PART : II—ELECTRICAL DRAWING

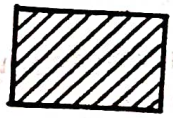
1 Conventional Symbols

In case of electrical installations and circuits, it may be very difficult to draw the drawing and write the name of electrical components and instruments at every place. The graphical symbols are used to indicate the electrical equipment and components. These symbols have been reproduced from I.S. 2032 (Part I to XI) 1974.

Main Board

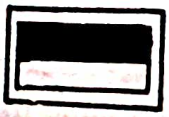
Main fuse board without switches 'Lighting' 

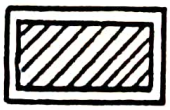
Main fuse board with switches 'Lighting' 

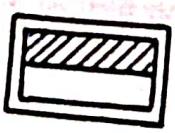
Distribution fuse board without switches 'Lighting' 

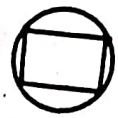
Distribution fuse board with switches 'Lighting' 

Main fuse board without switches 'Power' 

Main fuse board with switches 'Power' 

Distribution fuse board without switches 'Power' 

Distribution fuse board with switches 'Power' 

Energy meter 

Main switch 'Lighting' 

Main switch 'Power' 

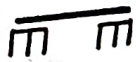
Cartridge fuse 

Rewirable fuse 

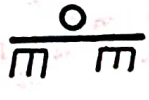
Netral link 

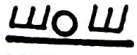
Wiring Appliances

General wiring

Wiring on wall surface 

Wiring below wall surface (concealed wiring) 

Surface conduit wiring 

Concealed conduit wiring 

Wiring going upward 

Wiring going downward 

Wiring passing vertical through a room 

Switches

Single pole switch 

Two pole switch 

Three pole switch 

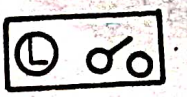
Single pole pull switch 

Multiposition switch 

Two way switch 

Intermediate switch 

Period limiting switch 

Time switch 

Pendent switch 

Push button or bell push 

Luminous push button 

Socket Outlets

Socket outlet 5 Amp, 3 pin 

Socket outlet 15 ampere, 3 pin 

Socket outlet 5 ampere with switch, 3 pin 

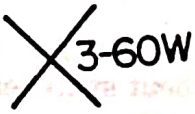
Socket outlet 15 ampere with switch, 3 pin 

Interlocking switch and socket outlet 5 ampere 

Interlocking switch and socket outlet 15 ampere 

Lighting Fixtures

Lamp or lamp outlet 

Group of 3 lamps of 60 watts X 3 × 60 W 

Lamp on wall bracket or light bracket 

Lamp mounted on a ceiling 

Counter weight lamp fixture 

Chain lamp fixture 

Rod lamp fixture 

Lamp fixture with switch 

Lamp connected to variable voltage supply

Emergency lamp

Panic lamp

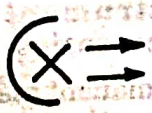
Bulk head fitting

Water tight light fitting

Batton lamp holder (lamp on wall)

Projector

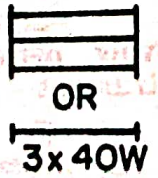
Spot light



Flood light

Fluorescent lamp

Group of 3 fluorescent lamps of 40 watts

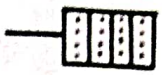


Signal lamp

Ceiling rose 2 plate

Electrical Appliances
Heater

Storage type electrical water heater

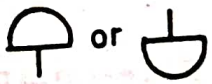


Electric bell (multilines representation)

Buzzer

Siren

Bell (single line representation)



Bell connected to fire alarm

Fan regulator

Hooter or horn

Battery

Ceiling fan

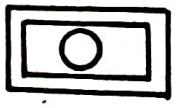
Exhaust fan

Bracket fan

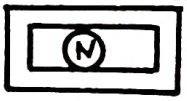
Earth point 

Earth plate 

Choke of fluorescent tube 

Manually operated fire alarm 

Automatic fire detector switch 

Fire indicator 

Tele-communication Apparatus

Socket outlet for telecommunication 

Aerial 

Loud speaker 

Radio out-let 

Amplifying equipment 

Television set 

Control board for public address system 

Direct current (D.C) 

Alternating current AC 

DC and AC current 

3 phase AC with one current circuit and one voltage circuit 

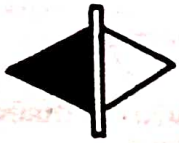
3 phase a.c. with two current circuits and three voltage circuits 

8 phase a.c. with three current circuits and three voltage circuits 

Method of Operation of Instrument and Accessories

Permanent magnet ratio meter or quotient meter 

Permanent magnet moving coil instrument 

Moving permanent magnet instrument 

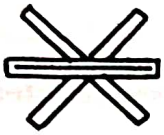
Moving permanent magnet ratio meter or quotient meter 

Moving iron instrument 

Iron electro-dynamic instrument 

Iron core electro-dynamic (ferrodynamic instrument)

Ironless electro-dynamic ratio meter or quotient meter



Iron core electro-dynamic (ferro-dynamic) ratio meter or quotient meter

Induction meter

Induction ratio meter (quotient meter)

Thermal (hot-wire) instrument

Bimetallic instrument

Electrostatic instrument

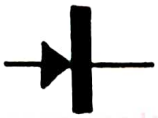
Vibrating reed instrument

Insulated thermo-couple (thermal converter)

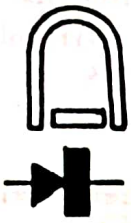
Moving coil instrument with insulated thermal converter incorporated in the instrument

Moving coil instrument with non-insulated thermal converter incorporated in the instrument

Rectifier

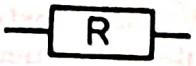


Moving coil instrument with rectifier

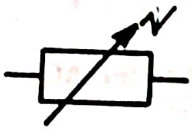


Shunt resistor

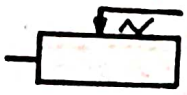
Series resistor



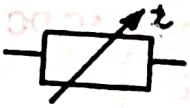
Resistance variable in steps



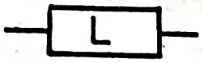
Variable moving resistance in steps



Resistance continuously variable



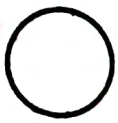
Series inductor



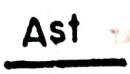
Series impedance

Electrostatic screening

Magnetic screening



Astatic instrument

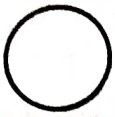


Zero adjuster

Refer to a separate document

Indicating Instruments

General symbol indicating instrument



Instrument with pointer indicator

Indicating instrument with digital indication

Voltmeter AC

Voltmeter DC

Voltmeter AC/DC

Ammeter AC

Ammeter DC

Ammeter AC/DC

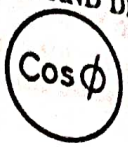
Wattmeter

Multimeter

Nil indicator for AC

Var meter

Power factor meter



Phase indicator meter

Frequency meter

Current direction indicator

Ohm meter

Synchroscope

Wave meter

Oscilloscope

Double voltmeter

Different voltmeter

Galvanometer

Thermometer Pyrometer

Technometer

Starters

Starter

Automatic starter

Semi-automatic starter

Star-delta starter

Auto-transformer starter

Rheostatic starter

Thermistor

Thermocouple

Winding

Winding

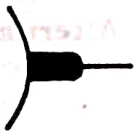
Commutating or compensating winding

Series winding

Shunt winding or separate winding

Brush or slip ring

Brush on commutator



Rotating Machines

Generator

Motor

Machine capable of use as generator or motor

Mechanically coupled machines

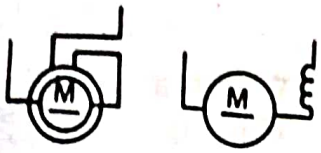
D.C. Machines

Direct current (D.C.) generator General symbol

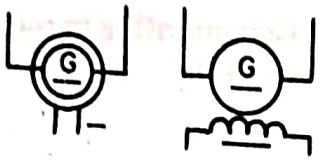
D.C. Motor (General symbol)

2-wire permanent magnet generator or motor

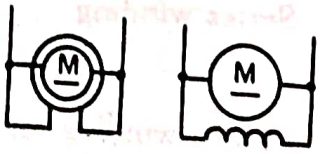
D.C. 2 wire series generator or motor



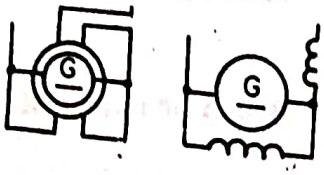
D.C. 2-Wire generator or motor separately excited



D.C. 2-Wire shunt generator or motor



D.C. 2-Wire generator or motor compound excited short shunt



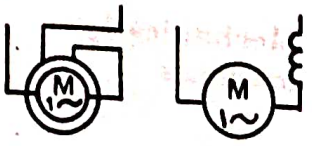
Alternating Machines

A.C. generator general symbol

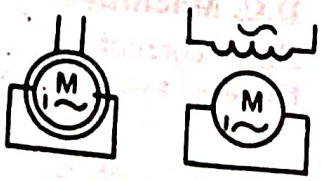
A.C. motor general symbol

A.C. Commutator Machines

A.C. series motor single phase

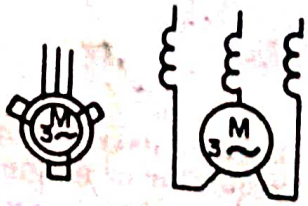


Repulsion motor single phase



A.C. series motor single phase Deri type

A.C. series motor 3 phase



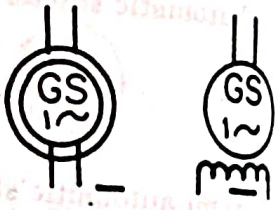
Snchronous Machines

Synchronous generator symbol

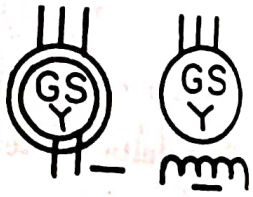
Synchronous motor general symbol

Permanent magnet synchronous generator (G.S.) or synchronous motor (M.S.) three phase

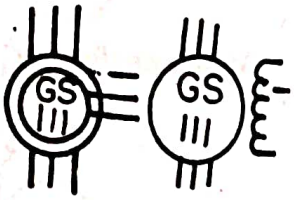
Single phase synchronous generator or synchronous motor



Three phase synchronous generator or synchronous motor star connected neutral taken out.

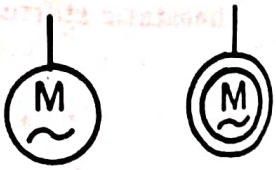


Three phase synchronous generator or synchronous motor two wires of each phase taken out



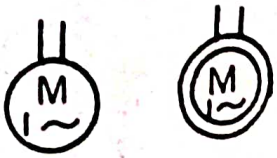
Induction Machines

Induction motor with short circuit rotor generator

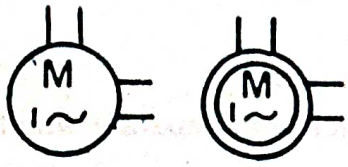


Induction motor with wound rotor general symbol

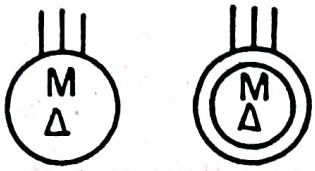
Squirrel cage single phase induction motor.



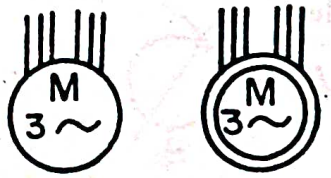
Squirrel cage induction motor, single phase leads of split phase brought out



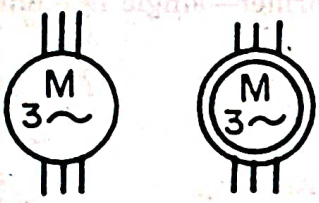
Squirrel cage induction motor, 3-phase



Squirrel cage induction, motor 3-phase, both leads of each phase brought out



3-phase induction motor with wound rotor



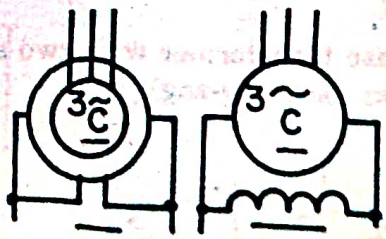
Induction motor, 3-phase, star connected with automatic starter in the rotor

For Example : 3-phase induction motor, with wound rotor, 415 V, 22 kW 50 Hz

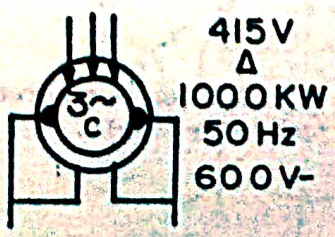
Synchronous Converter

Synchronous converter, general symbol

3-phase synchronous convertor, shunt excited

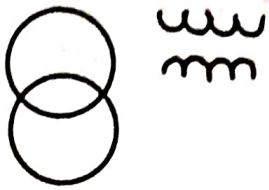


Symbols showing terminals, brushes and other prescribed data

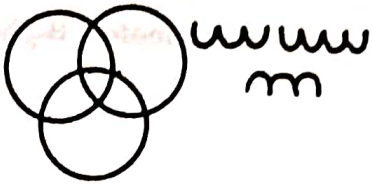


Transformers

Transformer with separate winding—single line and multiline

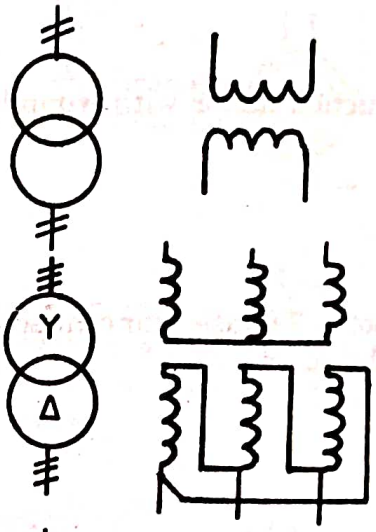


Transformer with three separate winding—single line and multiple



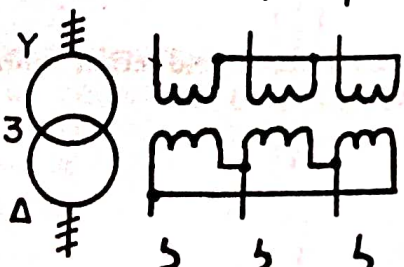
Auto-transformer—single line and multiline

Single phase transformer with two separate windings **Example :** 11000/415V, 250 kVA, 50 Hz Short circuiting voltage 4%

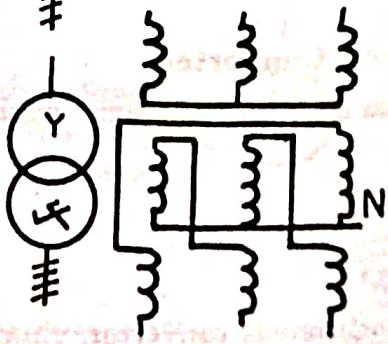


Three phase transformer with two separate windings star/delta

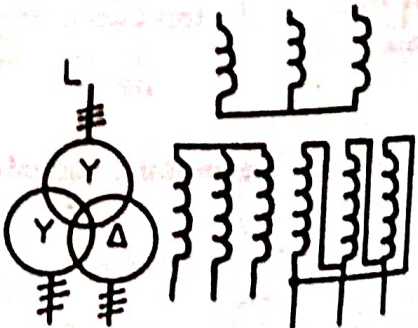
Three phase-bank of single phase transformer with two separate windings (connection star-delta)



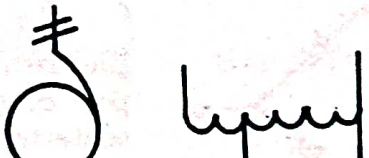
Three phase transformer with two separate windings (connection : star zig-zag)



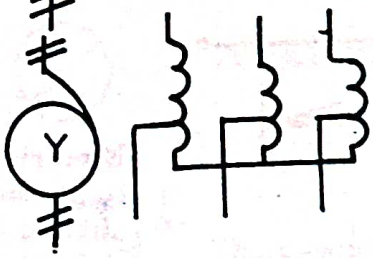
Three phase transformer with three separate windings (connection : star-star-star)



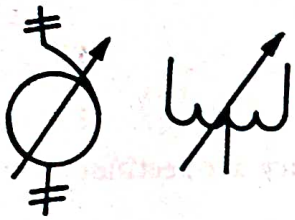
Single phase auto transformer



Three phase auto-transformer

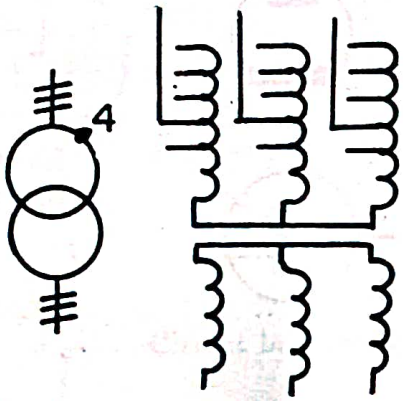


Single phase auto-transformer with continuous voltage regulations

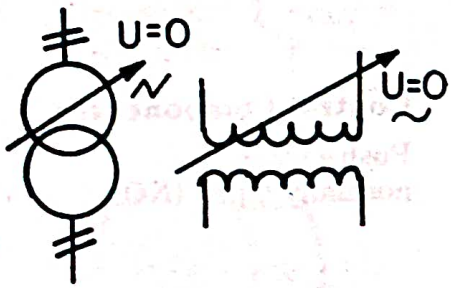


Transformer with tappings and adjustable transformers :

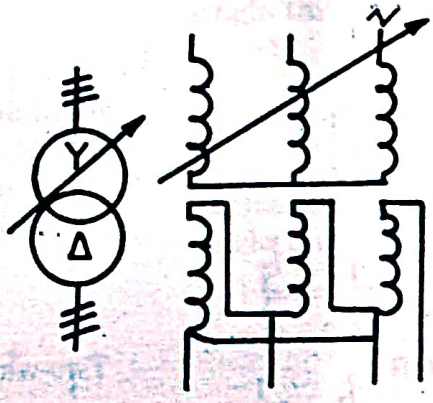
Three phase transformer with four tappings



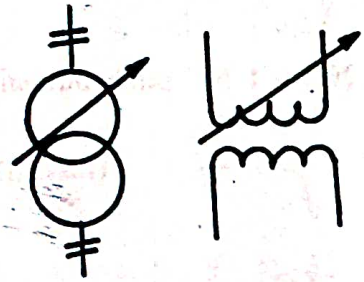
Single phase transformer with off-voltage tap changer



Three phase transformer with no-lead tap changer

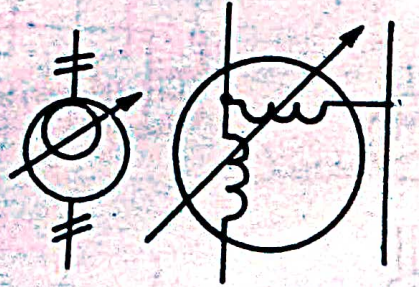


Single phase transformer with continuous voltage regulation

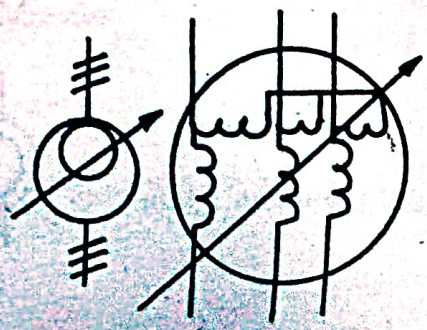


Induction Regulators :

Single phase induction regulator

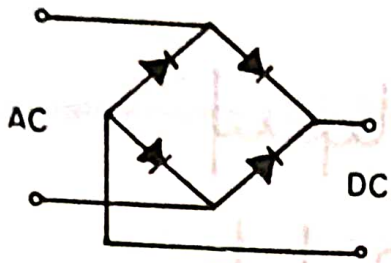


Three phase induction regulator



Rectifiers

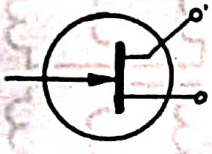
Bridge rectifier



Metal rectifier

Mercury arc rectifier

Silicon controlled rectifier
SCR

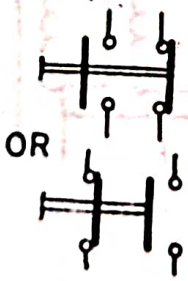


Control Components

Push button
normally Open (NO)

Push button
Normally Closed (NC)

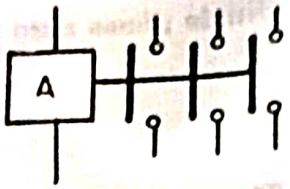
1 NO + 1 NC push button



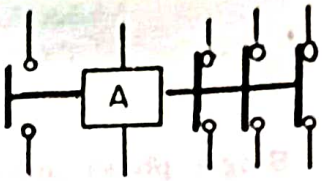
Three phase induction
motor (squirrel cage)

Slip ring induction motor

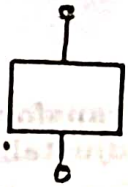
Electrically operated three pole contactor with power contacts or main contacts



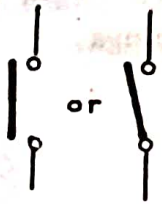
Electrically operated contactor with main and auxiliary contacts



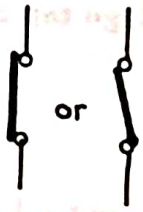
Electromagnetic relay or contactor



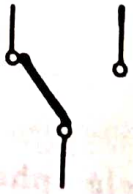
Auxiliary contact Normally Open (NO)



Auxiliary contact Normally Closed (NC)

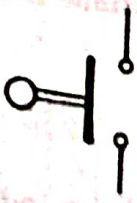


Two-way contact

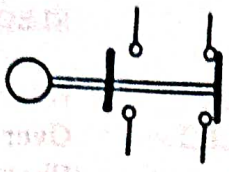


Limit switch normally closed

Limit switch N.O.

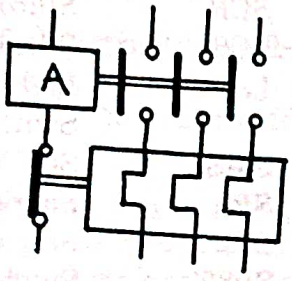


NO + NC limit switch operated together

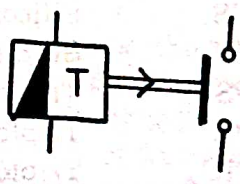


Signal or indicating lamp

Electrically operated contactor with thermal overload relay in all the three poles

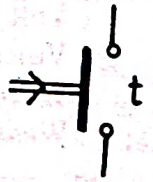


Relay with time delay

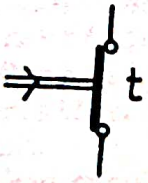


Time Delay Relay (TDR)

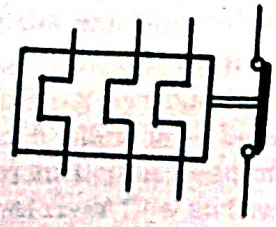
TDR Contact (Off position)



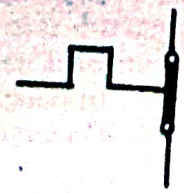
TDR contact (ON position)



Thermal Overload Relay (OLR)



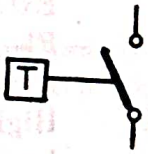
Overload Relay Contact



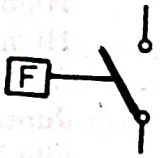
Switch Fuse Unit (SFU)

Pressure switch

Thermostat contact



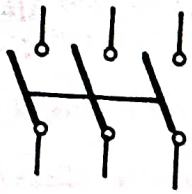
Flow switch



Circuit breaker

Switch double pole (linked) single throw

Switch triple pole (linked) single throw



Switch double pole (linked) double throw

Lightning arrester

AAC	All Aluminium Conductor
AC	Alternating Current
ACB	Air Circuit Breaker
CT	Current Transformer
CTS	Cab Type Sheathed
CVT	Capacitive Voltage Transformer
DP	Double Pole
ELCB	Earth Leakage Circuit Breaker
EHV	Extra High Voltage
EMF	Electro Motive Force
FET	Field Effect Transistor
HPMVL	High Pressure Mercury Vapour Lamp
HRCF	High Rupturing Capacity Fuse
HV	High Voltage
IC	Integrated Circuit
JFET	Junction Field Effect Transistor
kVA	kilo Volt Ampere
kW	kilo Watt
kWH	kilo Watt Hour
LA	Lightning Arrester
LDR	Light Dependent Resistance
LPMVL	Low Pressure Mercury Vapour Lamp
LV	Low Voltage
LED	Light Emitting Diode
MCB	Miniature Circuit Breaker
MOSFET	Metal Oxide Field Effect Transistor
MW	Mega Watt
NL	Neutral Link
OLC	Over Load Coil
OLTC	Over Load Trip Coil
Ph	Phase
PT	Potential Transformer
PVC	Poly Vinyl Chloride
PILC	Paper Insulated Lead Covered
Se	Series
Sh	Shunt
SCR	Silicon Controlled Rectifier
SCS	Silicon Controlled Switch
LASCS	Light Activated Silicon Controlled Switch
SMS	Sub Main Switch
SP	Single Pole
SPDT	Single Pole Double Throw
SPST	Single Pole Single Throw
SVL	Sodium Vapour Lamp
SUS	Silicon Unilateral Switch
SWG	Standard Wire Gauge
TPS	Triple Pole Switch
TPN	Triple Pole with Neutral
TPIC	Triple Pole Iron Clad
TPDT	Triple Pole Double Throw
TPST	Triple Pole Single Throw
TR	Thermal Relay
TRS	Tough Rubber Sheathed
UJT	Uni-Junction Transistor
VA	Volt Ampere
VIR	Vulcanised Indian Rubber
WT	Water Tight
WPC	Weather Proof Cable