEUR A ROTOR BOBINE	109.1.5
MACHINE SYNCHRONE	109.1.6
MOTEUR AVEC CONDENSATEUR-DEMARREUR	109.1.7
MOTEUR ASYNCHRONE AVEC CONDENSATEUR DE MARCHE	109.1.8
MOTEUR UNIVERSEL CA/CC	109.1.9
MOTEUR A INDUCTION A REPULSION	109.1.10
MOTEUR A VITESSE VARIABLE	109.1.11
REGULATEUR DE PHASE DE TENSION	109.1.12
BANC DE FORMATION: COMMANDE ET PROTECTION D'UN MOTEUR ELECTRIQUE	109.1.13
UNITE D'ESSAI DES MACHINES ELECTRIQUES	109.1.14
ELECTRODYNAMOMETRE	109.1.15
FREIN A POUDRE MAGNETIQUE	109.1.16
DYNAMO-FREIN	109.1.17
UNITE D'ESSAI DES TRANSFORMATEURS	109.1.18
BANC DE FORMATION: CIRCUITS INDUSTRIELS DE COMMANDE	109.1.19
BANC DE FORMATION - CONTROLE PAR THYRISTOR	109.1.20
DISPOSITIF DE CONTROLE DE VITESSE DE MOTEUR CC	109.1.21
DISPOSITIF DE CONTROLE DE VITESSE DE MOTEUR CA	109.1.22
MODULE AMPLIFICATEUR MAGNETIQUE	109.1.23
MODULE DE SYNCHRONISATION	109.1.24
STROBOSCOPE	109.1.25
DEMARREUR A RESISTANCE DU MOTEUR CC	109.1.26
DEMARREUR TRIPHASE (A RESISTANCE)	109.1.27
DEMARREUR TRIPHASE (PAR TRANSFORMATEUR)	109.1.28
DEMARREUR MAGNETIQUE TRIPHASE	109.1.29
DEMARREUR AUTOMATIQUE POUR MOTEUR SYNCHRONE	109.1.30
RHEOSTAT TRIPHASE	109.1.31
BANC DE FORMATION: ASSEMBLAGE DES MACHINES	109.1.32
TROUSSE DE CONSTRUCTION DU MOTEUR CA	109.1.33
BANC DE FORMATION: TROUSSE DE BOBINAGE	109.1.34
TROUSSE POUR CONSTRUCTION DU TRANSFORMATEUR	109.1.35
MODELE DE MOTEUR ASYNCHRONE EN COUPE	109.1.36A
MODELE DE MOTEUR A BAGUES EN COUPE	109.1.36B
MODELE DE MACHINE SYNCHRONE EN COUPE	109.1.36C
MODELE DE MACHINE CC EN COUPE	109.1.36D
LABORATOIRE DE MACHINES ELECTRIQUES 0,5 KVA	109.1.37
LABORATOIRE DE MACHINES ELECTRIQUES 1 A 3 KVA	109.1.38
CADRE D'ASSEMBLAGE D'INSTALLATION	109.1.39
TROUSSE D'INSTALLATION A DECOUVERT	109.1.39A
TROUSSE D'INSTALLATION POUR CANALISATION SOUS CONDUIT	109.1.39B
TROUSSE D'INSTALLATION D'ECLAIRAGE ELECTRIQUE	109.1.39C
TROUSSE MONTAGE DE MOTEUR MONOPHASE	109.1.39D
TROUSSE DE BRANCHEMENT DE MOTEUR TRIPHASE	109.1.39E
BANC DE FORMATION: INSTALLATION ELECTRIQUE POUR HABITATION	109.1.40
LABORATOIRE DE SYSTEME D'ENERGIE ELECTRIQUE	109.1.41
BANC DE FORMATION: LIGNE DE TRANSMISSION D'ENERGIE	109.1.42
TABLEAU DE DISTRIBUTION D'ALIMENTATION	109.1.43
TABLEAU D'ALIMENTATION MONOPHASEE DE LA TABLE DE TRAVAIL	109.1.44
TABLEAU D'ALIMENTATION TRIPHASEE DE TABLE DE TRAVAIL	109.1.45
UNITE DE CHARGE CC RESISTIVE	109.1.46
UNITE DE CHARGE AC RESISTIVE	109.1.47

I N D E X N U M E R I Q U E

FRANCAIS

	Item no.
UNITE DE CHARGE INDUCTIVE	109.1.48
UNITE DE CHARGE CAPACITIVE	109.1.49
ENSEMBLE DE RESISTANCES VARIABLES	109.1.50
SOURCE D'ALIMENTATION CA TRIPHASE	109.1.51
SOURCE D'ALIMENTATION CC, 250 V, 10 A	109.1.52
ALIMENTATION STABILISEE CC, 60 V	109.1.53
ALIMENTATION PROGRAMMABLE, 0-40 V, 3 A	109.1.54
ALIMENTATION CC REGLABLE, 0-20 V	109.1.55
STABILISATEUR DE TENSION CA, 1 kVA	109.1.56
STABILISATEUR DE TENSION CA, 2 kVA	109.1.57
STABILISATEUR DE TENSION CA, 4 kVA	109.1.58
UNITE D'ALIMENTATION SOLAIRE	109.1.59
MULTIMETRE, CLASSE: 1- 1,5	109.2.1
SONDE A HAUTE TENSION: 3 kV	109.2.1A
SONDE A HAUTE TENSION: 30 kV	109.2.1B
CAPTEUR DE TEMPERATURE	109.2.1C
PINCE TRANSFORMATEUR	109.2.1D
VOLT-OHM-AMPEREMETRE PORTABLE, NUMERIQUE	109.2.2
MULTIMETRE, CLASSE 1 - 1,5	109.2.3
MULTIMETRE, CLASSE 1 - 1,5	109.2.4
MULTIMETRE, CLASSE 2,0 - 3,0	109.2.5
MULTIMETRE, CLASSE 2,5 - 3,0	109.2.6
VOLT-OHMMETRE DE POCHE	109.2.7
OHM-CAPACIMETRE DE POCHE	109.2.8
PINCE AMPERE ET VOLTMETRIQUE	109.2.9
PINCE AMPERE ET VOLTMETRIQUE	109.2.10
PINCE AVOMETRIQUE	109.2.11
PINCE WATTMETRIQUE	109.2.12
WATTMETRE, CLASS 1,5/240 V	109.2.13
WATTMETRE, CLASSE 1,5/480 V	109.2.14
VARMETRE, 480 V	109.2.15
MESUREUR DE COS PHI, PORTABLE	109.2.16
PINCE DE MESURE DE COS PHI	109.2.17
FREQUENCEMENTRE, CLASSE 1,5	109.2.18
TRANSFORMATEUR DE COURANT 2,5 - 25/5	109.2.19
CABLE PRIMAIRE, 100 A	109.2.19A
CABLE PRIMAIRE, 250 A	109.2.19B
BARRE PRIMAIRE, 500 A	109.2.19C
TRANSFORMATEUR DE COURANT 10/5 A 1500/5	109.2.20
ESSAYEUR DE TERRE	109.2.21
ESSAYEUR D'ISOLEMENT, 0-100 MOHM	109.2.22
ESSAYEUR D'ISOLEMENT, 0-500 M OHM	109.2.23
ESSAYEUR D'ISOLEMENT, 0-1000 M OHM	109.2.24
ESSAYEUR D'ISOLEMENT, 0-2000/5000 M OHM	109.2.25
ESSAYEUR D'ISOLEMENT, 0-10 G OHM	109.2.26
TERAOHMMETRE	109.2.27
ESSAYEUR DE L'ISOLATION A HAUTE TENSION, 5 KV	109.2.28
INDICATEUR DE L'ORDRE DE PHASES	109.2.29
PORTE-FUSIBLE AVEC BORNES	109.2.30
ESSAYEUR DE CONTINUITE DE CABLAGE	109.2.31
APPAREIL DE MESURE RLC, AUTOMATIQUE, A AFFICHAGE NUMERIQUE	109.2.32
BOITE A RESISTANCES POUR CA ET CC	109.2.32A
CONDENSATEURS A DECADES	109.2.32B
JEU D'INDUCTANCE EN DECADES	109.2.32C

FRANCAIS

	Item no.
PONT DE MESURE DE CABLES	109.2.33
LOCALISEUR DE DEFAUT DE CABLE	109.2.34
FLUXMETRE	109.2.35
GAUSSMETRE	109.2.36
JEU DE CONTROLE DES PERTES DANS LE FER	109.2.37
LUXMETRE	109.2.38
SONOMETRE	109.2.39
TAHCYMETRE A EMBOUT DE CONTACT	109.2.40
TACHYMETRE OPTIQUE	109.2.41
THERMOMETRE DE SURFACE	109.2.42
THERMOMETRE	109.2.43
PHASEMETRE	109.2.44
OSCILLOSCOPE PORTABLE, 10 MHZ	109.2.45
TEMPORISATEUR - BASE DE TEMPS SECTEUR	109.2.46
TEMPORISATEUR - BASE DE TEMPS QUARTZ	109.2.47
VIBROMETRE	109.2.48
WATTMETRE ENREGISTREUR MONOPHASE	109.2.49
WATTMETRE ENREGISTREUR TRIPHASE	109.2.50
VARMETRE ENREGISTREUR TRIPHASE	109.2.51
ROULEAU DE PAPIER POUR L'ENREGISTREUR	109.2.52A
RECHANGE POUR TRACEUR	109.2.52B
OSCILLOGRAPHE A RAYON LUMINEUX	109.2.53
ROULEAU DE PAPIER POUR L'ENREGISTREUR UV	109.2.53A
GALVANOMETRE A SPOT LUMINEUX	109.2.53B
AMPLIFICATEUR	109.2.53C
LAMPE A VAPEUR DE MERCURE	109.2.53D
SYSTEME AUTONOME D'ACQUISITION DE DONNEES	109.2.54
AMPEREMETRE DE PRECISION CA/CC	109.2.55
VOLTMETRE DE PRECISION CA/CC	109.2.56
VOLT-AMPEREMETRE DE PRECISION CA/CC	109.2.57
WATTMETRE DE PRECISION CA/CC	109.2.58
WATTMETRE DE PRECISION - DOUBLE MECANISME	109.2.59
ENSEMBLE DE MESURE DE PRECISION DE LA PUISSANCE	109.2.60
GALVANOMETRE A AIGUILLE	109.2.61
RESISTANCES DE PRECISION, JEU	109.2.62
BOITE DE RESISTANCES, VALEURS MOYENNES	109.2.63
BOITE DE RESISTANCES, VALEURS SUPERIEURES	109.2.64
POTENTIOMETRE, TENSION/COURANT CC	109.2.65
APPAREIL ETALON DE TENSION CC, 1000 V	109.2.66
APPAREIL ETALON DU CC, 100 mA	109.2.67
ETALON DU COURANT CC-1A	109.2.68
ETALON DE COURANT CC - 30 A	109.2.69
ETALON DE TENSION/COURANT	109.2.70
MULTIMETRE ANALOGIQUE DE DEMONSTRATION	109.2.71
MESUREUR DE PUISSANCE ANALOGIQUE DE DEMONSTRATION	109.2.72
MACHINE A BOBINER AUTOMATIQUE	109.3.1
MACHINE A BOBINER L'INDUIT/STATOR	109.3.2
MACHINE A BOBINER UNIVERSELLE	109.3.3
PETITE MACHINE A BOBINER A COMMANDE MANUELLE	109.3.4
BOBINEUSE UNIVERSELLE A COMMANDE MANUELLE	109.3.5
MANDRIN DE BOBINAGE	109.3.6
JEU DE PIECES DE FIXATION POUR LA BOBINEUSE UNIVERSELLE	109.3.7
APPAREIL DE DEMONTAGE DE L'ENROULEMENT	109.3.8
MACHINE A PLIER L'ISOLANT	109.3.9

I N D E X N U M E R I Q U E

FRANCAIS

	Item no.
COLLIER DE FIXATION DU STATOR, 200 MM	109.3.10
COLLIER DE FIXATION DU STATOR, 350 MM	109.3.11
OUTILS A COUPER D'ISOLEMENT DES FENTES	109.3.12
INSTALLATION D'IMPREGNATION DES BOBINES	109.3.13
APPAREIL A LOGER L'ENROULEMENT	109.3.14
ESSAYEUR DU STATOR ET DE L'INDUIT	109.3.15
MACHINE A EQUILIBRER UNIVERSELLE, 75 KG	109.3.16
MACHINE A EQUILIBRER UNIVERSELLE, 10 KG	109.3.17
DISPOSITIF PORTABLE D'EQUILIBRAGE/D'ESSAYAGE	109.3.18
MACHINE D'EQUILIBRAGE DYNAMIQUE SIMPLIFIEE	109.3.19
TOUR A INDUIT AVEC OUTIL DE DEGAGEMENT, 200 MM	109.3.20
PERCEURSE D'ETABLI, 13 MM	109.4.1
FORETS HELICOIDaux, JEU	109.4.1A
FRAISE CONIQUE	109.4.1B
PERCEUSE ELECTRIQUE NORMALE/PERCUSSION 13 MM	109.4.2
MECHE A BETON, JEU	109.4.2A
PERCEUSE ELECTRIQUE NORMALE/PERCUSSION, 8 MM	109.4.3
FORETS HELICOIDaux, JEU	109.4.3A
ENSEMBLE DE PERCEUSE MINIATURE	109.4.4
JEU DE FORETS 0,8 A 3 MM	109.4.4A
MARTEAU ELECTRIQUE ROTATIF ET A PERCUSSION	109.4.5
TOURET A MEULES, 200 MM	109.4.6
MEULE-DIAMETRE 200 MM - GRAIN DE 36	109.4.6A
MEULE - DIAMETRE 200 MM - GRAIN DE 60	109.4.6B
DRESSEUR DE MEULE: 30 MM	109.4.6C
DISPOSITIF D'AFFUTAGE DES FORETS	109.4.6D
TRONCONNEUSE D'ANGLE: 115 MM	109.4.7
SCIE UNIVERSELLE CIRCULAIRE A TABLE	109.4.8
CISAILLE A LEVIER, D'ETABLI	109.4.9
CISAILLE A LEVIER	109.4.10
COUPE-BOULONS	109.4.11
ETAU SERRE-TUBE	109.4.12
COUPE-TUBE	109.4.13
COUPE-TUBES	109.4.14
CINTREUSE DE TUBES PORTABLE	109.4.15
PINCES DE CINTRAGE DES TUBES	109.4.16
ALESOIR POUR TUBES	109.4.17
ARRACHE DE ROULEMENTS	109.4.18
SEPARATEUR	109.4.19
ETAU PARALLELE D'ETABLI	109.4.20
ETAU DE SERRAGE A BASE TOURNANTE	109.4.21
ETAU A MAIN	109.4.22
ETAU A MAIN POUR BROCHES	109.4.23
CISAILLE A TOLE	109.4.24
CISAILLE DE FERBLANTIER - DROITE	109.4.25
CISEAUX INDUSTRIELS, 210 mm	109.4.26
CISAILLE, 190 mm	109.4.27
COUTEAU DE DECOUPAGE, 160 mm	109.4.28
MONTURE DE SCIE - 300 mm	109.4.29
LAME DE SCIE A METAUX	109.4.29A
LAME DE SCIE A METAUX	109.4.29B
LAME DE SCIE A METAUX	109.4.29C
SCIE A METAUX, MODELE JUNIOR, 230 mm	109.4.30
LAMES DE SCIE, 150 mm	109.4.30A

FRANCAIS

	Item no.
SCIE PASSE-PARTOUT	109.4.31
SCIE A GUICHET	109.4.32
TOURNEVIS, 2,5 X 60 MM	109.4.33
TOURNEVIS, 3 X 80 MM	109.4.34
TOURNEVIS ISOLE	109.4.35
TOURNEVIS	109.4.36
TOURNEVIS 8 X 150 MM	109.4.37
TOURNEVIS 10 x 175 mm	109.4.38
TOURNEVIS 10 X 175 MM	109.4.39
TOURNEVIS COURT 6 x 25 mm	109.4.40
TOURNEVIS D'ELECTRICIEN	109.4.41
TOURNEVIS PHILLIPS NO.1	109.4.42
TOURNEVIS 'PHILLIPS'	109.4.43
TOURNEVIS 'PHILLIPS'	109.4.44
TOURNEVIS 'PHILLIPS'	109.4.45
JEU DE TOURNEVIS D'HORLOGER	109.4.46
TOURNEVIS A LAMES MULTIPLES, OFF-SET	109.4.47
JEU DE TOURNEVIS 'PHILLIPS'	109.4.48
PINCE UNIVERSELLE - ISOLEE	109.4.49
PINCE COUPANTE DIAGONALE	109.4.50
PINCE PLATE	109.4.51
PINCE A BECS RONDS	109.4.52
PINCE A DENUDER A RESSORT	109.4.53
PINCE MULTIPRISE, 40 MM	109.4.54
JEU DE PINCES CIRCLIPS INTERIEURS	109.4.55
JEU DE PINCES CIRCLIPS EXTERIEURS	109.4.56
PINCE A LONGS BECS DROITS	109.4.57
PINCE TELEPHONE A LONG BEC COUDE	109.4.58
POINTE A TRACER	109.4.59
POINTEAU DE CENTRAGE AUTOMATIQUE, 120 mm	109.4.60
POINTEAU A CENTRER	109.4.61
JEU DE POINTEAUX	109.4.62
JEU DE RIVETEUSES, 2 A 10 MM	109.4.63
MARQUES A FRAPPER, JEU ALPHANUMERIQUE	109.4.64
EXTRACTEUR POUR VIS	109.4.65
CLES A FOURCHE DE 6 A 32 MM	109.4.66
JEU DE CLES A FOURCHE, WHITWORTH	109.4.67
JEU DE CLES POUR MAGNETO - 4 à 7,5 mm	109.4.68
JEU DE CLE A DOUILLES	109.4.69
JEU DE DOUILLES, 3/6 A 7/8 POUCE	109.4.70
DOUILLES METRIQUES	109.4.71
JEU DE CLES ALLEN , 2 A 10 MM	109.4.72
JEU DE CLES ALLEN, 1/16 A 1/4 POUCE AF	109.4.73
JEU DE CLE A DOUILLES	109.4.74
MARTEAU DE RIVETAGE	109.4.75
MARTEAU A PANNE RONDE	109.4.76
MARTEAU A TETE RONDE, 150 g	109.4.77
MAILLET DE FERBLANTIER	109.4.78
MARTEAU EN CUIVRE	109.4.79
	109.4.80
JEU DE CISEAUX A FROID	109.4.81
JEU DE TAMPONNOIRS	109.4.82
JEU DE FORETS POUR MACONNERIE	109.4.83
JEU DE FORETS POUR MACONNERIE	109.4.84
JEU DE LIMES, 250 MM	109.4.85
JEU DE LIMES AIGUILLES	109.4.86
GRATTOIR TRIANGULAIRE	109.4.87
BRUCELLES	109.4.88
JEU DE FILETAGE	109.4.89

I N D E X N U M E R I Q U E

FRANCAIS

	Item no.
BOITE A OUTILS	109.4.90
PERCEUSE A MAIN	109.4.91
VILEBREQUIN A CLIQUET	109.4.92
JEU DE FORET HELICOIDAL, DIA. DE 3 A 30 MM	109.4.92A
FRAISE TAILLEE	109.4.92B
JEU DE MECHE A CENTRER	109.4.93
CARDE A LIME	109.4.94
BROSSE METALLIQUE	109.4.95
BROSSE D'ETABLI	109.4.96
JEU DE PINCEAUX	109.4.97
BROSSE POUR ENLEVER LA POUSSIERE	109.4.98
BURETTE A HUILE	109.4.99
POMPE A GRAISSE A LEVIER	109.4.100
BALADEUSE	109.4.101
RALLONGE	109.4.102
COUTEAU POUR CABLES	109.4.103
COUTEAU DE PLOMBIER	109.4.104
COUTEAU A COUPER ET A DENUDER	109.4.105
COUPE-CABLE	109.4.106
JEU DES SPIRES EN FIL D'ACIER	109.4.107
MAILLET A REDRESSER LE FIL	109.4.108
RABATTOIR DE PLOMBIERS	109.4.109
GRATTOIR A LAME TRIANGULAIRE	109.4.110
MIROIRS DE PLOMBIER, JEU	109.4.111
GUIDE-RUBAN	109.4.112
GUIDE-SPIRALE	109.4.113
JEU DE PINCE A SERTIR	109.4.114
GRIFFES DE MONTEUR	109.4.115
CEINTURE DE SECURITE POUR MONTEURS	109.4.116
JEU DE CABLES ET DE POULIES POUR MONTEURS	109.4.117
TENDEURS, PAIRE	109.4.118
ENSEMBLE DE FOUR PORTABLE	109.4.119
LAMPE A SOUDER	109.4.120
CREUSET A SOUDURE, ELECTRIQUE	109.4.121
CREUSET DE FUSION ELECTRIQUE	109.4.122
BAIN DE SOUDURE ELECTRIQUE	109.4.123
FER A SOUDER, 400 G	109.4.124
FER A SOUDER, 30 W	109.4.125
FER A SOUDER	109.4.126
FER A SOUDER - 300 W	109.4.127
FER A SOUDER	109.4.128
PISTOLET A SOUDER, 80 W	109.4.129
SUPPORT	109.4.130
TABLE, 2000 X 1000 X 500 MM	109.4.131
TABLE DE NETTOYAGE	109.4.132
TABLE DE LABORATOIRE	109.4.133
ARMOIRE POUR OUTILS	109.4.134
ARMOIRE POUR MATERIAUX	109.4.135
BUREAU POUR INSTRUCTEUR	109.4.136
FAUTEUIL D'INSTRUCTEUR	109.4.137
TABLE POUR DEUX STAGIAIRES	109.4.138
TABOURET DE STAGIAIRE	109.4.139
CASQUE DE SECURITE	109.4.140
GANTS EN CAOUTCHOUC POUR TRAVAUX ELECTRIQUES	109.4.141
GANTS DE SOUDEUR	109.4.142
LUNETTES DE SECURITE	109.4.143
NECESSAIRE ANTISTATIQUE POUR POSTE DE TRAVAIL	109.4.144
TROUSSE DE SECOURISME	109.4.145
EXTINCTEUR CLASSE "B", "E", 6 kg	109.4.146

FRANCAIS

	Item no.
ENSEMBLE POUR RINCER LES YEUX	109.4.147
MICROMETRE NUMERIQUE, 0 à 25 mm	109.4.148
PIED A COULISSE NUMERIQUE, 0-150 mm	109.4.149
COMPARATEUR A CADRAN	109.4.150
SUPPORT MAGNETIQUE POUR COMPARATEUR	109.4.151
JAUGES A RAYONS	109.4.152
JAUGE D'EPAISSEUR	109.4.153
JAUGES DE FILETAGE, 60 deg.	109.4.154
JAUGES DE FILETAGE, 55 deg.	109.4.155
JAUGES A PAS DE VIS AU POUCE, B.A.	109.4.156
CALIBRE DE FIL	109.4.157
REGLE, 300 mm	109.4.158
METRE A RUBAN, 3 m	109.4.159
DECAMETRE A RUBAN SUR ENROULEUR	109.4.160
BALANCE A RESSORT DE CONTACT, 5 G	109.4.161
BALANCE A RESSORT DE CONTACT, 5 A 50 G	109.4.162
BALANCE A RESSORT DE CONTACT, 50 A 500 G	109.4.163
CONDUCTEUR EN CUIVRE	109.5.1
JEU DE CONDUCTEURS RIGIDES, MASSIFS	109.5.2
JEU DE CONDUCTEURS RIGIDES MASSIFS	109.5.3
JEU DE CONDUCTEURS RIGIDES MASSIFS	109.5.4
JEU DE CONDUCTEURS RIGIDES A AME CABLEE	109.5.5
JEU DE CONDUCTEURS RIGIDES A AME CABLEE	109.5.6
JEU DE CONDUCTEURS RIGIDES A AME CABLEE	109.5.7
DOUBLE CONDUCTEUR POUR INSTALLATION EXTERNE	109.5.8
DOUBLE CONDUCTEUR POUR INSTALLATION EXTERNE	109.5.9
DOUBLE CONDUCTEUR POUR INSTALLATION EXTERNE	109.5.10
DOUBLE CONDUCTEUR POUR INSTALLATION EXTERNE	109.5.11
TRIPLE CONDUCTEUR POUR INSTALLATION EXTERNE	109.5.12
TRIPLE CONDUCTEUR POUR INSTALLATION EXTERNE	109.5.13
CABLE SOUPLE POUR SECTEUR, 3 CONDUCTEURS	109.5.14
CABLE SOUPLE POUR SECTEUR, 3 CONDUCTEURS	109.5.15
CABLE SOUPLE POUR SECTEUR, 4 CONDUCTEURS	109.5.16
CABLE SOUPLE POUR SECTEUR, 4 CONDUCTEURS	109.5.17
CABLE SOUPLE POUR SECTEUR, 4 CONDUCTEURS	109.5.18
CABLE SOUPLE POUR SECTEUR, 2 CONDUCTEURS	109.5.19
CONDUCTEUR SOUPLE, JEU	109.5.20
CONDUCTEUR SOUPLE, JEU	109.5.21
CONDUCTEUR SOUPLE, JEU	109.5.22
CONDUCTEUR EXTRA SOUPLE	109.5.23
CONDUCTEUR MEPLAT POUR BATIMENT	109.5.24
CONDUCTEUR MEPLAT POUR BATIMENT	109.5.25
CABLE 3 X 1,5 MM CARRE	109.5.26
CABLE 4 X 1,5 MM CARRE	109.5.27
CABLE 3 X 2,5 MM CARRES	109.5.28
CABLE 4 X 2,5 MM CARRES	109.5.29
CABLE 3 X 4 MM CARRES	109.5.30
CABLE 4 X 4 MM CARRES	109.5.31
CABLE 4 X 16 MM CARRES	109.5.32
CABLE 3 X 35 MM CARRES	109.5.33
SUPPORT 9 - 18 MM DIA.	109.5.34
SUPPORT 9 - 18 MM DIA.	109.5.35
SUPPORT 18 - 25 MM DIA.	109.5.36
SUPPORT 18 - 25 MM DIA.	109.5.37

INDEX NUMERIQUE

FRANCAIS

	Item no.
EMBASES ET COSSES 8 MM DIA.	109.5.38
EMBASES ET COSSES 11 MM DIA.	109.5.39
EMBASES ET COSSES 14 MM DIA.	109.5.40
EMBASES ET COSSES 18 MM DIA.	109.5.41
EMBASES ET COSSES 25 MM DIA.	109.5.42
ATTACHE-FILS DEMONTABLE	109.5.43
ATTACHES DE CABLES DEMONTABLES	109.5.44
ATTACHES DE CABLE FIXES	109.5.45
CORDON D'ATTACHE	109.5.46
CONDUIT RIGIDE EN PVC, 20 MM	109.5.47
BOITE DE BORNES, PVC	109.5.48
BOITE DE PASSAGE, PVC	109.5.49
BOITE EN TE, PVC	109.5.50
BOITE DE DERIVATION, PVC	109.5.51
COURBE DE VERIFICATION OUVRABLE, PVC	109.5.52
COUDE DE VERIFICATION OUVRABLE, PVC	109.5.53
RACCORD DE VERIFICATION EN TE OUVRABLE, PVC	109.5.54
ACCOUPLEMENT POUR CONDUIT, PVC	109.5.55
ADAPTATEUR MALE, PVC	109.5.56
ADAPTEUR FEMELLE, PVC	109.5.57
ADHESIF PVC	109.5.58
JEU D'ECROUS	109.5.59
RONDELLES PLATES	109.5.60
RONDELLES A RESSORT, JEU	109.5.61
PLANCHETTE A BORNES, 2 CONDUCTEURS	109.5.62
PLANCHETTE A BORNES, 3 CONDUCTEURS	109.5.63
PLANCHETTE A BORNES, 4 CONDUCTEURS	109.5.64
SERRE-CABLE, 1,5 MM	109.5.65
SERRE-CABLE, 2,5 MM	109.5.66
SERRE-CABLE, 4 MM	109.5.67
SERRE-CABLE, 16 MM	109.5.68
SERRE-CABLE, 35 MM	109.5.69
CONNECTEURS DE CABLE, 1,5 MM	109.5.70
CONNECTEURS DE CABLE, 2,5 MM	109.5.71
CONNECTEURS DE CABLE, 4,0 MM	109.5.72
CONNECTEURS DE CABLE, 16 MM	109.5.73
CONNECTEURS DE CABLE, 35 MM	109.5.74
BOITE DE RACCORDEMENT DROIT, PVC	109.5.75
BOITE D'EXTREMITE DE CABLE	109.5.76
BOITE DE RACCORDEMENT DROIT, PVC	109.5.77
BOITE D'EXTREMITE DE CABLE	109.5.78
BOITE DE RACCORDEMENT DROIT	109.5.79
BOITE DE CABLE EN T	109.5.80
BOITE D'EXTREMITE DE CABLE	109.5.81
MASTIC DE FERMETURE POUR JOINTS PVC	109.5.82
ASPHALTE POUR CABLES DE PUISSANCE	109.5.83
BITUME	109.5.84
BOITE D'ENTREE POUR CABLE	109.5.85
SORTIE DE COURANT, MONOPHASEE, 15 A	109.5.86
SORTIE DE COURANT, MONOPHASEE, 15 A	109.5.87
SORTIE DE COURANT, TRIPHASEE, 15 A	109.5.88
SORTIE DE COURANT, TRIPHASEE, 35 A	109.5.89
PRISE DE COURANT, MONOPHASEE, 15 A	109.5.90
PRISE DE COURANT, TRIPHASEE, 15 A	109.5.91
PRISE DE COURANT, TRIPHASEE, 35 A	109.5.92
PRISE DE COURANT FEMELLE, 4 MM, NOIRE	109.5.93
PRISE DE COURANT FEMELLE, 4 MM, ROUGE	109.5.94
PRISE DE COURANT FEMELLE, 4 MM, VERTE	109.5.95
PRISE DE COURANT FEMELLE, 4 MM, JAUNE	109.5.96

I N D E X N U M E R I Q U E

FRANCAIS

	Item no.
PRISE DE COURANT FEMELLE, 4 MM, BLEUE	109.5.97
FICHE DE COURANT MÂLE, 4 MM, NOIRE	109.5.98
FICHE DE COURANT MÂLE, 4 MM, ROUGE	109.5.99
FICHE DE COURANT MÂLE, 4 MM, VERTE	109.5.100
FICHE DE COURANT MÂLE, 4 MM, JAUNE	109.5.101
FICHE DE COURANT MÂLE, 4 MM, BLEUE	109.5.102
DOUILLE DE LAMPE TEMOIN	109.5.103
DOUILLE DE LAMPE TEMOIN	109.5.104
DOUILLE DE LAMPE TEMOIN	109.5.105
DOUILLE DE LAMPE	109.5.106
DOUILLE DE LAMPE	109.5.107
DOUILLE AVEC STARTER ET BOBINE, JEU	109.5.108
CULOT DE FUSIBLE, SIMPLE, 25 A	109.5.109
CULOT DE FUSIBLE, SIMPLE, 60 A	109.5.110
CULOT DE FUSIBLE, TRIPLE, 25 A	109.5.111
CULOT DE FUSIBLE, TRIPLE, 60 A	109.5.112
FUSIBLE, 10 A	109.5.113
FUSIBLE, 15 A	109.5.114
FUSIBLE, 25 A	109.5.115
FUSIBLE, 35 A	109.5.116
FUSIBLE, 60 A	109.5.117
PINCES CROCODILE, JEU	109.5.118
INTERRUPTEUR	109.5.119
INTERRUPTEUR	109.5.120
INTERRUPTEUR	109.5.121
INTERRUPTEUR	109.5.122
INTERRUPTEUR	109.5.123
INTERRUPTEUR	109.5.124
INTERRUPTEUR	109.5.125
INTERRUPTEUR	109.5.126
INTERRUPTEUR	109.5.127
CONTRACTEUR INSTANTANE	109.5.128
CONTRACTEUR INSTANTANE	109.5.129
DISJONCTEUR DE MINUTERIE	109.5.130
PAPIER DOUBLE	109.5.131
PAPIER DOUBLE	109.5.132
MATIERE ISOLANTE POUR RAINURE	109.5.133
MATIERE ISOLANTE POUR RAINURE	109.5.134
MATIERE ISOLANTE POUR RAINURE	109.5.135
MATIERE ISOLANTE POUR RAINURE	109.5.136
MATIERE ISOLANTE POUR RAINURE	109.5.137
MATIERE ISOLANTE POUR RAINURE	109.5.138
MATIERE ISOLANTE POUR RAINURE	109.5.139
MATIERE ISOLANTE POUR RAINURE	109.5.140
RUBAN ISOLANT EN PLASTIC, PVC	109.5.141
BANDE ISOLANTE EN TISSU	109.5.142
RUBAN AUTO-AMALGAMANT	109.5.143
JEU DE RUBAN EN COTON	109.5.144
JEU DE FILS A FICELER	109.5.145
MANCHONS DE ISOLATION, JEU	109.5.146
FEUILLE DE CUIVRE	109.5.147
FEUILLE DE CUIVRE	109.5.148
FEUILLE DE LAITON	109.5.149
PLAT DE LAITON	109.5.150
SOUDURE A LA RESINE	109.5.151
SOUDURE UNIVERSELLE	109.5.152
SOUDURE DE FERBLANTIER	109.5.153
BRASURE POUR PLOMBIER	109.5.154
PIERRE DE SEL D'AMMONIAQUE	109.5.155

I N D E X N U M E R I Q U E

FRANCAIS

	Item no.
PATE A SOUDER	109.5.156
GRAISSE DECAPANTE	109.5.157
VERNIS	109.5.158
VERNIS	109.5.159
PRODUITS CHIMIQUES	109.5.160
ADHESIF PUISSANT A COMPOSANT SIMPLE	109.5.161
COLLECTION DE VIS D'ACIER	109.5.162
JEU DE VIS A BOIS	109.5.163
JEU DE CHEVILLES POUR MUR	109.5.164
JEU DE VIS A TETE CYLINDRIQUE	109.5.165

VIDEOCASSETTES: PRINCIPES DE BASE DE L'ELECTRICITE	109.6.1
VIDEOCASSETTES: PRINCIPES DE BASE DE L'ELECTRONIQUE	109.6.2
VIDEOCASSETTES: PRINCIPES DE BASE DE LA TECHNIQUE DIGITALE	109.6.3
VIDEOCASSETTES: PRINCIPES DE BASE DE LA COMMANDE DE PUISSANCE	109.6.4
MANUEL: ELECTROTECHNIQUE	109.6.5
MANUEL: ELECTRICITE APPLIQUEE	109.6.6
MANUEL: MESURES ELECTRIQUES	109.6.7
LIVRE(S): DES MACHINES ELECTRIQUES	109.6.8
MANUEL: TRANSFORMATEUR	109.6.9
LIVRE: TECHNIQUE DE LA HAUTE TENSION	109.6.10
MANUEL: ELECTRONIQUE D'ENERGIE ELECTRIQUE	109.6.11
MANUEL: RELAIS D'ETAT SOLIDE	109.6.12
MANUEL: DISPOSITIFS ELECTROMECHANQUES	109.6.13
MANUEL: CABLES ELECTRIQUES	109.6.14
MANUEL: AMORCES ELECTRIQUES	109.6.15
MANUEL: PILES ET ACCUMULATEURS	109.6.16
MANUEL DE SOUDAGE	109.6.17
MANUEL: INSTALLATIONS ELECTRIQUES	109.6.18
MANUEL: CANALISATION ELECTRIQUE	109.6.19
GUIDE DE L'ATELIER INDUSTRIEL	109.6.20
LIVRE: TECHNIQUE DE SECURITE ELECTRIQUE	109.6.21
MANUEL DE SECURITE DE TRAVAIL	109.6.22
LIVRE - NORMES INTERNATIONALES (NI)	109.6.23
MANUEL: DIODES DE PUISSANCE	109.6.24
SPECIFICATIONS - THYRISTORS	109.6.25
SPECIFICATIONS - SEMICONDUCTEURS DE PUISSANCE	109.6.26
SPECIFICATIONS - REGULATEURS DE TENSION	109.6.27
SPECIFICATIONS - RESISTANCES	109.6.28
SPECIFICATIONS - CONDENSATEURS ELECTROLYTIQUES	109.6.29
SPECIFICATIONS - CONDENSATEURS CERAMIQUES	109.6.30

IAO: ELECTRICITE FONDAMENTALE	109.7.1
IAO: ELECTRICITE, CIRCUITS CC ET CA	109.7.2
IAO: ELECTRONIQUE DE BASE	109.7.3
IAO: ELECTRONIQUE NUMERIQUE	109.7.4
IAO: ELECTRONIQUE INDUSTRIELLE	109.7.5
IAO: MICROPROCESSEUR	109.7.6
IAO: MESURES ET MACHINES ELECTRIQUES	109.7.7
IAO: INSTALLATIONS ELECTRIQUES	109.7.8

INDICE ESPAÑOL (POR ORDEN NUMERICO)

109.1.1	ENTRENADOR - ELECTRICIDAD BASICA
109.1.2	ENTRENADOR - ELECTRONICA DE POTENCIA
109.1.3	ELECTROMAQUINA DE CORRIENTE CONTINUA
109.1.4	MOTOR A JAULA DE ARDILA
109.1.5	ELECTROMAQUINA DE ROTOR BOBINADO
109.1.6	MAQUINA ELECTRICO CA, SINCRONICO
109.1.7	MOTOR ASINCRONICO MONOFASICO CON CONDENSADOR Y DISYUNTOR
109.1.8	MOTOR ASINCRONICO MONOFASICO CON CONDENSADOR
109.1.9	MOTOR UNIVERSAL CA/CC
109.1.10	MOTOR ELECTRICO, TIPO DE REPULSION
109.1.11	MOTOR ELECTRICO, VELOCIDAD VARIABLE
109.1.12	DESFASADOR DE VOLTAJE
109.1.13	ENTRENADOR
109.1.14	UNIDAD DE ENSAYO EN ELECTROMAQUINAS
109.1.15	DINAMO - FRENO
109.1.16	FRENO - MAGNETICO
109.1.17	FRENO ELECTROMAGNETICO DE CORRIENCIAS PARASITAS
109.1.18	UNIDAD DE ENSAYO DE TRANSFORMADOR
109.1.19	ENTRENADOR DE CONTROL
109.1.20	ENTRENADOR - CONTROL DE TIRISTORES
109.1.21	UNIDAD DE CONTROL DE VELOCIDAD PARA MOTORES CC
109.1.22	UNIDAD DE CONTROL DE VELOCIDAD PARA MOTORES CA
109.1.23	UNIDAD DE AMPLIFICADOR MAGNETICO
109.1.24	SINCRONIZADOR
109.1.25	STROBOSCOPE
109.1.26	INICIADOR DE MOTOR CC, RESISTOR
109.1.27	INICIADOR TRIFASICO (RESISTOR)
109.1.28	INICIADOR TRIFASICO (TRANSFORMADOR)
109.1.29	INICIADOR TRIFASICO MAGNETICO
109.1.30	INICIADOR AUTOMATICO PARA MOTOR SINCRONICO
109.1.31	REOSTATO TRIFASICO
109.1.32	ENTRENADOR DE CONSTRUCCIONES DE ELECTROMAQUINAS
109.1.33	KIT PARA CONSTRUCCION DE MOTOR CA
109.1.34	ENTRENADOR PARA BOBINADOS
109.1.35	KIT PARA CONSTRUCCION DE TRANSFORMADOR
109.1.36A	MODELO DE MOTOR INDUCCION, RECORTAR
109.1.36B	MODELO DE MOTOR A ANILLOS, RECORTAR
109.1.36C	MODELO DE MAQUINA SINCRONICA, RECORTAR
109.1.36D	MODELO DE MAQUINA CC, RECORTAR
109.1.37	LABORATORIO DE MAQUINAS ELECTRICAS, 0.5 kVA
109.1.38	LABORATORIO DE MAQUINAS ELECTRICAS, 1-3 kVA
109.1.39	ENTRAMAR PARA ALAMBRADO
109.1.39A	KIT DE INSTALACION
109.1.39B	KIT DE INSTALACION
109.1.39C	KIT DE INSTALACION PARA
109.1.39D	KIT DE INSTALACION PARA MOTOR MONOFASE
109.1.39E	KIT DE INSTALACION PARA MOTOR TRIFASE
109.1.40	KIT DE INSTALACION PARA HABITACION
109.1.41	LABORATORIO DE IMITACION DE SISTEMA DE ENERGIA
109.1.42	ENTRENADOR DE LINEA DE ENERGIA
109.1.43	CUADRO DE DISTRIBUCION DE FUENTE DE POTENCIA
109.1.44	TABLERO MONOFASILO DE FUENTE DE POTENCIA
109.1.45	TABLERO TRIFASILO DE FUENTE DE POTENCIA
109.1.46	CARGA RESISTIVA PARA CC
109.1.47	CARGA RESISTIVA PARA CA

INDICE ESPAÑOL (POR ORDEN NUMERICO)

109.1.48	CARGA
109.1.49	CARGA
109.1.50	JUEGO DE RESISTENCIAS VARIABLES
109.1.51	FUENTE DE POTENCIA CA DE TRES FASES
109.1.52	FUENTE DE POTENCIA CC, 250 V, 10 A
109.1.53	FUENTE DE POTENCIA CC REGULADA, 60 V
109.1.54	FUENTE DE POTENCIA PROGRAMABLE 0-40 V, 3A
109.1.55	FUENTE DE POTENCIA CC REGULABLE, 0-20 V
109.1.56	ESTABILIZADOR DE VOLTAJE CA, 1 kVA
109.1.57	ESTABILIZADOR DE VOLTAJE CA, 2 kVA
109.1.58	ESTABILIZADOR DE VOLTAJE CA, 4 kVA
109.1.59	UNIDAD DE LA ENERGIA SOLAR
109.2.1	MULTIMETRO, GRADO 1 - 1.5
109.2.1A	SONDA, TENSION ALTA - 3 kV
109.2.1B	SONDA, TENSION ALTA - 30 kV
109.2.1C	SENSOR DE TEMPERATURA
109.2.1D	TRANSFORMADOR CORRIENTE, CLIP
109.2.2	AVOMETRO DIGITAL PORTATIL
109.2.3	MULTIMETRO, GRADO 1 - 1.5
109.2.4	MULTIMETRO, GRADO 1 - 1.5
109.2.5	MULTIMETRO, GRADO 2.0 - 3.0
109.2.6	MULTIMETRO, GRADO 2.5 - 3.0
109.2.7	VOLTIMETRO Y OHMMETRO, TIPO BOLSILO
109.2.8	OHMMETRO Y MEDITOR DE CAPACITANCIA, TIPO BOLSILO
109.2.9	AMPERIMETRO Y VOLTIMETRO, CLIP
109.2.10	AMPERIMETRO Y VOLTIMETRO, CLIP
109.2.11	AVOMETRO, CLIP
109.2.12	VATIMETRO, CLIP
109.2.13	VATIMETRO, GRADO 1.5/240 V
109.2.14	VATIMETRO, GRADO 1.5/480 V
109.2.15	VARIMETRO, 480 V
109.2.16	MEDIDOR DE COS PHI, PORTATIL
109.2.17	MEDIDOR DE COS PHI, CLIP
109.2.18	FRECUENCIMETRO, GRADO 1.5
109.2.19	TRANSFORMADOR CORRIENTE 2.5 - 25/5
109.2.19A	CABLE PRIMARIO, 100 A
109.2.19B	CABLE PRIMARIO, 250 A
109.2.19C	CABLE PRIMARIO, 500 A
109.2.20	TRANSFORMADOR CORRIENTE 10/5 - 1500/5
109.2.21	MEDIDOR DE LA RESISTENCIA DE TIERRA
109.2.22	MEDIDOR DE AISLAMIENTO, 0 - 100 M OHM
109.2.23	MEDIDOR DE AISLAMIENTO, 0 - 500 M OHM
109.2.24	MEDIDOR DE AISLAMIENTO, 0 - 1000 M OHM
109.2.25	MEDIDOR DE AISLAMIENTO, 0 - 2000/5000 M OHM
109.2.26	MEDIDOR DE AISLAMIENTO, 0 - 10 G OHM
109.2.27	TERAOHMMEDIDOR
109.2.28	PROBADOR DE AISLAMIENTO DE 5 kV
109.2.29	INDICADOR DE ORDEN DE SUCESION DE FASES
109.2.30	FUSIBLE CON BORNES
109.2.31	PROBADOR DE ALAMBRADO

INDICE ESPAÑOL (POR ORDEN NUMERICO)

109.2.32	MEDIDOR RLC, AUTOMATICO, DIGITAL
109.2.32A	CAJA DE RESISTENCIAS PARA CA Y CC
109.2.32B	CAJA DE CAPACITANCIA DE DECADAS
109.2.32C	CAJA DE INDUCTANCIA DE DECADAS
109.2.33	PUENTE DE MEDICIONES DE CABLE
109.2.34	LOCALIZAR DE FALLAS DE CABLE
109.2.35	MEDIDOR DE FLUJO MAGNETICO
109.2.36	DENSIMETRO DE FLUJO MAGNETICO
109.2.37	MEDIDOR DE PERDIDA EN FIERRO
109.2.38	MEDIDOR DE ILUMINACION
109.2.39	MEDIDOR DE NIVEL DE SONIDO
109.2.40	TACOMETRO MECANICO
109.2.41	TACOMETRO OPTICO
109.2.42	MEDIDOR DE TEMPERATURE DE ALLANAR
109.2.43	MEDIDOR DE TEMPERATURA
109.2.44	METRO DE FASE
109.2.45	OSCILOGRAFO PORTATIL, 10 MHZ
109.2.46	CRONOMETRO NUMERICO - REFERENCIA DE TIEMPO CA
109.2.47	CRONOMETRO NUMERICO - REFERENCIA DE TIEMPO CUARZO
109.2.48	MEDIDOR DE VIBRACION
109.2.49	VATIMETRO MONOFASICO CON REGISTRADOR
109.2.50	VATIMETRO TRIFASICO CON REGISTRADOR
109.2.51	VARIMETRO TRIFASICO CON REGISTRADOR
109.2.52A	BOBINA DE PAPEL CON REGISTRADOR
109.2.52B	RELLENO
109.2.53	OSCILOGRAFO ILUMINARSE
109.2.53A	UV PAPEL PARA REGISTRADOR
109.2.53B	GALVANOMETRO PARA OSCILOGRAFO ILUMINARSE
109.2.53C	AMPLIFICADOR
109.2.53D	LAMPARA MERCURIO
109.2.54	SISTEMA AUTONOMO PARA ADQUISICION DE DATA
109.2.55	AMPERIMETRO DE PRECISION CA/CC
109.2.56	VOLTIMETRO DE PRECISION CA/CC
109.2.57	AMPERIMETRO Y VOLTIMETRO DE PRECISION CA/CC
109.2.58	VATMETRO DE PRECISION CA/CC
109.2.59	VATIMETRO CA/CC DE PRECISION, ELECTRODINAMICO
102.2.60	VATIMETROS DE PRECISION, JUEGO
102.2.61	GALVANOMETRO CON AFILADORA
102.2.62	RESISTENCIAS PATRON, JUEGO
102.2.63	CAJA DE RESISTENCIAS, VALOR INTERMEDIARIO
102.2.64	CAJA DE RESISTENCIAS, VALOR ALTA
102.2.65	POTENCIOMETRO PARA VOLTAJE Y CORRIENTE CC
109.2.66	CALIBRADOR DE VOLTAJE CC, 1000 V
109.2.67	CALIBRADOR DE CORRIENTE CD, 100 MA
109.2.68	CALIBRADOR/NORMA DE CORRIENTE CC - 1 A
109.2.69	NORMA DE CORRIENTE CD - 30 A
109.2.70	NORMA DE VOLTAJE/CORRIENTE CA
109.2.71	MULTIMETRO ANALOGICO PARA PRESENTACION
109.2.72	VATIMETRO ANALOGICO PARA PRESENTACION

INDICE ESPAÑOL (POR ORDEN NUMERICO)

109.3.1	MAQUINA BOBINADORA DE CABLES - AUTOMATICO
109.3.2	MAQUINA BOBINADORA PARA ROTOR Y ESTATOR
109.3.3	MAQUINA BOBINADORA, UNIVERSAL
109.3.4	MAQUINA BOBINADORA, MANUAL, PAQUEÑO
109.3.5	MAQUINA BOBINADORA MANUAL, UNIVERSAL
109.3.6	SOPORTE BOBINAS
109.3.7	INSTALACION UNIVERSAL PARA BOBINADORA, JUEGO
109.3.8	APPARATOR PARA REMOVER BOBINAS
109.3.9	MAQUINA DE CERQUILLO
109.3.10	ANILLO DE SUJECION PARA ESTATOR, 200 MM
109.3.11	ANILLO DE SUJECION PARA ESTATOR, 350 MM
109.3.12	CORTADOR PARA AISLAMIENTO DE CANALES
109.3.13	INSTALLATION DE IMPREGNACION PARA BOBINAS
109.3.14	APPARATO PARA INSERTOR BOBINAS
109.3.15	COMPROBADOR DE ESTADOR Y ROTOR
109.3.16	EQUILIBRADORA UNIVERSAL - 75 KG
109.3.17	EQUILIBRADORA UNIVERSAL - 10 KG
109.3.18	EQUILIBRADORA PORTATIL
109.3.19	EQUILIBRADORA SIMPLE
109.3.20	TORNO PARA ROTORES, 200 MM
109.4.1	TALADRADORA DE BANCO
109.4.1A	JUEGO DE BROCAS - 1 A 13 MM
109.4.1B	FRESA CONICA PARA AVELLANAR
109.4.2	PREFORADORA/MARTILLO ELECTRICA PORTATIL - 13 MM
109.4.2A	AROCAS PARA PIEDRAS, JUEGO
109.4.3	PERFORADORA/MARTILLO ELECTRICA PORTATIL - 8 MM
109.4.3A	MECHA HELICOIDAL
109.4.4	TALADRADORA PAQUENA, JUEGO
109.4.5	MARTILLO ELECTRICA
109.4.6	AMOLADORA DE PEDESTAL - 200 MM
109.4.6A	MUELA RECTA - 200 MM, 36 GRIT
109.4.6B	MUELA RECTA - 200 MM, 60 GRIT
109.4.6C	HERRAMIENTA PARA LIMPIAR PIEDRAS DE AMALADORA - 30 MM
109.4.6D	AFILADOR DE BROCAS
109.4.7	RECTIFICADORA DE MANO, ELECTRICO
109.4.8	SIERRA CIRCULAR UNIVERSAL
109.4.9	ESQUILADORA MECANICA
109.4.10	CIZALLA DE PALANCA - 8 MM
109.4.11	ALICATE DE CORTE PARA PERNOS - 16 MM
109.4.12	DOBLADOR PARA TUBOS DE BANCO
109.4.13	ALICATE DE CORET PARA TUBOS
109.4.14	ALICATE DE CORET PARA TUBOS, 50 MM
109.4.15	DOBLADOR PARA TUBOS CON SOPORTE, PORTATIL
109.4.16	ALICATE PARA TUBOS
109.4.17	ESCARIADOR DE TUBOS
109.4.18	EXTRACTOR PARA RODAMIENTOS
109.4.19	SEPARADOR
109.4.20	MORZA PARALELA DE BANCO
109.4.21	ABRAZADERA EN G CON VCE GIRATORIO
109.4.22	MORZA DE MANO
109.4.23	VICE DE BROCHE DE MANO
109.4.24	SIERRA ELECTRICA DE MANO, PORTATIL

INDICE ESPAÑOL (POR ORDEN NUMERICO)

109.4.25	TIJERA DE MANO PARA CHAPAS 300 MM
109.4.26	TIJERAS INDUSTRIALES
109.4.27	TIJERAS, 190 MM
109.4.28	CUCHILLA DE ACABADO, 160 MM
109.4.29	ARCO DE SIERRA, 300 MM
109.4.29A	HOJAS DE SIERRA DE MANO - 18 DIENTES/PULGADA
109.4.29B	HOJAS DE SIERRA DE MANO - 24 DIENTES/PULGADA
109.4.29C	HOJAS DE SIERRA DE MANO - 32 DIENTES/PULGADA
109.4.30	ARCO DE SIERRA PEQUEÑO, 230 MM
109.4.30A	HOJAS DE SIERRA DE ARCO, 150 MM
109.4.31	SERRUCHO DE MANO
109.4.32	SERRUCHO DE PUNTA
109.4.33	DESTORNILLADOR STANDARD 2.5 x 60 MM
109.4.34	DESTORNILLADOR STANDARD 3 x 80 MM
109.4.35	DESTORNILLADOR STANDARD 4 x 100 MM
109.4.36	DESTORNILLADOR STANDARD 6 x 125 MM
109.4.37	DESTORNILLADOR STANDARD 6 x 150 MM
109.4.38	DESTORNILLADOR STANDARD 6 x 175 MM
109.4.39	DESTORNILLADOR STANDARD 6 x 200 MM
109.4.40	DESTORNILLADOR STANDARD 6 x 25 MM
109.4.41	DESTORNILLADOR AISLADO
109.4.42	DESTORNILLADOR "PHILLIPS" NO. 1
109.4.43	DESTORNILLADOR "PHILLIPS" NO. 2
109.4.44	DESTORNILLADOR "PHILLIPS" NO. 3
109.4.45	DESTORNILLADOR "PHILLIPS" NO. 4
109.4.46	DESTORNILLADOR, JUEGO
109.4.47	DESTORNILLADOR ACODADO
109.4.48	DESTORNILLADOR ACODADO, PHILLIPS
109.4.49	ALICATE COMBINADO (UNIVERSAL)
109.4.50	ALICATE DE CORTE DIAGONAL
109.4.51	ALICATE DE BOCA PLANA
109.4.52	
109.4.53	CORTACHAPAS
	ALICATE PARA DESAISLAR CABLES ELECTRICOS
109.4.54	ALICATE PARA BOMBAS DE AGUA
109.4.55	ALICATE PARA "CIRCLIPS", INTERNO
109.4.56	ALICATE PARA "CIRCLIPS", EXTERNO
109.4.57	ALICATE DE BOCA CIGUENA, PLANO
109.4.58	ALICATE DE PUNTAS DELGADAS Y CURVAS
109.4.59	RAYADOR
109.4.60	PUNZON DE CENTRADO AUTOMATICO, 120 MM
109.4.61	PUNZON DE MARCAR, 125 MM
109.4.62	PUNZON PARA PASADORES, JUEGO
109.4.63	PUNZON REMACHADOR, JUEGO, 2 - 10 MM
109.4.64	PUNZONES MARCADORES, JUEGO ALFANUMERICO
109.4.65	EXTRACTOR DE PERNOS
109.4.66	LLAVE FIJA, JUEGO, 6 - 32 MM
109.4.67	LLAVE FIJA, JUEGO, WHITWORTH
109.4.68	LLAVE FIJA, PEQUEÑA, JUEGO, 4 - 7.5 MM
109.4.69	LLAVE DE CAJA, JUEGO
109.4.70	LLAVE DE CAJA, JUEGO, 3/6 - 7/8 PULGADA
109.4.71	CAJAS - METRICO
109.4.72	LLAVE "ALLEN", JUEGO, 2 - 10 MM
109.4.73	LLAVE "ALLEN", JUEGO, 3/64 - 1/4 PULGADA AF
109.4.74	LLAVE DE VASO CON MANGO, JUEGO
109.4.75	MARTILLO CON PENA CRUSADA, 500 G
109.4.76	MARTILLO DE BOLA, 500 G
109.4.77	MARTILLO DE BOLA LLANO, 150 G

INDICE ESPAÑOL (POR ORDEN NUMERICO)

109.4.78	MAZA DE MADERA, 50 MM DIA.
109.4.79	MARTILLO DE COBRE, 2 KG
109.4.80	MARTILLO BLANDO, 750 G
109.4.81	CINCEL Y BOTEROS, JUEGO
109.4.82	BROCA - CINCEL PARA CONCRETO
109.4.83	BROCAS PARA PIEDRAS, JUEGO
109.4.84	BROCAS PARA PIEDRAS, JUEGO
109.4.85	JUEGO DE LIMAS - 250 MM
109.4.86	JUEGO DE LIMAS DE AGUJA
109.4.87	RASCADOR TRIANGULAR
109.4.88	PINZAS
109.4.89	MACHOS Y COJINETES DE ROSCAR, JUEGO, M4 - M12
109.4.90	CAJA PARA HERRAMIENTAS
109.4.91	TALADRADORA MANUAL, 10 MM
109.4.92	BERBIQUI, 200 MM
109.4.92A	BARRENA PARA BERBIQUI, 3 - 30 MM DIA.
109.4.92B	AVELLANADOR
109.4.93	BROCA DE CENTRAR, DOBLE, JUEGO
109.4.94	CEPILLO DE ALAMBRE
109.4.95	CEPILLO DE ACERO
109.4.96	CEPILLO PARA LIMPIAR LOS BANCOS
109.4.97	PINCEL PARA PINTOR
109.4.98	PINCEL PARA LIMPIAR
109.4.99	ACEIREIRA - 0.25 L
109.4.100	PISTOLA DE ENGRASE
109.4.101	LAMPARA PORTATIL DE TALLER
109.4.102	CONDUCTOR DE PROLONGATION
109.4.103	NAVAJA PARA QUITAR LA AISLACION DE LOS CABLES
109.4.104	NAVAJA PARA FONTANERO
109.4.105	NAVAJA PARA CABLES
109.4.106	ALICATE DE CORTE PARA CABLES
109.4.107	RESORTE PARA CURVAR, JUEGO
109.4.108	APLANADOR
109.4.109	FROTADOR DE PLOMERO
109.4.110	RASPADOR
109.4.111	ESPEJO PARA PLOMERIA
109.4.112	ALAMBRE DE ACERO PARA PASAR CONDUCTORES
109.4.113	RESORTE PARA PASAR EL CONDUCTOR
109.4.114	ALICATE PARA TERMINALES
109.4.115	TREPADORES
109.4.116	CINTURON DE SEGURIDAD
109.4.117	POLEA PARA CUERDA
109.4.118	RANA PARA ALAMBRE
109.4.119	CUBETA DE FUNDICION, PORTATIL
109.4.120	LAMPARA DE COMBUSTIBLE PARA SOLDAR - 0.75 L
109.4.121	MARMITA DE SOLDAR ELECTRICA
109.4.122	MARMITA DE FUNDICION
109.4.123	BANCO DE SOLDAR, ELECTRICO
109.4.124	SOLDADOR DE MANO NO ELECTRICO, CON CABEZA DE MARTILLO - 400 G
109.4.125	SOLDADOR DE MANO, ELECTRICO - 30 W
109.4.126	SOLDADOR DE MANO, ELECTRICO - 100 W
109.4.127	SOLDADOR DE MANO, ELECTRICO - 300 W
109.4.128	SOLDADOR DE MANO, ELECTRICO - 450 W
109.4.129	PISTOLA DE SOLDAR ELECTRICA - 80 W
109.4.130	SOPORTA
109.4.131	BANCO, 2000 x 1000 x 500 MM

INDICE ESPAÑOL (POR ORDEN NUMERICO)

109.4.132	BANCO PARA LIMPIAR PIEZAS
109.4.133	MESA DE TRABAJO, 1600 x 800 x 800 MM
109.4.134	ARMARIO DE HERRAMIENTAS
109.4.135	ARMARIO DE HERRAMIENTAS
109.4.136	MESA PARA INSTRUCTOR
109.4.137	SILLA PARA INSTRUCTORES
109.4.138	MESA PARA ALUMNOS
109.4.139	SILLA PARA ALUMNOS
109.4.140	CASCO PROTECTOR DE INSTALADOR
109.4.141	GUANTES DE PROYECCION PARA ELECTRICISTA
109.4.142	GUANTES DE PROTECCION PARA SOLDADOR
109.4.143	ANTIPARRAS DE SEGURIDAD
109.4.144	EQUIPO AISLANTE PARA ESTACION DE TRABAJO
109.4.145	EQUIPO DE PRIMEROS AUXILIOS
109.4.146	EXTINTOR DE INCENDIOS - CLASSE B, E, 6 KG
109.4.147	UNIDAD DE LAVADO DE OJOS
109.4.148	MICROMETRO DIGITAL, 0 - 25 MM
109.4.149	CALIBRADOR DIGITAL, 0 - 150 MM
109.4.150	CALIBRE DE CUADRANTE
109.4.151	PORTA - BASE MAGNETICA
109.4.152	CALIBRADOR DE RADIOS
109.4.153	LAMINA CALIBRADORA METRICO, JUEGO
109.4.154	CALIBRO-PASO, METRICO, JUEGO
109.4.155	CALIBRO-PASO, BSW, BSF, JUEGO
109.4.156	CALIBRO-PASO, BA, JUEGO
109.4.157	CALABRADOR DE ALAMBRE
109.4.158	REGLA, 300 MM
109.4.159	CINTA DE MEDICION, 3 M
109.4.160	CINTA METRICA EN CAJA DE CUERO
109.4.161	BALANZA DE CONTACTO, 5 G
109.4.162	BALANZA DE CONTACTO, 5 - 50 G
109.4.163	BALANZA DE CONTACTO, 50 - 500 G

109.5.1	ALAMBRE DE COBRE, SIMPLE
109.5.2	CONDUCTOR SOLIDO, JUEGO
109.5.3	CONDUCTOR SOLIDO, JUEGO
109.5.4	CONDUCTOR SOLIDO, JUEGO
109.5.5	CONDUCTORES O CORDONES RETORCIDOS, JUEGO
109.5.6	CONDUCTORES O CORDONES RETORCIDOS, JUEGO
109.5.7	CONDUCTORES O CORDONES RETORCIDOS, JUEGO
109.5.8	CABLE DOBLE PLANA PARA MONTAJE ALISAR
109.5.9	CABLE DOBLE PLANA PARA MONTAJE ALISAR
109.5.10	CABLE DOBLE PLANA PARA MONTAJE ALISAR
109.5.11	CABLE DOBLE PLANA PARA MONTAJE ALISAR
109.5.12	CABLE TRIPLE PLANA PARA MONTAJE ALISAR
109.5.13	CABLE TRIPLE PLANA PARA MONTAJE ALISAR
109.5.14	CABLE DE POTENCIA FLEXIBLE - 3 CONDUCTORES
109.5.15	CABLE DE POTENCIA FLEXIBLE - 3 CONDUCTORES
109.5.16	CABLE DE POTENCIA FLEXIBLE - 4 CONDUCTORES
109.5.17	CABLE DE POTENCIA FLEXIBLE - 4 CONDUCTORES
109.5.18	CABLE DE POTENCIA FLEXIBLE - 4 CONDUCTORES
109.5.19	CABLE DE POTENCIA FLEXIBLE - 2 CONDUCTORES
109.5.20	ALAMBRE DE COBRE FLEXIBLE, JUEGO

109.5.21	ALAMBRE DE COBRE FLEXIBLE, JUEGO
109.5.22	ALAMBRE DE COBRE FLEXIBLE, JUEGO
109.5.23	ALAMBRE DE COBRE EXTRA FLEXIBLE
109.5.24	CABLE AISLANTE PLANO PARA MONTAJE
109.5.25	CABLE AISLANTE PLANO PARA MONTAJE
109.5.26	CABLE 3 x 1.5 MM CUADRO
109.5.27	CABLE 4 x 1.5 MM CUADRO
109.5.28	CABLE 3 x 2.5 MM CUADRO
109.5.29	CABLE 4 x 2.5 MM CUADRO
109.5.30	CABLE 3 x 4 MM CUADRO
109.5.31	CABLE 4 x 4 MM CUADRO
109.5.32	CABLE 4 x 16 MM CUADRO
109.5.33	CABLE 3 x 35 MM CUADRO
109.5.34	SOPORTE 9 - 18 MM
109.5.35	SOPORTE 9 - 18 MM
109.5.36	SOPORTE 18 - 25 MM
109.5.37	SOPORTE 18 - 25 MM
109.5.38	ARMADURAS Y TALLAS 8 MM
109.5.39	ARMADURAS Y TALLAS 11 MM
109.5.40	ARMADURAS Y TALLAS 14 MM
109.5.41	ARMADURAS Y TALLAS 18 MM
109.5.42	ARMADURAS Y TALLAS 25 MM
109.5.43	TORNILLO DE FIJACION PARA CONDUCTORES, TRINQUENTE
109.5.44	CONEXION DE CABLE, TRINQUENTE
109.5.45	CONEXION DE CABLE, PERMANENTE
109.5.46	CORDEL
109.5.47	CANAL RIGIDO, PVC, 20 MM
109.5.48	CAJA FINAL, PVC
109.5.49	CAJA INTERMEDIA, PVC
109.5.50	CAJA ENTRE, PVC
109.5.51	CAJA ENTRE SECTOR, PVC
109.5.52	CURVAR PARA REVISAR, PVC
109.5.53	TUBO ACODADO PARA REVISAR, PVC
109.5.54	"T" PARA REVISAR, PVC
109.5.55	TUBO DE CONEXION, PVC
109.5.56	ADAPTADOR, MACHO, PVC
109.5.57	ADAPTADOR, TUERCA
109.5.58	TUERCAS, JUEGO
109.5.59	SUBSTANCIA ADHESIVA PARA PVC
109.5.60	RESORTE DE CURVAR, 20 MM
109.5.61	CONTA DE ACERO PARA MONTADOR
109.5.62	DESPOJARSE DE BORNES x 2
109.5.63	DESPOJARSE DE BORNES x 3
109.5.64	DESPOJARSE DE BORNES x 4
109.5.65	BORNES DE CABLE, 1.5 MM
109.5.66	BORNES DE CABLE, 2.5 MM
109.5.67	BORNES DE CABLE, 4 MM
109.5.68	BORNES DE CABLE, 16 MM
109.5.69	BORNES DE CABLE, 35 MM
109.5.70	CONECTORES DE CABLE, 1.5 MM
109.5.71	CONECTORES DE CABLE, 2.5 MM
109.5.72	CONECTORES DE CABLE, 4.0 MM
109.5.73	CONECTORES DE CABLE, 16 MM
109.5.74	CONECTORES DE CABLE, 35 MM
109.5.75	UNION DE CABLE, DIRECTO, PVC
109.5.76	OBTURADOR DE CABLE FINAL

INDICE ESPAÑOL (POR ORDEN NUMERICO)

109.5.77	UNION DE CABLE PVC, DIRECTO
109.5.78	OBTURADOR DE CABLE FINAL
109.5.79	UNION DE CABLE, DIRECTO
109.5.80	UNION DE CABLE EN "T"
109.5.81	OBTURADOR DE CABLE FINAL
109.5.82	HENCHIMIENTO PARA UNION DE CABLE PVC
109.5.83	MIXTURA PARA UNION DE CABLE DE POTENCIA
109.5.84	ALQUITRAN
109.5.85	CAJA DE ENTRADA PARA CABLES
109.5.86	TOMA DE MONTAJE PARA SIMPLE FASE, 15 A
109.5.87	TOMA DE MONTAJE PARA SIMPLE FASE, 15 A
109.5.88	TOMA DE MONTAJE PARA TRES FASES, 15 A
109.5.89	TOMA DE MONTAJE PARA TRES FASES, 35 A
109.5.90	FICHA PARA SIMPLE FASES, 15 A
109.5.91	FICHA PARA TRES FASES, 15 A
109.5.92	FICHA PARA TRES FASES, 35 A
109.5.93	BORNE, 4 MM, NEGRO
109.5.94	BORNE, 4 MM, ROJO
109.5.95	BORNE, 4 MM, VERDE
109.5.96	BORNE, 4 MM, AMARILLO
109.5.97	BORNE, 4 MM, AZUL
109.5.98	FICHA, 4 MM, NEGRO
109.5.99	FICHA, 4 MM, ROJO
109.5.100	FICHA, 4 MM, VERDE
109.5.101	FICHA, 4 MM, AMARILLO
109.5.102	FICHA, 4 MM, AZUL
109.5.103	RECEPTACULO PARA LAMPARA DE SENALES
109.5.104	RECEPTACULO PARA LAMPARA DE SENALES
109.5.105	RECEPTACULO PARA LAMPARA DE SENALES
109.5.106	RECEPTACULO
109.5.107	RECEPTACULO
109.5.108	RECEPTACULO Y INICIADOR Y BOBINA DE REACTANCIA, JUEGO
109.5.109	FUSIBLE, ROSCADO, 25 A, UNICO
109.5.110	FUSIBLE, ROSCADO, 60 A, UNICO
109.5.111	FUSIBLE, ROSCADO, 25 A, TRIPLE
109.5.112	FUSIBLE, ROSCADO, 60 A, TRIPLE
109.5.113	TAPON, 10 A
109.5.114	TAPON, 15 A
109.5.115	TAPON, 25 A
109.5.116	TAPON, 35 A
109.5.117	TAPON, 60 A
109.5.118	PINZA "COCODRILLO"
109.5.119	INTERRUPTOR PARA MONTAJE
109.5.120	INTERRUPTOR PARA MONTAJE
109.5.121	INTERRUPTOR PARA MONTAJE
109.5.122	INTERRUPTOR PARA MONTAJE
109.5.123	INTERRUPTOR PARA MONTAJE
109.5.124	INTERRUPTOR PARA MONTAJE
109.5.125	INTERRUPTOR PARA MONTAJE
109.5.126	INTERRUPTOR PARA MONTAJE
109.5.127	INTERRUPTOR PARA MONTAJE
109.5.128	INTERRUPTOR DE CONTACTOR MOMENTANEO
109.5.129	INTERRUPTOR DE CONTACTOR MOMENTANEO
109.5.130	INTERRUPTOR HORARIO
109.5.131	PAPEL LAMINADO
109.5.132	PAPEL LAMINADO

INDICE ESPAÑOL (POR ORDEN NUMERICO)

109.5.133	CHAPAS AISLANTES PARA CANALES
109.5.134	CHAPAS AISLANTES PARA CANALES
109.5.135	CHAPAS AISLANTES PARA CANALES
109.5.136	CHAPAS AISLANTES PARA CANALES
109.5.137	CHAPAS AISLANTES PARA CANALES
109.5.138	CHAPAS AISLANTES PARA CANALES
109.5.139	CHAPAS AISLANTES PARA CANALES
109.5.140	CHAPAS AISLANTES PARA CANALES
109.5.141	CINTA AISLANTE PLASTICO
109.5.142	CINTA AISLANTE TEXTIL
109.5.143	CINTA AUTOAMALGAMANTE
109.5.144	CINTA AISLANTE ALGODON, JUEGO
109.5.145	CUERDA PARA USO CORRIENTE, JUEGO
109.5.146	TUBO AISLANTE, JUEGO
109.5.147	HOJAS DE COBRE
109.5.148	HOJAS DE COBRE
109.5.149	HOJAS DE LATON
109.5.150	LATON, EN PERFIL LLANO
109.5.151	SOLDADURA CON RESINA INCORPORADA
109.5.152	SOLDADURA UNIVERSAL
109.5.153	PALILLOS DE SOLDADURA
109.5.154	SUELDA
109.5.155	PIEDRA DE AMONIACO PARA SOLDAR
109.5.156	PASTA DE SOLDAR
109.5.157	FUNDENTE PARA SOLDADURA
109.5.158	BARNIZ
109.5.159	BARNIZ
109.5.160	PRODUCTO QUIMICO
109.5.161	ADHESIVO FUERTE DE COMPONENTE UNICO
109.5.162	CLAVOS DE ACERO
109.5.163	TORNILLOS PARA MADERA
109.5.164	ANCLAJE
109.5.165	TORNILLOS CON CABEZA CILINDRICA
109.5.166	TUERCAS
109.5.167	ARANDELA PLANA EN ACERO, COMPOSICION
109.5.168	ARANDELA CON DENTADA INTERNA, EN ACERO, COMPOSICION

109.6.1	VIDEO CASETE, FUNDAMENTOS DE ELECTROTECNIA
109.6.2	VIDEO CASETE, FUNDAMENTOS DE ELECTRONICA
109.6.3	VIDEO CASETE, FUNDAMENTOS DE LOGICAS DIGITALES
109.6.4	VIDEO CASETE, FUNDAMENTOS DE CONTROL DE POTENCIA
109.6.5	MANUAL - ELECTROTECNIA
109.6.6	MANUAL - ELECTRICIDAD APLICADA
109.6.7	MANUAL - MEDIDAS ELECTRICOS
109.6.8	MANUAL - MAQUINAS ELECTRICAS
109.6.9	MANUAL - TRANSFORMADOR
109.6.10	MANUAL - INGENIERIA DE ALTO VOLTAJE
109.6.11	MANUAL - ELECTRONICA DE POTENCIA
109.6.12	MANUAL - RELES DEL ESTADO SOLIDO
109.6.13	MANUAL - APARATOS ELECTROMECHANICOS
109.6.14	MANUAL - CABLES ELECTRICAS
109.6.15	MANUAL - MECHAS DE SEGURIDAD

INDICE ESPAÑOL (POR ORDEN NUMERICO)

109.6.16	MANUAL - BATERIAS
109.6.17	MANUAL - SOLDADURA
109.6.18	MANUAL - INSTALACION EN ELECTROTECNIA
109.6.19	MANUAL - ALAMBRADO
109.6.20	GUIA DE TALLER INDUSTRIAL
109.6.21	LIBRO - SEGURIDAD EN ELECTROTECNIA
109.6.22	SEGURIDAD EN EL TRABAJO, LIBRO(S)
109.6.23	LIBRO - NORMAS INTERNACIONALES (NI)
109.6.24	ESPECIFICACIONES, DIODES DE POTENCIA
109.6.25	ESPECIFICACIONES, TIRISTORES
109.6.26	ESPECIFICACIONES, SEMICONDUCTORES DE PONTENCIA
109.6.27	ESPECIFICACIONES, REGULADORES DE VOLTAGE
109.6.28	ESPECIFICACIONES, RESISTORES
109.6.29	ESPECIFICACIONES, CONDENSADORES ELECTROLITICOS
109.6.30	ESPECIFICACIONES, CONDENSADORES DE CERAMICA

INSTRUCCIONES DE AYUDA PARA COMPUTO

109.7.1	FUNDAMENTOS DE ELECTRICIDAD
109.7.2	ELECTRICIDAD: CORRIENTE DIRECTA Y CORRIENTE ALTERNA
109.7.3	ELECTRONICA BASICA
109.7.4	ELECTRONICA DIGITAL
109.7.5	ELECTRONICA INDUSTRIAL
109.7.6	MIRCO-PROCESADORA
109.7.7	MEDIDAS Y MAQUINAS ELECTRICAS
109.7.8	INSTALACIONES ELECTRICAS

LIST OF ILO EQUIPMENT PLANNING GUIDES

Guide No.	Title	Pages
1	Machining and Fitting Occupations	189
2	Tool and Die Making	214
3	Welding Occupations	113
4	Sheetmetal Occupations	145
5	Automotive (second edition, revised)	250
6	Plumbing/Pipe Fitting Occupations	121
7	Foundry	157
8	Carpentry and Joinery	134
9	Electrical Occupations (second edition, revised)	257
10	Electronics (second edition, revised)	162
11	Communication Engineering	244
12	Masonry	117
13 Part 1	Learning Stations and Layouts for Workshops	341
14	Refrigeration and Air-Conditioning	149
15	Audio-Visual, Draughting, Office, Reproduction and other ancillary Equipment and Supplies (second edition, revised)	240
16	Hotel and Catering	222
17	Forestry	230

ILO Technical Co-operation Equipment
and Subcontracting Branch (EQUIPRO)
CH-1211 Geneva 22
Switzerland

Reference: ILO Equipment Planning Guide No. 9 - Electrical Occupations

The following suggestions are given to improve the guide:

Name:
Institution:
Address:

Signature:
Date: