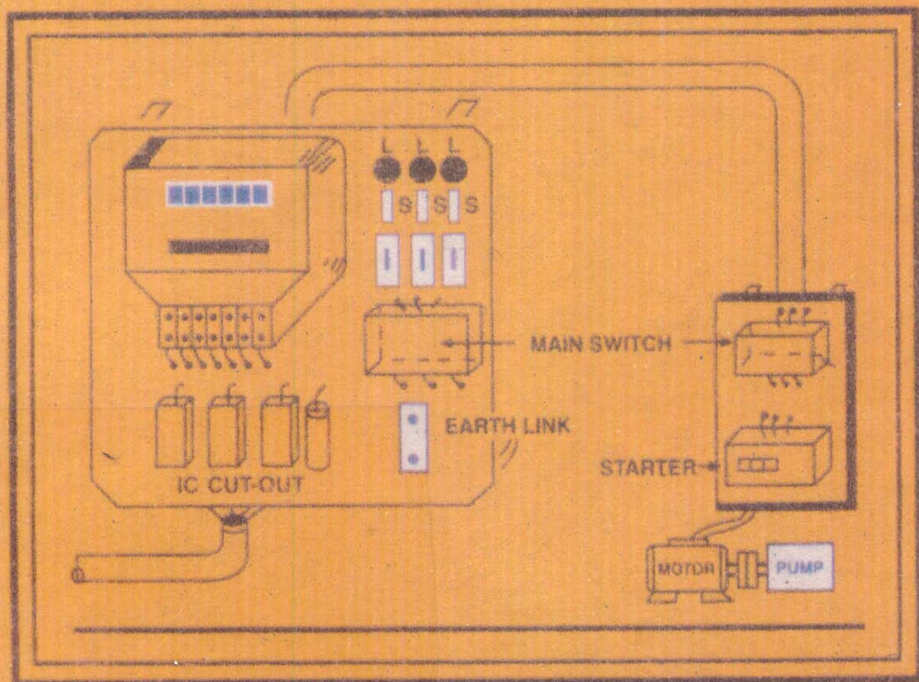


ELECTRICAL WIRING, ESTIMATING & COSTING

S.L. UPPAL



KHANNA PUBLISHERS

**ELECTRICAL
WIRING, ESTIMATING
AND COSTING**

Electrical Wiring, Estimating and Costing

For
*Technical Schools, Industrial Institutes, N.C.C.,
State Diplomas, Electrician and Supervisory Courses*

By

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PREFACE TO THE FIRST EDITION

This is the first book of its kind and has been written with the main object to provide the basic text knowledge of the applications of Electricity which are so common in our day-to-day life ; but still uncommon. special attempt has been made to represent everything diagrammatically. The book may prove quite useful for basic courses at the technical schools, industrial institutes and at college levels. A knowledge of electrical fundamentals is assumed (dealt within the first volume of this book) and the use of calculus is avoided.

The author is grateful to M/s. M.E.M. Electrical Accessories, London and Ashley Accessories Ltd., England for their kind permission to use their catalogues. Suggestions to improve the book will be appreciated.

March, 1963

AUTHORS

PREFACE TO THE FIFTH EDITION

The main object of this edition is to completely revise the old edition to meet the present day requirements of the students of National certificate, state diploma and basic Technical courses in the trade institutions. Special efforts have been made to include all aspects which the students are supposed to know.

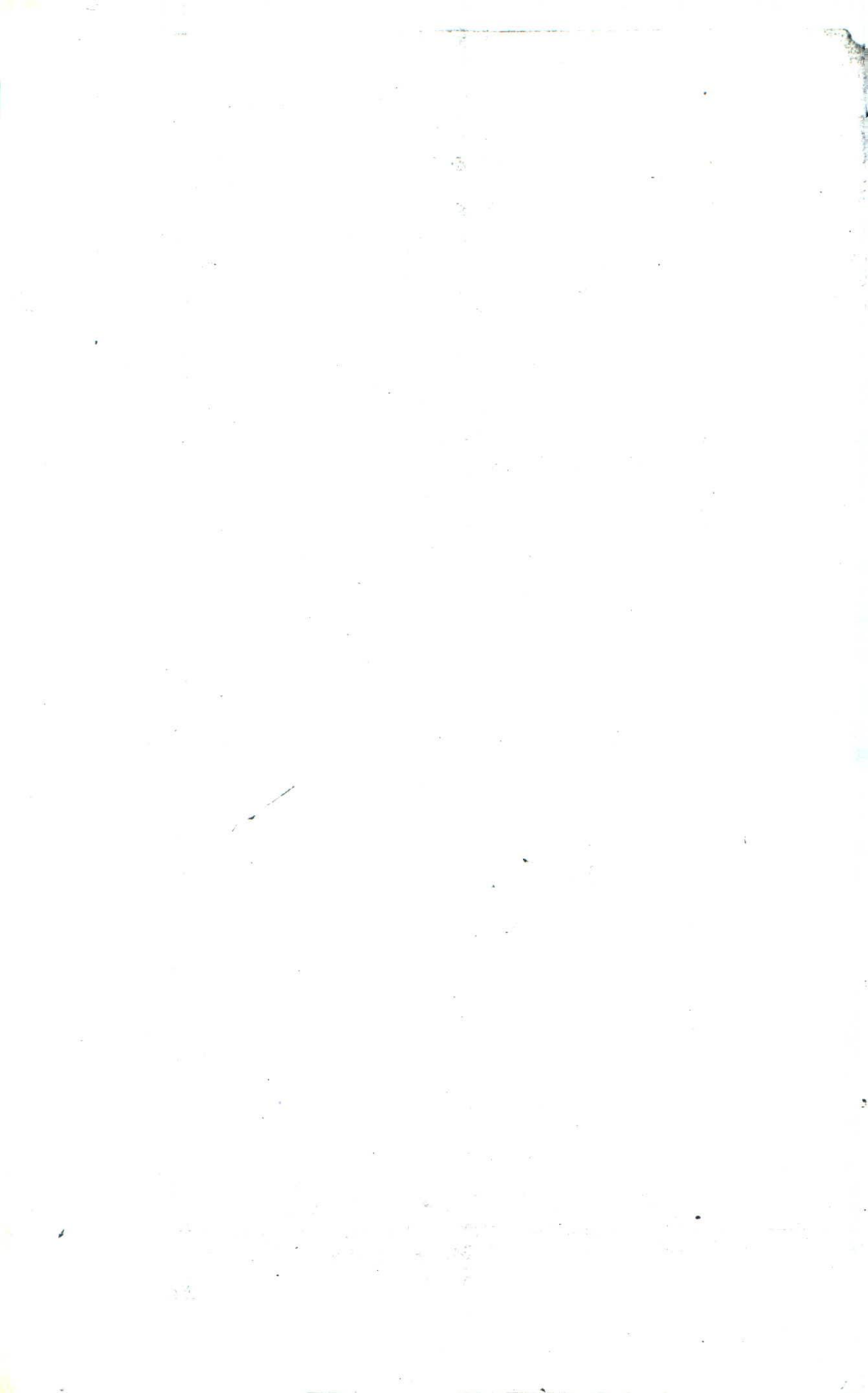
This edition features additional chapters on The Electrical Panel Boards, their Design, Miscellaneous Electrical Components and Bell Circuits and Indicators.

The subject matter has been presented in a simple, easy and understandable language. The object has been to explain the importance of engineering technology.

I am sure that this book will now be useful even to the service engineers, the young students of engineering colleges and polytechnics as efforts have been made to bring it out in a comprehensive form. It is earnestly hoped that this book will be welcomed mostly by the teachers and the taught alike. It will prove to be a boon for them not only for providing guidance but also from the examination point of view.

I will be highly indebted for any useful criticism or suggestion from the readers to improve the standard of this book.

K.B. Bhatia



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Conventional Symbols for Electrical Installation



1. Control Gear and Distribution Fuse-Board

- | | |
|--|---|
| (1) Main fuse-board without switches, lighting |  |
| (2) Main fuse-board without switches, lighting |  |
| (3) Main fuse-board without switches, power |  |
| (4) Main fuse-board with switches, power |  |
| (5) Distribution fuse-board without switches, lighting |  |
| (6) Distribution fuse-board with switches, lighting |  |
| (7) Distribution fuse-board without switches power |  |
| (8) Distribution fuse-board with switches, power |  |
| (9) Main switches, lighting |  |
| (10) Main switches, power |  |
| (11) Meter |  |






2. Ceiling Outlets

- | | |
|---|---|
| (12) Single light pendant |  |
| (13) Counter-weight pendant |  |
| (14) Rod pendant |  |
| (15) Chain pendant |  |
| (16) Light bracket |  |
| (17) Batten lampholder |  |
| (18) Water-tight light fitting |  |
| (19) Bulk-head fitting |  |
| (20) Power factor capacitor (when installed |  |









remote from the lamp unit)

- (21) Lighting outlet connection to an emergency system 
- (22) Choke (when installed remote from the lamp unit) 





3. Switching Outlets

- (23) One-way switch 
- (24) Two-way switch 
- (25) Intermediate switch 
- (26) Pendant switch 
- (27) Pull switch 

4. Socket Outlets

- (28) Socket-outlet, 2 pin 5 amp. 
- (29) Socket-outlet, 3 pin 5 amp. 
- (30) Socket-outlet and switch combined, 2 pin 5 amp. 
- (31) Socket-outlet and switch combined, 3 pin 5 amp. 
- (32) Socket-outlet, 2 pin 15 amp. 
- (33) Socket-outlet, 3 pin 15 amp. 
- (34) Socket-outlet and switch combined, 2 pin 15 amp. 
- (35) Socket-outlet and switch combined, 3 pin 15 amp. 

5. Fix Heating Outlet

- (36) Convecting heater 
- (37) Electric unit heater 
- (38) Immersion heater 
- (39) Thermostat 

- (40) Immersion heater with incorporated thermostat
- (41) Self-contained electric water heater
- (42) Humidistat



6. Bells, Buzzers

- (43) Bell push
- (44) Bell
- (45) Buzzer
- (46) Indicator (at 'N' insert number of ways)
- (47) *Relay



7. Clocks

- (48) Synchronous clock outlet
- (49) Impulse clock outlet
- (50) Master clock



8. Fire Alarms

- (51) Fire alarm push
- (52) Automatic contact
- (53) Bell connected to fire alarm
- (54) Fire alarm indicator (at 'N', insert number of ways)



9. Public Address System

- (55) Amplifier
- (56) Control board
- (57) Microphone outlet
- (58) Loudspeaker outlet



10. Radio Reception Outlets

(59) Receiver outlet

(60) Aerial



11. Fixed Apparatus Outlets

(61) Ceiling fan

(62) Bracket fan

(63) Exhaust fan

(64) Fan regulator

(65) Cooker control unit



B-12. Earthing

(66) Earth point

(67) Surge diverter



B-13. Other Symbols

(68) Pilot or corridor lamp

(69) Indicator (buzzer may be added if required)

(70) Relay

(71) Reset position

(72) Horn or hooner

(73) Siren

