

International electrical standards & regulations

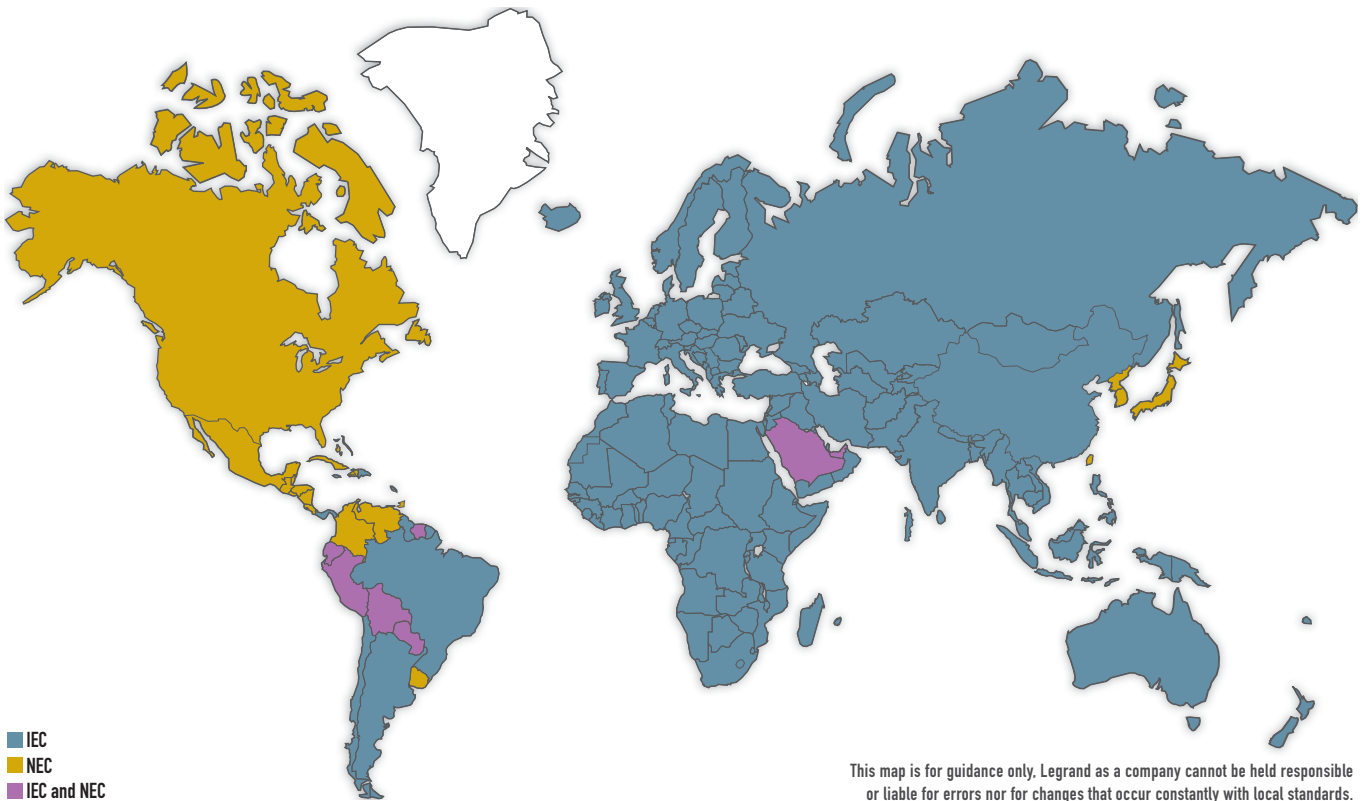


AN OVERVIEW OF ELECTRICAL
INSTALLATIONS

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Standard for low voltage installations

Type of standards (IEC/NEC) for low voltage electrical installations.



A

Afghanistan (220 V 50 Hz)
Albania (230 V 50 Hz)
Algeria (220 V 50 Hz)
Andorra (230 V 50 Hz)
Angola (220 V 50 Hz)
Argentina (220 V 50 Hz)
Armenia (220 V 50 Hz)
Australia (230 V 50 Hz)
Austria (230 V 50 Hz)
Azerbaijan (220 V 50 Hz)

B

Bahamas (120/240 V, 120/208 V 60 Hz)
Bahrain (240 V 50 Hz)
Bangladesh (230 V 50 Hz)
Belarus (220 V, 220/127 V, 127 V 50 Hz)
Belgium (230 V 50 Hz)
Belize (110 V 60 Hz)
Benin (220 V 50 Hz)
Bhutan (230 V 50 Hz)

Bolivia (230 V | 50 Hz)

Bosnia and Herzegovina (220 V 50 Hz)
Botswana (220 V 50 Hz)
Brazil (220-127 V 60 Hz)
Brunei Darussalam (240 V 50 Hz)
Bulgaria (220/230 V 50 Hz)
Burkina Faso (230 V 50 Hz)
Burundi (220 V 50 Hz)

C

Cambodia (220 V 50 Hz)
Cameroon (220 V 50 Hz)
Canada (240/120 V, 240 V 60 Hz)
Central African Republic (220 V 50 Hz)
Chad (220 V 50 Hz)
Chile (220 V 50 Hz)
China (220 V 50 Hz)
Colombia (240/120 V, 208/120 V 60 Hz)
Congo (Democratic Republic) (220-240 V 50 Hz)
Costa Rica (240/120 V 60 Hz)
Croatia (230 V 50 Hz)

Cuba (115/230 V | 60 Hz)

Cyprus (230 V 50 Hz)
Czech Republic (230 V 50 Hz)

D

Denmark (230 V 50 Hz)
Djibouti (220 V 50 Hz)
Dominican Republic (240 V 60 Hz)

E

Ecuador (110 V 60 Hz)
Egypt (220 V 50 Hz)
El Salvador (240/120 V 60 Hz)
Eritrea (220 V 50 Hz)
Estonia (220 V 50 Hz)
Ethiopia (220 V 50 Hz)

F

Fiji (240 V 50 Hz)
Finland (230 V 50 Hz)
France (230 V 50 Hz)
French Overseas Territories (220 V 50 Hz)

G

■ Gabon (220 V 50 Hz)
■ Gambia (220 V 50 Hz)
■ Georgia (220 V 50 Hz)
■ Germany (230 V 50 Hz)
■ Ghana (240-220 V 50 Hz)
■ Greece (230 V 50 Hz)
■ Grenada (230 V 50 Hz)
■ Guatemala (220/110 V 60 Hz)
■ Guyana (120/240 V 50 Hz, 60 Hz)

H

■ Haiti (220 V, 110 V 60 Hz)
■ Honduras (220/110 V 60 Hz)
■ Hungary (230 V 50 Hz)

I

■ Iceland (230 V 50 Hz)
■ India (230 V 50 Hz)
■ Indonesia (220 V 50 Hz)
■ Iran (220 V 50 Hz)
■ Iraq (220 V 50 Hz)
■ Ireland (230 V 50 Hz)
■ Israel (230 V 50 Hz)
■ Ivory Coast (230 V 50 Hz)
■ Italy (230 V 50 Hz)

J

■ Jamaica (220/110 V 50 Hz)
■ Japan (110 V 60 Hz)
■ Jordan (230 V 50 Hz)

K

■ Kazakhstan (220-230 V 50 Hz)
■ Kenya (240 V 50 Hz)
■ Korea (North) (220 V 60 Hz)
■ Korea (South) (110 V 60 Hz)
■ Kuwait (230 V 50 Hz)
■ Kyrgyzstan (220 V 50 Hz)

L

■ Laos (220 V 50 Hz)
■ Latvia (220 V 50 Hz)
■ Lebanon (220 V 50 Hz)
■ Lesotho (220 V 50 Hz)
■ Liberia (230 V, 220 V 50 Hz)
■ Libyan Arab Jamahiriya (220 V 50 Hz)
■ Liechtenstein (230 V 50 Hz)
■ Lithuania (230 V 50 Hz)
■ Luxembourg (230 V 50 Hz)

M

■ Macedonia (220 V 50 Hz)

■ Madagascar (220/110 V 50 Hz)

■ Malawi (230 V 50 Hz)

■ Malaysia (240 V 50 Hz)

■ Maldives (220 V 50 Hz)

■ Mali (220 V 50 Hz)

■ Malta (230 V 50 Hz)

■ Mauritania (220 V 50 Hz)

■ Mauritius (220 V 50 Hz)

■ Mexico (220/127 V, 220 V, 120 V 60 Hz)

■ Moldova (220 V, 220/127 V, 127 V 50 Hz)

■ Monaco (220 V 50 Hz)

■ Mongolia (220 V 50 Hz)

■ Morocco (220 V 50 Hz)

■ Mozambique (220 V 50 Hz)

■ Myanmar (230 V 50 Hz)

N

■ Namibia (220 V 50 Hz)

■ Nepal (220 V 50 Hz)

■ Netherlands (230 V 50 Hz)

■ New Zealand (230 V 50 Hz)

■ Nicaragua (240/120 V 60 Hz)

■ Niger (220 V 50 Hz)

■ Nigeria (230 V, 220 V 50 Hz)

■ Norway (230 V 50 Hz)

O

■ Oman (240 V 50 Hz)

P

■ Pakistan (230 V 50 Hz)

■ Panama (240/120 V 60 Hz)

■ Papua New Guinea (240 V 50 Hz)

■ Paraguay (220 V 50 Hz)

■ Peru (220 V 60 Hz)

■ Philippines (250 V 60 Hz)

■ Poland (230 V 50 Hz)

■ Portugal (230 V 50 Hz)

Q

■ Qatar (240 V 50 Hz)

R

■ Romania (230 V 50 Hz)

■ Russian Federation (220 V 50 Hz)

■ Rwanda (220 V 50 Hz)

S

■ Saint Lucia (240 V 50 Hz)

■ Saint Vincent and the Grenadines (230 V 50 Hz)

■ Saudi Arabia (220/127 V 60 Hz)

■ Senegal (220 V 50 Hz)

■ Seychelles (230 V 50 Hz)

■ Sierra Leone (230 V 50 Hz)

■ Singapore (230 V 50 Hz)

■ Slovakia (230 V 50 Hz)

■ Slovenia (230 V 50 Hz)

■ Somalia (230 V, 220 V, 110 V 50 Hz)

■ South Africa (250 V, 230 V, 220 V 50 Hz)

■ Spain (220 V, 220/127 V 50 Hz)

■ Sri Lanka (230 V 50 Hz)

■ Sudan (240 V 50 Hz)

■ Suriname (220/127 V 60 Hz)

■ Swaziland (230 V 50 Hz)

■ Sweden (230 V 50 Hz)

■ Switzerland (230 V 50 Hz)

■ Syrian Arab Republic (220 V 50 Hz)

T

■ Taiwan (220 V 60 Hz)

■ Tajikistan (220 V, 220/127 V, 127 V 50 Hz)

■ Tanzania (United Republic) (230 V 50 Hz)

■ Thailand (220 V 50 Hz)

■ Togo (230 V 50 Hz)

■ Tonga (240 V 50 Hz)

■ Trinidad and Tobago (230/115 V 60 Hz)

■ Tunisia (230 V 50 Hz)

■ Turkey (220 V 50 Hz)

■ Turkmenistan (220 V, 220/127 V, 127 V 50 Hz)

U

■ Uganda (240 V 50 Hz)

■ Ukraine (220 V 50 Hz)

■ United Arab Emirates (240 V 50 Hz)

■ United Kingdom of Great Britain and Northern Ireland (230 V 50 Hz)

■ United States of America (120/240 V, 208/120 V 60 Hz)

■ Uruguay (220 V 50 Hz)

■ Uzbekistan (220 V 50 Hz)

V

■ Vanuatu (220 V 50 Hz)

■ Venezuela (120 V 60 Hz)

■ Vietnam (220 V 50 Hz)

Y

■ Yemen (250 V 50 Hz)

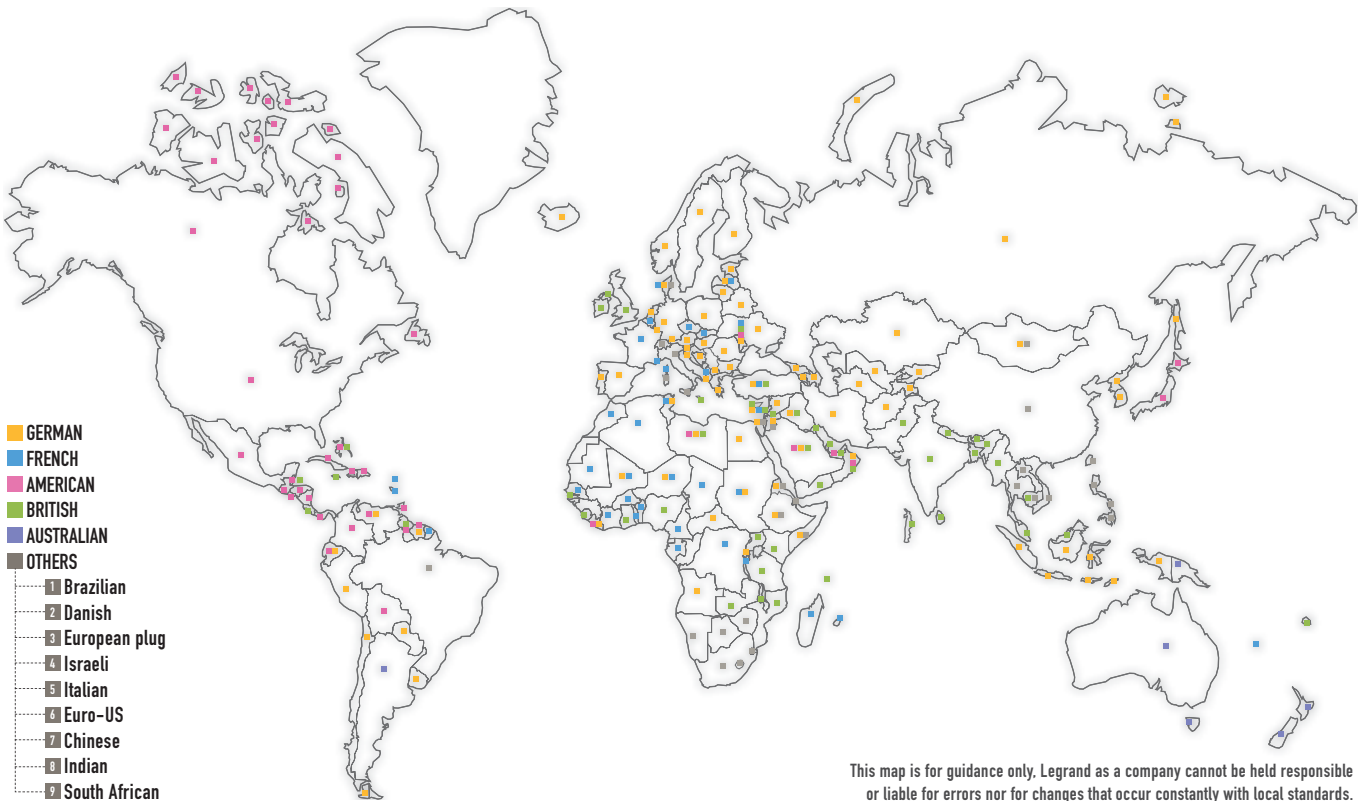
Z

■ Zambia (230 V 50 Hz)

■ Zimbabwe (225 V 50 Hz)

Overview of standards for socket outlets worldwide

The map gives an overview of which local standard a country belongs to.



A

Afghanistan
 5 Albania
 Algeria
 Andorra
 Angola
 Argentina
 Armenia
 Australia
 Austria
 Azerbaijan

B

Bahamas
 Bahrain
 Bangladesh
 Barbados
 Belarus
 Belgium
 Belize

Benin

Bhutan

Bolivia

Bosnia and Herzegovina

Botswana

Brazil

Brunei Darussalam

Bulgaria

Burkina Faso

Burundi

C

4 Cambodia

Cameroon

Canada

Central African Republic

Chad

Chile

7 China

Colombia

Congo (Democratic Republic)

Costa Rica

Croatia

Cuba

Cyprus

Czech Republic

D

2 Denmark

3 Djibouti

Dominican Republic

E

Ecuador

Egypt

El Salvador

6 Eritrea

Estonia

8 Ethiopia

F

■ Fiji
 ■ Finland
 ■ France
 ■ French Overseas Territories

G

■ Gabon
 ■ Gambia
 ■ Georgia
 ■ Germany
 ■ Ghana
 ■ Greece
 ■ Grenada
 ■ Guatemala
 ■ Guyana

H

■ Haiti
 ■ Honduras
 ■ Hungary

I

■ Iceland
 ■ India
 ■ Indonesia
 ■ Iran
 ■ Iraq
 ■ Ireland
 ■ Israel
 ■ Ivory Coast
 ■ Italy

J

■ Jamaica
 ■ Japan
 ■ Jordan

K

■ Kazakhstan
 ■ Kenya
 ■ Korea (North and South)
 ■ Kuwait
 ■ Kyrgyzstan

L

■ Laos
 ■ Latvia
 ■ Lebanon
 ■ Lesotho
 ■ Liberia
 ■ Libyan Arab Jamahiriya
 ■ Liechtenstein

■ Lithuania

■ Luxembourg

M

■ Macedonia
 ■ Madagascar
 ■ Malawi
 ■ Malaysia
 ■ Maldives
 ■ Mali
 ■ Malta
 ■ Mauritania
 ■ Mauritius
 ■ Mexico
 ■ Moldova
 ■ Monaco
 ■ Mongolia
 ■ Morocco
 ■ Mozambique
 ■ Myanmar

N

■ Namibia
 ■ Nepal
 ■ Netherlands
 ■ New Zealand
 ■ Nicaragua
 ■ Niger
 ■ Nigeria
 ■ Norway

O

■ Oman

P

■ Pakistan
 ■ Panama
 ■ Papua New Guinea
 ■ Paraguay
 ■ Peru
 ■ Philippines
 ■ Poland
 ■ Portugal

Q

■ Qatar

R

■ Romania
 ■ Russian Federation
 ■ Rwanda

S

■ Saint Lucia
 ■ Saint Vincent and the Grenadines

■ Saudi Arabia

■ Senegal

■ Seychelles
 ■ Sierra Leone
 ■ Singapore
 ■ Slovakia
 ■ Slovenia

■ Somalia

■ South Africa

■ Spain

■ Sri Lanka

■ Sudan

■ Suriname

■ Swaziland

■ Sweden

■ Switzerland

■ Syrian Arab Republic

T

■ Taiwan

■ Tajikistan

■ Tanzania (United Republic)

■ Thailand

■ Togo

■ Tonga

■ Trinidad and Tobago

■ Tunisia

■ Turkey

■ Turkmenistan

U

■ Uganda

■ Ukraine

■ United Arab Emirates

■ United Kingdom of Great Britain
and Northern Ireland

■ United States of America

■ Uruguay

■ Uzbekistan

V

■ Vanuatu

■ Venezuela

■ Vietnam

Y

■ Yemen

Z

■ Zambia

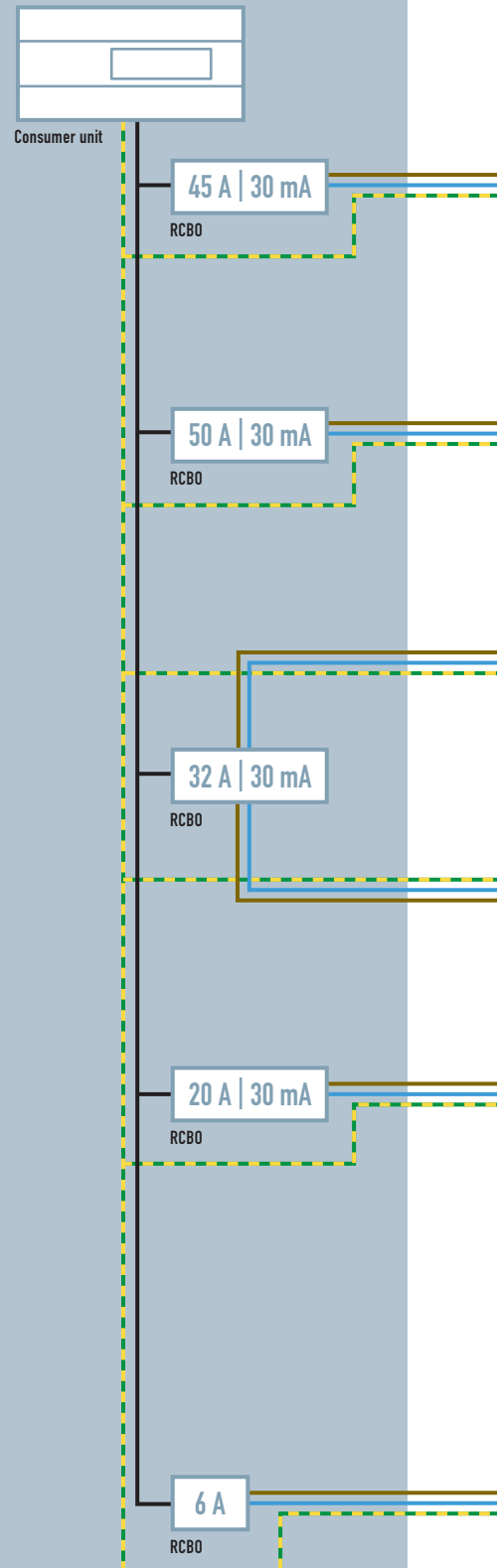
■ Zimbabwe

IEC | British standard

Typical residential wiring diagram issued from BS 7671 requirements for electrical installations.

I Consumer units and Din-Rail equipment by Legrand Group	10-11
II Wiring accessories by Legrand Group	12-13

CONSUMER UNIT



N.B.: Conductors cross section is calculated according to various parameters for each circuit. See regulations for details of alternative options using combinations of RCD and MCB.

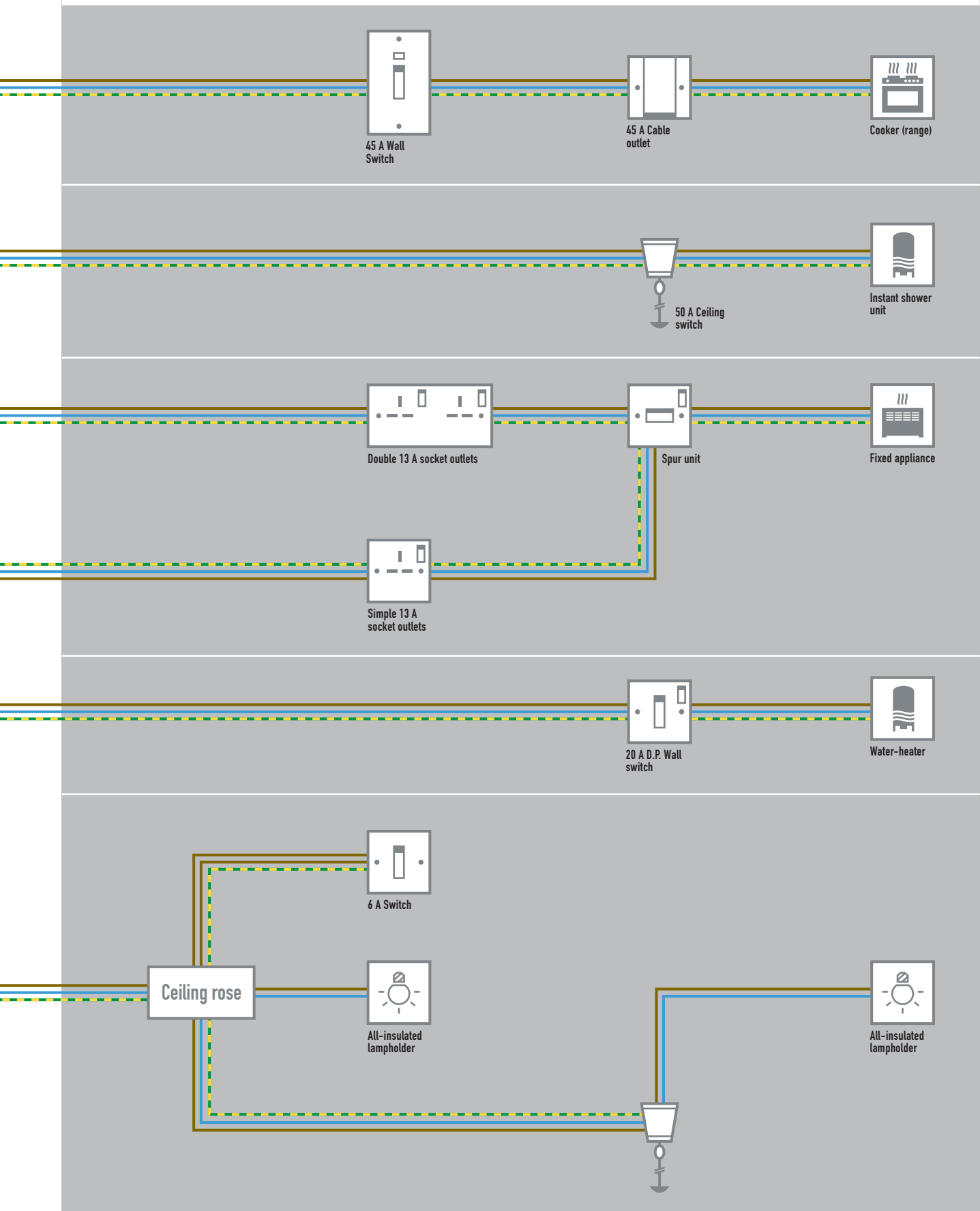


For more details on countries
See maps page 02 to 05

COLOUR CODE OF SOLID STRANDED FLEXIBLE CONDUCTORS

- or — Line
- Neutral
- - - Earth

MCB: Miniature circuit breaker
 RCBO: Residual current operated circuit breaker with integral overcurrent protection



Overview of the installation and related wiring accessories standard

↓ SUPPLY

Since 1 January 1995 nominal voltage in UK is 230 V +10% / - 6% a.c. at 50 Hz. Earth is normally supplied but may be local.

↓ HOUSE SERVICE CUT-OUT

The Electricity Boards protective device, usually a 80 A or a 100 A HRC Fuse. It is sealed in a special housing to prevent tampering.

↓ METER

Usually a dual meter for normal and off-peak energy consumption, sealed to prevent tampering.

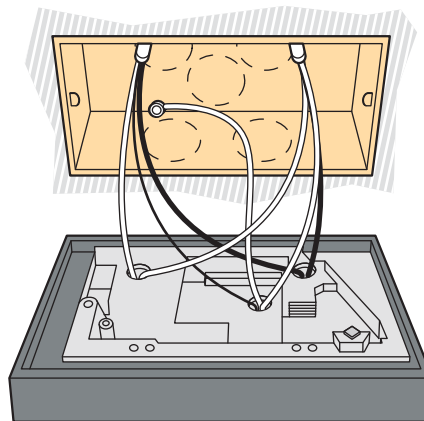
↓ CONSUMER UNIT

It houses the main switch which isolates the total installation and the individual circuit protection devices. The consumer unit should comply with BS EN 60439-3. Circuit protection is normally provided by miniature circuit breakers to BS EN 60898 (older installation may have fuse protection). The consumer unit may also contain one or more residual current devices providing additional protection in all or part of the installation (older installations may not have RCD protection provided).

↓ POWER CIRCUITS

Appliances having heavy current consumption (cookers, water-heaters, etc.) should each be supplied on a specific circuit of the appropriate rating.

In general, a double pole switch controls and isolates the appliance when necessary and the connection of the appliance can be made either directly to the switch or via a flexible cable outlet. Switches should conform to BS EN 60669 and Cooker Control unit to BS 4177.



FLUSH FITTING OF TWO GANG SOCKET

	Height	Width	Fixing centres
1 gang	75 mm	75 mm	60.5 mm
2 gang	75 mm	135 mm	121 mm

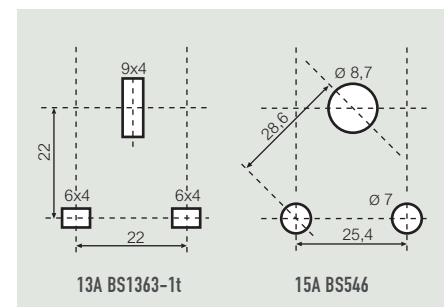
↓ SOCKET OUTLET CIRCUITS

Socket outlets should comply with BS 1363-2 and are usually of the switched type. They are usually supplied via a ring final circuit which is a circuit running from the protection device to each outlet and then returning to the protection device. Permanent connections to a ring final circuit and branches off the ring are made via fused connection units to BS 1363-4.

Socket outlets to BS 546 are no longer used in domestic installations in the UK but are still widely used in some other countries.

↓ PLUGS

Plugs of domestic appliances should conform to BS 1363-1. They contain a fuse link to BS 1362 of a rating appropriate to the flexible cord of the appliance (max =13 A). Domestic appliances sold in UK must be fitted with



a BS 1363-1 plug, further the UK plug and socket safety regulations require mandatory third party certification of plugs.

↓ LIGHTING CIRCUITS

Usually a circuit supplies several lighting points in turn. A lighting point usually consists of a ceiling rose in which incoming, outgoing and switch connections are made and a pendant flexible cord supplying an attached lampholder or may be a complete luminaire. Light switches should meet BS EN 60669-1. Dimmers should meet BS EN 60669-2-1.

INSTALLATION RULES

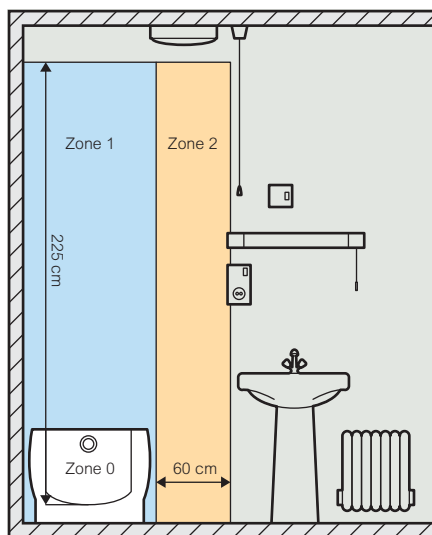
BS 7671, "Requirements for Electrical Installations" is published by the Institution of Engineering and Technology and BSI, it governs all domestic electrical installations (and many other types). Copies are available from:
THE INSTITUTION OF ENGINEERING AND TECHNOLOGY
 MICHAEL FARADAY HOUSE
 SIX HILLS WAY,
 STEVENAGE, SG1 2AY UK

BS 7671 is also available from BSI. The various British standards governing the construction of electrical equipment are also available at the BSI shop on their website: www.bsigroup.com

BSI also maintains a database available for enquiries covering all British standards.

↓ BATHROOMS

The wiring regulations are very strict. Every switch or other means of electrical control or adjustment shall be so situated as to be normally inaccessible in the bathroom. The required Ingress protection is managed through a series of defined zones progressively from the bath or shower. Pull cord switches are allowed, shaver sockets with isolating transformers are also allowed but should conform to BS EN 61558-2-5.



Note: For showers without basins (eg wet-room) zone 1 is extend to 120cm from the centre point of the water outlet.

↓ OUTDOORS

Any socket outlet provided outdoors or intended to supply outdoor equipment (e.g. electric lawn-mowers should have a 30 mA RCD protection).

↓ EARTHING

Socket outlets to BS1363-2 have provision for earthing. A protective conductor (which could also be steel conduit) is generally required for all low voltage circuits (1000 V a.c. between conductors) and its continuity must be proved. All main incoming services, for example, water and gas pipes and metallic parts of the building structure, etc. must be bonded and connected to the main earthing terminal of the installation. In addition it may be necessary to supplementary bond water and waste pipes, sinks and other metallic items such as central heating radiators. However in rooms with a fixed bath or shower, supplementary bonding must be applied to simultaneously accessible metal parts unless RCD protection of all circuits in the bathroom is provided.

↓ POLARITY

The polarity is conserved and marked throughout the installation:

Live:

Terminals marked L are for brown coloured insulated conductors, both solid conductors and flexible conductors are coloured brown

Neutral:

Terminals marked N are for blue coloured insulated conductors, both solid conductors and flexible conductors are coloured blue.

Earth:

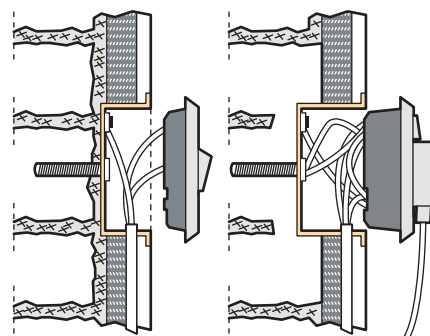
Terminals marked E or are for green/yellow coloured

insulated earth conductors, both solid conductors and flexible conductors are either coloured green or yellow or sleeved as such.

↓ CABLING

Most domestic wiring is done in flat p.v.c. insulated and sheathed 3 core cable (flat twin and earth). Maximum use is made of floor and internal wall voids to run cables. Surface installations are run in conduit or trunking, these can be plastic or metal. Various British standards govern the design and construction of conduits, trunking and cable. Wiring accessories may be installed in plastic or (more often) metal flush boxes to BS 4662. Surface installations are made in appropriate proprietary boxes.

Typically:



16 mm plaster depth box

25 mm socket box

Consumer units and Din-Rail equipment by Legrand Group

The Legrand range of insulated and metal consumer units offers flexible and easy installation for a wide range of configurations from full Lexic RCBO protection to mixes of Lexic RCBs, MCBs and RCBOs.

Ekinox consumer units have been designed to provide a new dimension of protection in homes, offices and industries. With a stylish colour, elegant curves and distinctive finish, Ekinox blends in perfectly with any interior decor.

Legrand Lexic modular circuit breakers offer an extensive range of characteristics and can be used to organise distribution in rows as required, up to 125 A. It is the ideal universal solution for all commercial and residential installations.

→ SPECIFIC TO UK MARKET

Consumer units



INSULATED DUAL WITH RCD INCOMER
8 modules unit



INSULATED DUAL RCD SPLIT LOAD
16 modules unit



METAL DUAL RCD SPLIT LOAD
16 modules unit

Din-Rail equipment



ISOLATING
SWITCH



RCCB - DX



RCBO



MCB - DX



TIME SWITCH



SURGE PROTECTION
DEVICE



CONTACTOR

→ **SPECIFIC TO INDIAN MARKET** (see p. 46-47 for standards organization)



Power protection
See page 56 to 57

Consumer units



EKINOXE DBs
8 ways



EKINOXE DBs
12 ways



EKINOXE DBs
IP 43 with acrylic door

Din-Rail equipment



MCB



ISOLATOR SWITCH



MCB FOR D.C



RCBO

Wiring accessories by Legrand Group

All the expertise of the Legrand Group has been brought into play to offer markets governed by the British Standard a unique selection of wiring accessory ranges, in terms of both finish and function, and thus cover all requirements in all sectors of the residential and commercial markets.

Arteor, the Legrand Group's new international range complies with all international standards and offers the very best in terms of innovation, design and technology.

Arteor by Legrand



TATOO - EDITION 1
Switch



GRAPHIC - FORMAL
Switch



BRUSHED METAL - STAINLESS STEEL
Switch



WOOD - WENGE STYLE
Switch



MIRROR BLACK
Micropush switch



MIRROR WHITE
Shutter control



GALUCHAT
Sensitive switch



SIGNATURE
Universal dimmer

Synergy by Legrand



MODERN - SILVER
Socket



FLAT PLATE - BLACK NICKEL
Switch

Mallia by Legrand



WHITE
Switch



SILVER
Switch



Home automation
See page 64 to 67

Axolute by Bticino



WHITE LIMOGES
Switch



RED CHINA
Switch



BRUSHED BRONZE
Switch



BLACK GLASS
Socket



LIQUID WHITE
Switch



MATT GOLD
Switch



CHERRY WOOD
Switch



SHINY INOX ALESSI STEEL
Switch

Living, Light, Light Tech by Bticino



LIVING - NATIVE
Switch



LIVING - SOLID RED
Switch



LIGHT - SATIN GOLD
Switch



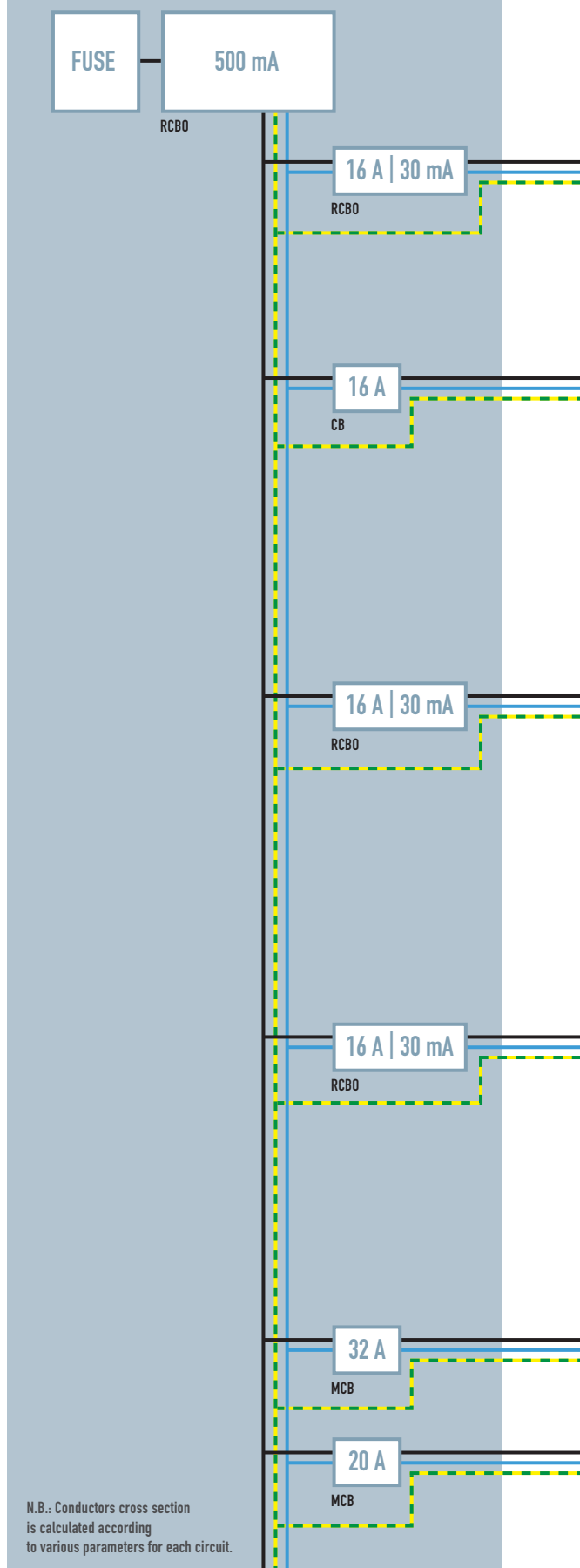
LIGHT TECH - ALU TECH
Switch

IEC | German standard

Typical residential wiring diagram issued from VDE 0100 requirements for electrical installations.

I Consumer units and Din-Rail equipment by Legrand Group	18-19
II Wiring accessories by Legrand Group	20-21

CONSUMER UNIT



N.B.: Conductors cross section is calculated according to various parameters for each circuit.

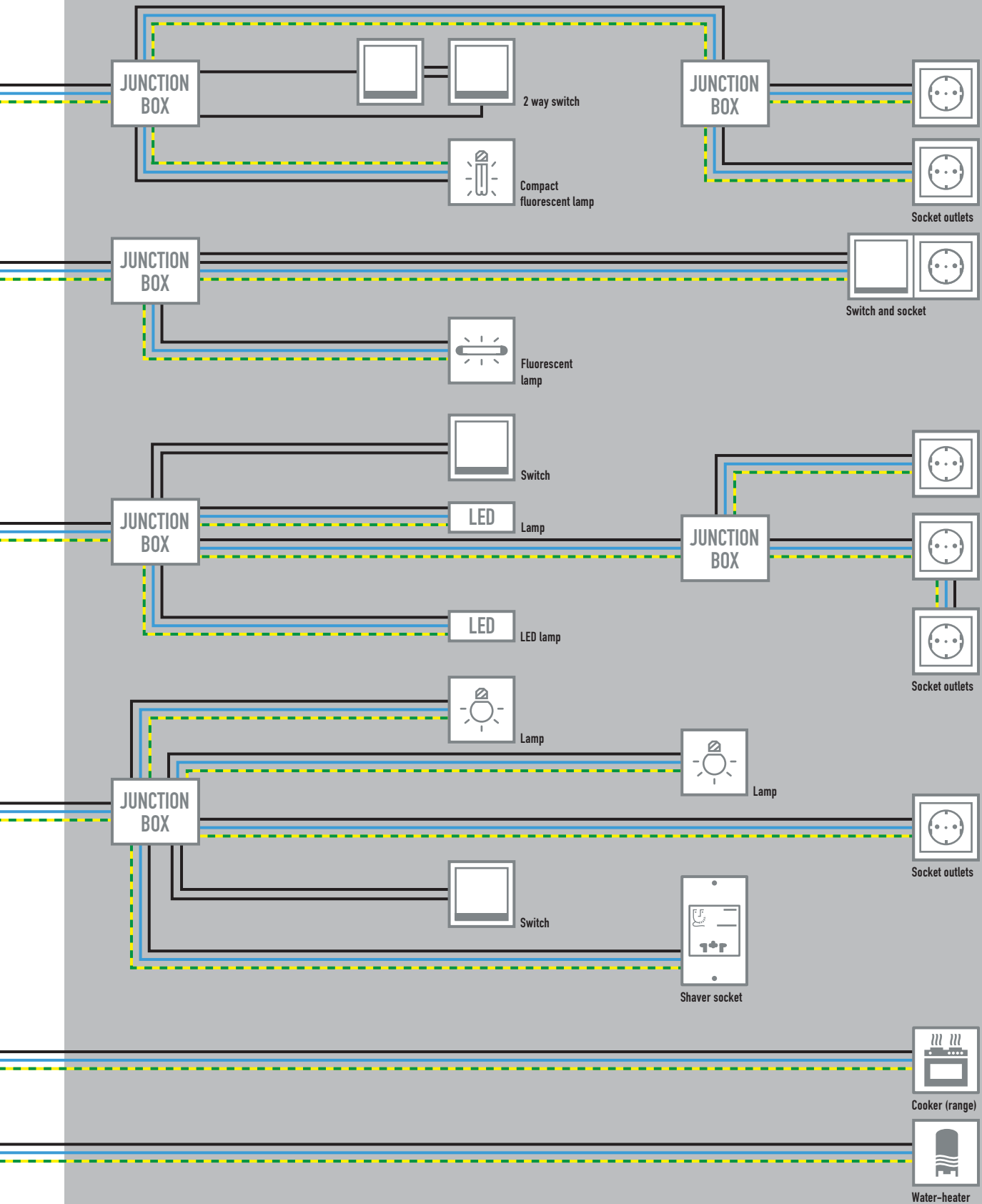


For more details on countries
See maps page 02 to 05

COLOUR CODE OF SOLID STRANDED FLEXIBLE CONDUCTORS

-  Line
-  Neutral
-  Earth

- CB: Circuit breaker
- MCB: Miniature circuit breaker
- RCBO: Residual current operated circuit breaker with integral overcurrent protection



GERMAN STANDARD

Overview of the installation and related wiring accessories standard

↓ SUPPLY

May be single phase (230 V-50 Hz) or - in the majority of cases - 3 phases (400 / 230 V-50 Hz). Max. Tolerance (voltage): + 6% / -10%. TN- and TT- systems are in use. TT- systems are the most common in domestic installations. There is usually one meter. Facilities are provided with a second meter for special tariffs, etc. A fuse isolator unit allows all phases to be cut-off, isolating the whole domestic installation.

↓ DISTRIBUTION BOARD

The distribution board usually contains pre-fuses (for example 3 x 32 A), RCBO 30 mA for household applications (1 or 3 poles). Transformer(s) as for entry door systems, MCB (16 A for general circuits up to 32 A (3 poles) for (water) heating systems). Time lag switches in dwellings. These devices are all mounted on a DIN-Rail.

↓ POWER CIRCUITS

Single phase up to 3 WA, 7.3 KVA: 3 phases. Electrical appliances having a high power consumption (cookers, washing machines, etc.) are supplied via a specific circuit and connected either to 16 A socket-outlet or cable outlet or to a specific socket Perilexi or CEE 17.

It is not uncommon to find 3 phases appliances. Protection rating and cable size of each circuit are calculated according to the appliance (min section 1.5 mm² Cu 16 A).

↓ GENERAL CIRCUITS

These circuits supply both lighting points and socket outlets. The rating of the protective device is usually 16 A. There is no limitation of the number of outlets on a circuit. This limit is calculated according to expected/probable use of the circuit. Socket outlets are generally of the 2P+E type "German". These plugs are non polarized. All German socket outlets are earthed. In general, the protective conductor is distributed throughout all circuits. For class II devices < 2.5 A, the Euro-plug is used. The wire cross-section of the fixed installed cables is normally 1.5mm² (protected by a 16 A Circuit Breaker).

↓ DAMP & OUTDOOR INSTALLATIONS

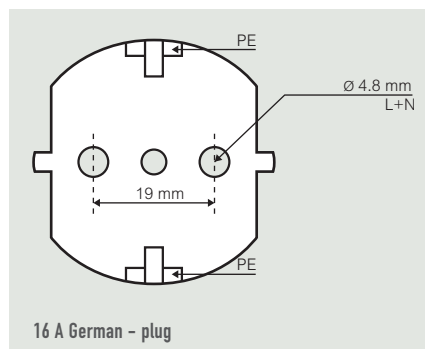
Special rules apply, in particular for IP rating of accessories and equipment and RCD Protection.

↓ EARTHING

Earthing is local, usually through a foundation earthing arrangement. All metallic services shall be bonded (gas and water pipe, heating, waste systems, etc.) with a 10 mm². In bathrooms the local equipotential bonding could have a cross sectional area of 4 mm². Neutral is re-earthed in the control panel. A protective conductor is distributed to all socket outlets.

↓ INSTALLATION RULES

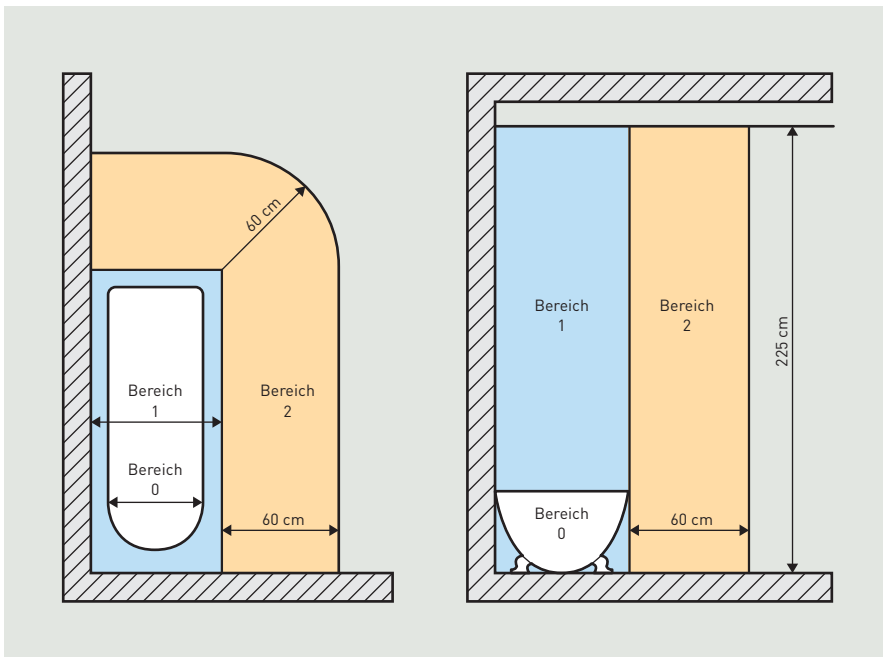
The installation must comply with the requirements of VDE 0100 and the "TAB" (TAB = technische Anschlussbedingungen = special requirements of the energy supplier, for example EON, RWE, EnBw or Wattenfall). Installations may only be erected by registered and qualified electricians.



INSTALLATION RULES

The installation should comply with the requirements of VDE 0100 and the "TAB" (TAB = technische Anschlussbedingungen = special requirements of the energy supplier, for example EON, RWE, EnBw or Wattenfall). Installations should only be completed by registered and qualified electricians.

Organisations:
 DKE
 60596 Frankfurt, Stresemannallee 15
 www.dke.de
 VDE-Verlag
 10625 Berlin, Bismarckstraße 33
 www.vde-verlag.de



↓ BATHROOMS

Special rules apply to bathrooms. The room is divided into different zones:

Zone "Bereich 0": Electrical equipment are not allowed. Only special SELV-devices, max.12V AC or max. 30V DC are allowed. The power supply for these SELV-circuits is not allowed in "Bereich 0" and in "Bereich 1".

Zone "Bereich 1": Only fixed installed electrical equipment for hot water production and SELV- or PELV -devices (max. 25V AC or max. 60V DC) are allowed. The power supply for the SELV- or PELV -circuits has to be installed

outside "Bereich 0" and in "Bereich 1".

Zone "Bereich 2": Only Electrical equipment supplied by SELV- or PELV (max. 25V AC or max.60V DC) are allowed. Only shaver sockets according to DIN EN 61558-2-5 are allowed.

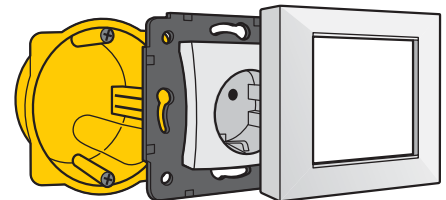
In bathrooms, an additional equipotential bonding and RCDs (30 mA) protection for socket outlets are mandatory (Details in the DIN VDE 0100-701).

↓ HOME AND BUILDING CONTROL

KNX (EIB) ISO/IEC14543, EN50090 is common in big and luxury installations.

↓ ACCESSORIES

They shall comply to the appropriate VDE standards. Flush accessories are fitted in boxes. Claw-mounting and screw-mounting are used.



↓ ENERGY SAVING & REGENERATIVE POWER GENERATION

Single-room heating control and time-controlled hot water supply is mandatory due to the EnEV (energy saving directive). Airproof installations are common in low energy-buildings. More and more roofs are equipped with photovoltaic cells.

Consumer units and Din-Rail equipment by Legrand Group

Surface-mounting or flush-mounting Nedbox is a 63 A low voltage consumer unit for easy and clever cabling. The consumer unit is especially suited to housing and small commercial applications in Central Europe (Germany, Austria, Poland, Sweden, Hungary...).

Lexic range is Legrand's insurance of high performance, providing safety, simplicity and freedom of installation. For easier installation in residential applications, Lexic range offers a large choice of functions such as MCBs, RCDs, voltage surge protector, auxiliaries, Stop and Go automatic resetting.

Consumer units



NEDBOX
2 rows of 12 modules



FLUSH-MOUNTING DISTRIBUTION BOARD
2 rows of 12 modules



Power protection
See page 56 to 57

Din-Rail equipment



I RCD - DX



VOLTAGE SURGE
PROTECTOR



TIME-LAG
SWITCH



I RCD - DX



I MCB - DX



I RCD - DX



I RCD - DX



I MCB - DX-E



I MCB - DX-E



PULSE OPERATED
LATCHING RELAY

Wiring accessories by Legrand Group

The Legrand Group offers the most comprehensive ranges on the market to meet all your requirements. It is constantly adding new functions to make these ranges even better in terms of sustainable development, accessibility and comfort. With an unrivalled choice of shapes and finishes, you can be certain of being able to incorporate these functions stylishly in all your projects.

With the Legrand Group you can enhance electrical installations in the eyes of your customers, offering them solutions that meet their requirements for high quality, ease of use and attractive appearance.

Céliane by Legrand



MICA
Switch



COBALT
Switch



NICKEL VELVET
Switch



CORIAN® NOCTURNE
Switch



MAHOGANY
Switch with lever



PORCELAIN
Touch control switch



KAOLIN GLASS
Silent switch



CAMEL LEATHER
Touch-sensitive switch

Valena by Legrand



WHITE
Switch



IVORY
Socket



ALUMINIUM
Switch



IVORY - TERRA
Switch



Home automation
See page 64 to 67

Axolute by Bticino



LIQUID WHITE
Switch



SHINY INOX ALESSI STEEL
Switch



RED CHINA
Switch



BLACK GLASS
Switch

Living, Light, Light Tech by Bticino



LIVING - NATIVE
Switch



LIVING - SOLID RED
Switch

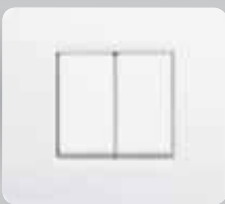


LIGHT - SATIN GOLD
Switch



LIGHT TECH - ALU TECH
Socket

Màtix by Bticino



MÀTIX-WHITE
Switch



MÀTIX-IVORY
Switch



MÀTIX-SILVER
Switch

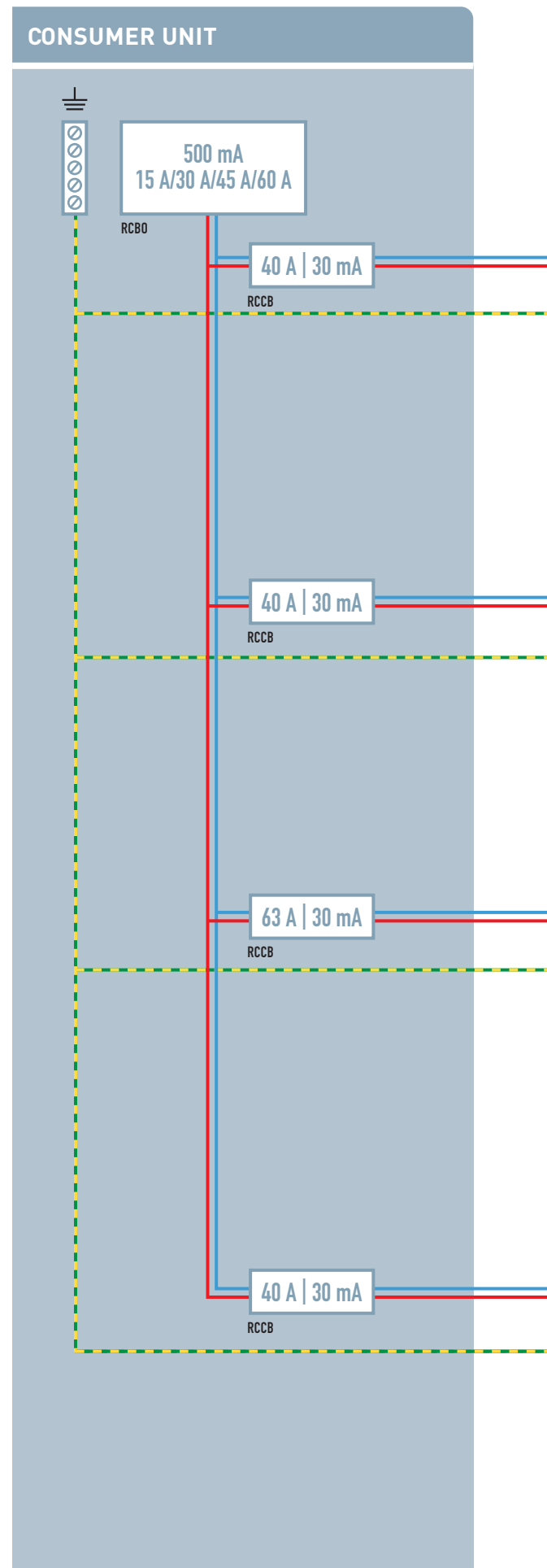


MÀTIX-TITANIUM
Switch

IEC | French standard

Typical residential wiring diagram issued from NFC 15-100 requirements for electrical installations.

I Consumer units and Din-Rail equipment by Legrand Group	26-27
II Wiring accessories by Legrand Group	28-29

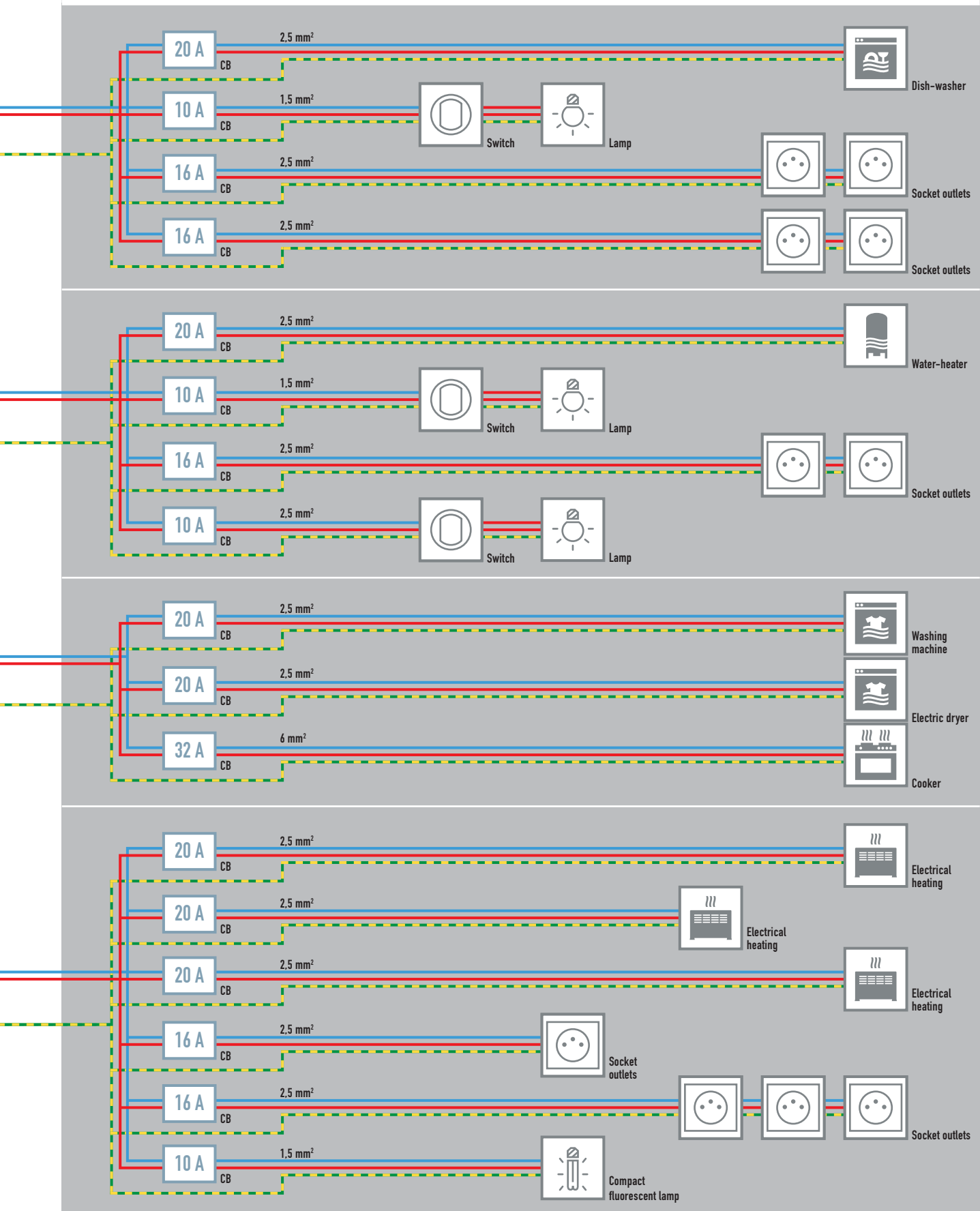


For more details on countries
See maps page 02 to 05

COLOUR CODE OF SOLID STRANDED FLEXIBLE CONDUCTORS

— or — Line
 — Neutral
 — Earth

CB: Circuit breaker
 RCCB: Residual current circuit breaker
 RCBO: Residual current operated circuit breaker with integral overcurrent protection



Overview of the installation and related wiring accessories standard

↓ SUPPLY

Usually single phase (230 V / 50 Hz). Earth is usually local (TT system). The protective conductor is mandatory in every circuit. An AD fuse is installed on the phase in conjunction with the main circuit breaker.

↓ METER

A single kW/h meter is supplied. If an optional off-peak power fare is subscribed, a 2-fares meter with pilot-line switching is installed.

↓ MAIN CIRCUIT-BREAKER

This device has 3 functions:

- Acts as the main switch of the installation
- Limits the current consumption to a pre-settled level of the contract with electricity supplier
- Provides protection against indirect contact through a residual current protection (type S, 500 mA).

↓ LIGHTNING PROTECTION

The installations supplied by an overhead electric line and located in high risk lightning areas have to be protected by a Surge Protective Device (SPD) installed downstream of the main residual current circuit breaker. The Surge Protective Device has to be connected to the main earth terminal of the consumer unit.

↓ CONSUMERS DISTRIBUTION BOARD

All the protection and control functions of the electrical installation are located in the main household trunking (called GTL). The power distribution panel board and the communication panel board are located in the GTL.

↓ POWER DISTRIBUTION PANEL BOARD

This panel board concentrates all the control and protection functions of the electrical installation.

The protection against overcurrent (short circuit and overload) is provided by circuit-breakers or fuses. All the circuits have to be protected by a 30 mA RCD in order to provide the complementary protection against the direct contacts. Other devices could be located in the panel board as:

- Time switches and time delay relays
- Bell transformer
- Power relays (heating, etc)
- Latching relays for lighting
- Signalling lamps
- Daylight/dusk switches
- Dimmers
- Land-shedding relays
- Off-peak power relays
- Buzzer or bell.

↓ CIRCUIT PROTECTION AGAINST OVERCURRENT

Each circuit has to be protected against overcurrent at its origin. The overcurrent protection device shall ensure the simultaneous breaking of both phase and neutral conductors. The protection device should be a miniature circuit breakers or a fuse cartridge.

↓ SPECIALIZED CIRCUITS

Some appliances (e.g. washing machine, freezer, dishwasher, etc) should be supplied by a dedicated circuit having the appropriate cross sectional area and overcurrent and RCD protection. They will be connected either via a socket or via a cable outlet box (e.g. oven, cooking plate, water-heater).

↓ SOCKET OUTLETS

The socket outlet circuits are installed in a star configuration. The maximum number of socket-outlets is 8 on a 2.5 mm² circuit and 5 on a 1.5 mm² circuit. Socket outlets are of the earthed type 2P+E. Shutters are mandatory for all type of socket-outlets up to 32 A.

↓ PLUGS

They can be 2P or 2P+E type. The flat bodied 2P type should have sleeved pins. Specific 20 A

INSTALLATION RULES

All the low voltage electrical installation shall comply with the French standard NF C 15100. This standard provides detailed rules concerning all the aspects of the wiring and designing of the installation. Copies of the standards, as well as other French electrical standards are available

From:
UTE
ute@ute.asso.fr
http://www.ute-fr.com
Helpful practical guides are available from:
Promotelec
http://www.promotelec.com

and 32 A plugs are also available for high power circuits.

↓ LIGHTING POINTS

The lighting circuits are installed in a star configuration. A maximum of 8 points per circuit is allowed, each controlled by switches or dimmers. Multiple-point control of lighting is usually achieved by latching relays and push-buttons. The use of time-lag switches for the light control in public areas is also recommended.

↓ EARTHING

The earthing terminal is usually provided by a closed loop foundation earth electrode. Supplementary bonding of metal fittings in bathroom, kitchens, etc., is mandatory.

↓ CABLING

Most domestic wiring is run either in plastic surface mounted trunking or in plastic flushed-in conduit systems. Generally PVC insulated solid copper conductors are used in fixed wiring. Concerning the surface-mounted trunking systems, the protection against the external influences has to be ensured throughout the entire length of the circuit.

↓ ELECTRICAL ACCESSORY INSTALLATION

Switches, sockets, etc., should be installed in a flush or surface mounted box or in an especially designed trunking system. All the accessories have to be screw fitted.

↓ OUTDOOR CIRCUITS

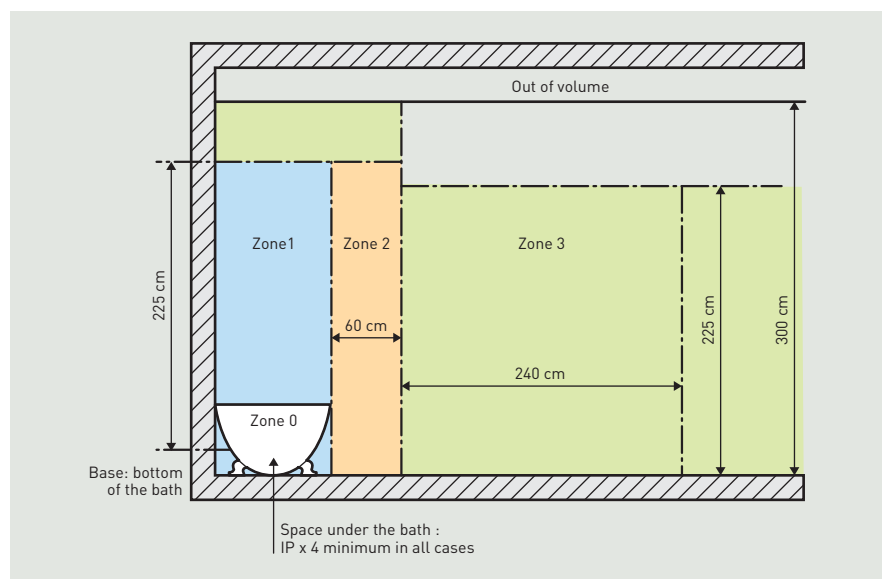
The use of a 30 mA RCD protection is mandatory for the protection of the domestic outdoor circuits. Outdoor sockets should be at least IP 44.

↓ BATHROOMS

Specific rules apply for circuits in bathrooms.

↓ COMMUNICATION BOARD

In the domestic installation a communication board is installed in the main household trunking (GTL). It is the central part of the communication network of the dwelling. Each room of the dwelling is supplied by a twisted pair cable originating from the communication board and terminating with an RJ 45 socket. This communication network is able to provide different services such as telephone, Ethernet and TV.



Consumer units and Din-Rail equipment by Legrand Group

The enclosures for the French residential system fit perfectly into all indoor, outdoor or design projects.

The modular products protect people and property, as well as the most sensitive equipment: including protection against voltage surges and protection with a high level of immunity.

The Stop&Go increases continuity of service on circuits that require special monitoring (aquarium, refrigerator, freezer) and management products, combining ease of use and energy saving.

Consumer units



EKINOXE TX
3 rows of 12 modules



NX
2 rows of 12 modules



PRACTIBOX
3 rows of 12 modules



PLEXO³
2 rows of 12 modules



DISTRIBUTION BOARD
FOR SPECIAL TARIFF
1 row of 12 modules

 **Power protection**
See page 56 to 57

Din-Rail equipment



| RCD - DX



| RCD - DX
Automatic terminals



| RCD - DX



| VOLTAGE SURGE
PROTECTOR



| E.L.C.B.



| MCB - DNX 4500



| STOP&GO
Automatic resetting



| PULSE OPERATED
LATCHING RELAY

Wiring accessories by Legrand Group

A new generation of wiring accessories for all your lighting, energy distribution, data and audio-video content, blind management, climate control and safety requirements.

Offers to suit all your sites, with a unique range of designs and user interfaces.

All with the high quality mechanisms and modular design that have made the Legrand Group the world standard for wiring accessories.

Céliane by Legrand



TITANE
Socket



COBALT
Switch



NICKEL VELVET
Switch



CORIAN® NOCTURNE
Switch



MAHOGANY
Switch with lever



PORCELAIN
Touch control switch

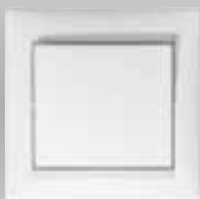


KAOLIN GLASS
Silent switch



CAMEL LEATHER
Touch-sensitive switch

Valena by Legrand



WHITE
Switch




IVORY
Socket



ALUMINIUM
Switch



IVORY - TERRA
Switch

 Home automation
See page 64 to 67

Axolute by Bticino



WHITE LIMOGES
Switch



RED CHINA
Switch



BRUSHED BRONZE
Switch



BLACK GLASS
Switch



LIQUID WHITE
Switch



MATT GOLD
Switch



CHERRY WOOD
Switch



SHINY INOX ALESSI STEEL
Switch

Living, Light, Light Tech by Bticino



LIVING - NATIVE
Switch



LIVING - SOLID RED
Switch



LIGHT - SATIN GOLD
Switch



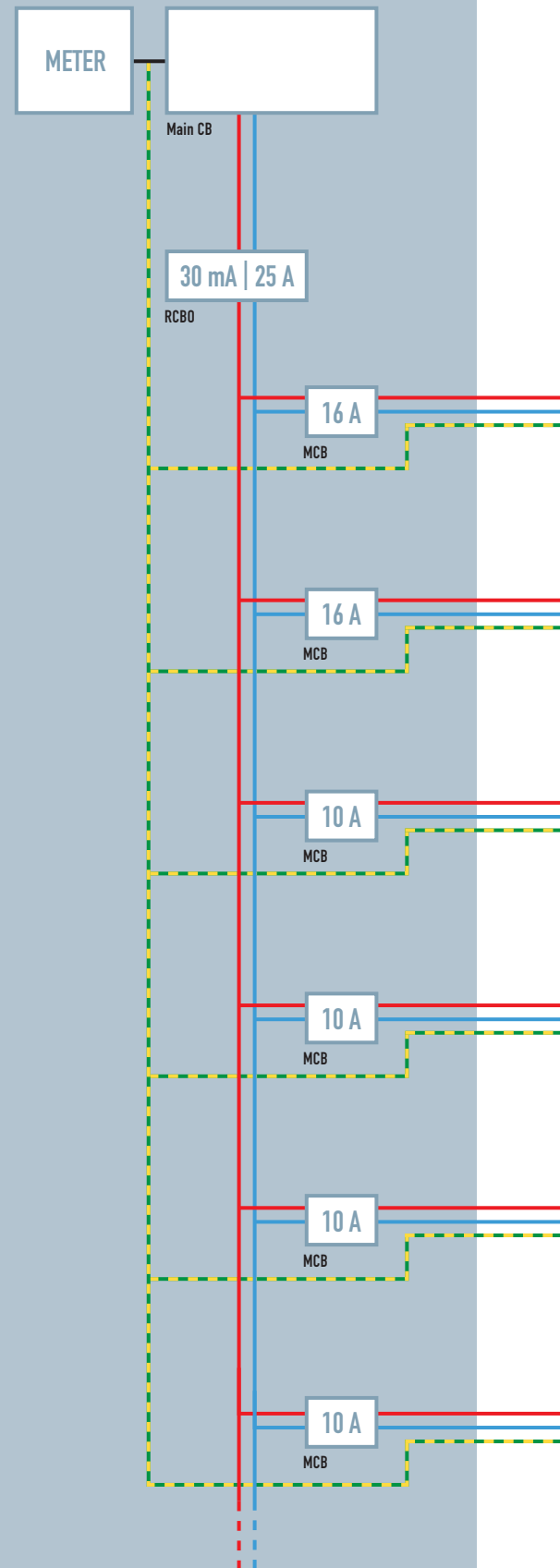
LIGHT TECH - ALU TECH
Socket

IEC | Italian standard

Typical residential wiring diagram issued from IEC EN 64-8 requirements for electrical installations.

I Consumer units and Din-Rail equipment by Legrand Group	32
II Wiring accessories by Legrand Group	33

CONSUMER UNIT

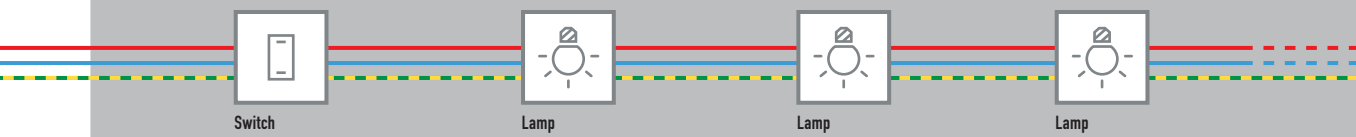
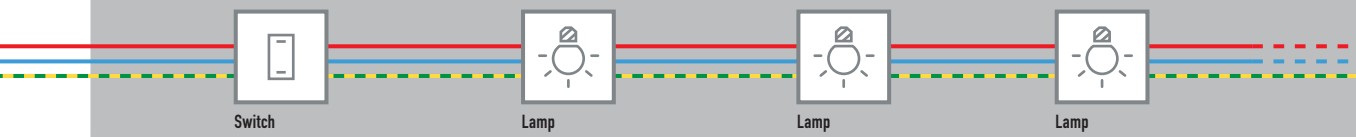
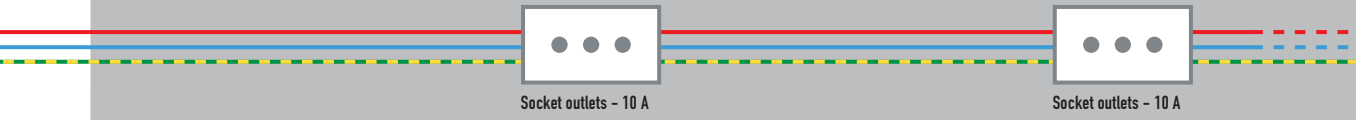
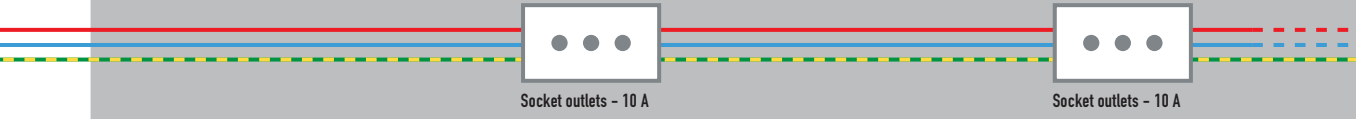
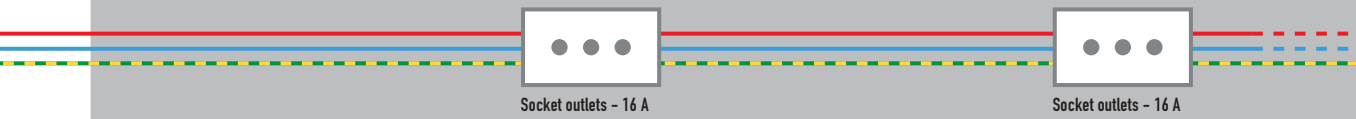
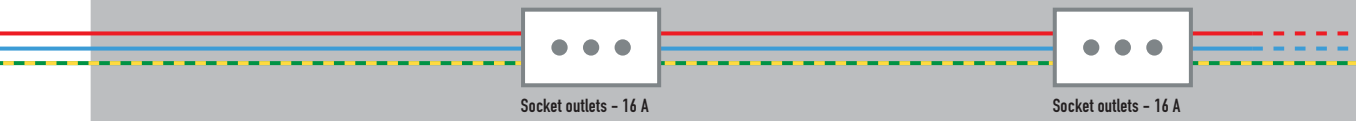


For more details on countries
See maps page 02 to 05

COLOUR CODE OF SOLID STRANDED FLEXIBLE CONDUCTORS

— or — Line
 — Neutral
 — Earth

MCB: Miniature circuit breaker
 RCBO: Residual current operated circuit breaker with integral overcurrent protection
 CB: Circuit breaker



Consumer units, Din-Rail equipment...

The consumer unit range includes resin flush-mounted cabinet E215, 2 and 3 rows IP40, for residential applications, and wall-mounted cabinet Idroboard IP65 for industrial and service sector applications.

Btdin is a complete range of thermal magnetic circuit breakers and earth leakage devices, and is completed by a full range of auxiliary items: insulating switches, control devices and the new automatic resetting Stop&Go for domestic RCD.



Power protection
See page 56 to 57

Consumer units



E215
2 rows of 12 modules



E215
3 rows of 12 modules



IDROBOARD
2 rows of 12 modules

Din-Rail equipment



RCD



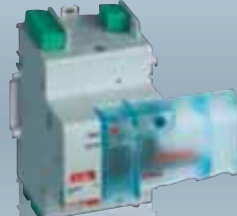
CONTACTOR



VOLTAGE
SURGE PROTECTION



ISOLATING
SWITCH



AUTOMATIC RESETTING
STOP & GO



MCB

... wiring accessories by Legrand Group

Axolute, the luxury range offering a wide choice of materials and prestigious finishes coupled with the performance of the latest digital technologies.

Light and Light Tech, two ranges offering harmonious and rational geometry

Living, tender and rounded forms hosting elegant grey devices.

Màtix, a perfect solution for residential projects and building contractors.



Home automation
See page 64 to 67

Axolute by Bticino

LIQUID WHITE Switch	BRILLIANT INOX ALESSI Switch	RED CHINA Switch	BLACK GLASS Switch

Living, Light, Light Tech by Bticino

LIVING - CHERRY WOOD Switch	LIVING - TRUE GOLD Switch	LIGHT - JELLY ORANGE Switch	LIGHT TECH - CHROME Switch

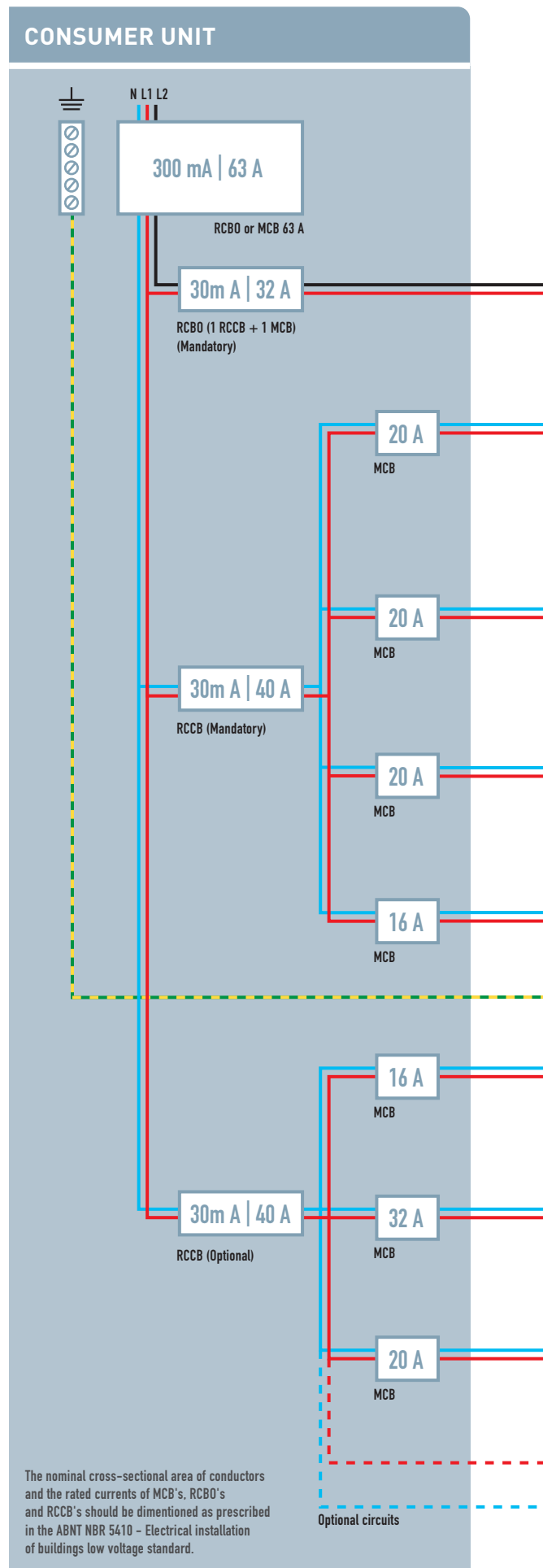
Màtix by Bticino

MÀTIX-WHITE Switch and socket	MÀTIX-COBALT Switch	MÀTIX-BLACK NICKEL Switch	MÀTIX-TERRACOTTA Switch

IEC | Brazil standard

Typical residential wiring diagram
issued from ABNT NBR 5410 requirements
for electrical installations.

I Consumer units and Din-Rail equipment by Legrand Group	38-39
II Wiring accessories by Legrand Group	40-41

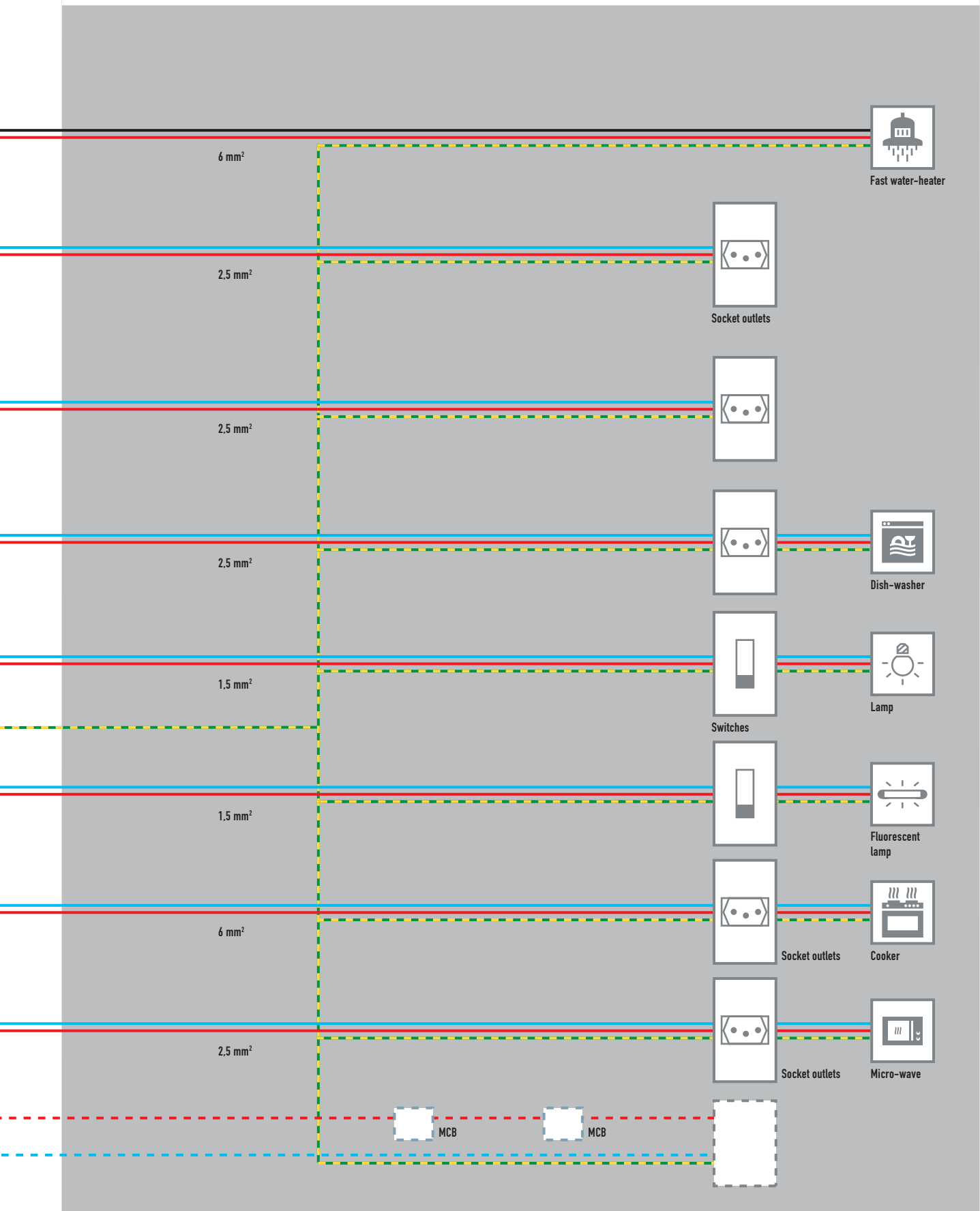


For more details on countries
See maps page 02 to 05

COLOUR CODE OF SOLID STRANDED FLEXIBLE CONDUCTORS

-  Phase
-  Neutral
-  Earth

MCB: Miniature circuit breaker
 RCBO: Residual current operated circuit breaker with integral overcurrent protection
 RCCB: Residual current circuit breaker



Overview of the installation and related wiring accessories standard

↓ SUPPLY

Usually single phase (127 V-60 Hz) and two phase (220 V-60 Hz) loads. Phases and neutral are supplied. Earth is usually local. A circuit-breaker should be installed on the phases. Fuses are still common in old residences.

↓ METER

As single kWh meter is supplied. The most common domestic type of electricity meter is the electro-mechanical induction watt-hour meter sealed in a special housing to prevent tampering.

↓ MAIN CIRCUIT-BREAKER

This unit has 3 functions:

- Acts as main isolator for the installation
- Limits consumption of current to a pre-set level determined by contract with electricity supply organisation
- Provides "blanker" residual current protection at 300 mA.

↓ COMPULSORY PROTECTION AGAINST LIGHTNING

Installation supplied by overhead electric line and located in areas where thunder is heard more than 25 days per year must be protected by a Surge Protective Device immediately placed after the main residual current circuit breaker (300 mA and recommended Type S). The Surge Protective Device must be connected to the earth terminal block of the distribution board.

↓ CONSUMERS DISTRIBUTION BOARD

It contains distribution of power to subcircuits and circuit protection (overload and short circuit). Additionally it may contain other functions:

- Residual current protection of sub-circuits
- Time switches or time delay relays
- Bell transformer
- Power relays (heating, etc)
- Latching relays for lighting
- Indicator lamps
- Daylight/dusk switches
- Dimmers
- Land-shedding relays
- Off-peak power relays
- Buzzer or bell
- Home automation.

The unit is usually site-assembled and "soft" wired (no busbars).

↓ CIRCUIT PROTECTION

Each circuit must have a suitable protection device on its source. This device shall insure the breaking of phases conductors in one operation. Rewireable fuses are not required by Brazilian electrical installation of building standard, the NBR 5410.

↓ POWER CIRCUITS

All appliances having a relatively high consumption of current should be supplied on a specific circuit with appropriate protection and cabling. They will be connected either via a special plug and socket-outlet or via cable outlet

box (e.g. cooker, dishwasher, washing machine, water-heater, air-conditioning, etc). Individual circuits must be used for lighting points and socket outlets points.

↓ SOCKET OUTLETS

Are supplied on radial circuits provided with earth (maximum of 8 socket outlets per circuit in 220 V and 5 socket outlets in 127 V). It is recommended all circuits of socket outlets are protected by 30mA Residual Current Devices. Socket outlets are of the earthed type (2P+E) up to 20 A and should comply with the ABNT NBR 14136 (Brazilian dimensional standard). Shutters are not mandatory. There are two versions of socket outlets: 10 A and 20 A. A 10 A socket outlet should not allow the insert of a 20 A plug,

↓ PLUGS

Plugs can be 2P or 2P+E type up to 20 A and should comply with the ABNT NBR 14136 (Brazilian dimensional standard). Sleeved pins are not mandatory. There are two versions of plugs:

- For equipment with rated current up to 10 A
- For equipment with rated current above 10 A up to 20 A.

↓ LIGHTING POINTS

Lighting points are supplied radial circuits provided with earth (max 8 points per lighting circuit) and

INSTALLATION RULES

All electrical installations should comply with Brazilian standard ABNT NBR 5410. This document lays down detailed rules governing all aspects of wiring and designing on installation.

controlled by switches or dimmers. **Note:** multiple-point control of lighting is usually achieved using latching relays and push-buttons. The use of time switches to control lights in public areas is commonly used.

EARTHING

All circuits distribute a protective conductor. All services should be bonded to earth. Supplementary bonding of metal fittings in bathrooms, kitchens, etc., is also necessary.

CABLING

Most domestic wiring is run either in plastic surface trunking or in flushed in conduit systems. Some rules govern the choice of the type of conduit to be used. Generally solid copper conductors (usually PVC insulated) are used for fixed wiring. Attention must be paid to the various rules governing cable section, voltage drop, etc. For plastic surface trunking, protection against external influences must be ensured continuously throughout the length of conduit runs, especially at angles and entries into wiring devices.

ELECTRICAL ACCESSORY INSTALLATION

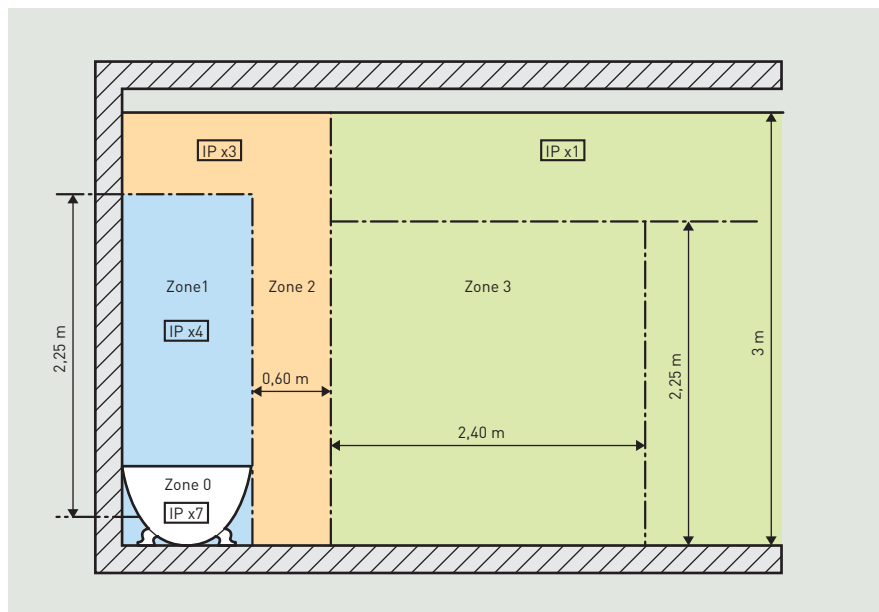
Switches, sockets, etc., should be installed in a flush or surface box or in a purpose made equipment trunking. Accessories may be either screw-fitted or provided with expanding claws which grip the walls of a circular flush box

OUTDOORS

The use of 30 mA RCD protection is recommended. Outdoor socket outlets should be at least IP 44.

BATHROOMS

Special rules apply to bathrooms which are divided into 4 zones.



DEFINITION OF ZONE CONTAINING BATH OR SHOWER				
Zones	0	1	2	3
Wiring systems	X ⁽²⁾	II ⁽¹⁾	II ⁽¹⁾	II
Switchgear and controlgear	X	X ⁽²⁾	X ⁽²⁾	- Supplied individually by an isolating transformer - Supplied by Safety Extra Low Voltage (SELV) ⁽⁴⁾ - Protected by a 30 mA RCD
Appliances	X ⁽²⁾	X ⁽²⁾ (3)	II + 30 mA RCD (2)(3)(5)	- Supplied individually by an isolating transformer - Supplied by SELV ⁽⁵⁾ - Protected by a 30 mA RCD

X: prohibited
 II: Permitted for Class II
 RCD 30 mA: Protection by 30 mA residual current devices
⁽¹⁾ Limited to choose which are necessary to supply appliances located in this zone
⁽²⁾ Except those supplied by SELV, limited to 12 V ac or 30 V dc
⁽³⁾ Water heating permitted
⁽⁴⁾ No voltage limit (a50 V)
⁽⁵⁾ Except a socket outlet supplied a low power isolating transformer

Consumer units and Din-Rail equipment by Legrand Group

Legrand load centers, circuit breakers, time switches, residual current and surge protection devices are designed to satisfy individual requirements as far as design, integration, energy saving and protection of people and property are concerned.

Unic, Lexic and Ekinox systems comply with Brazilian Standards ABNT NBR and International Standards IEC offering the flexibility to install both protection: Bolt-on type and Din-Rail type.

Consumer units



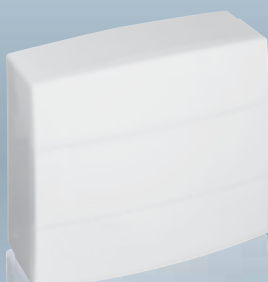
EKINOXE TX
2 rows of 12 modules



EKINOXE TX
3 rows of 12 modules



EKINOXE TX
4 rows of 12 modules



UNIC
1 row of 8 modules



UNIC
2 rows of 12 modules

 Power protection
See page 56 to 57

Lexic Din-Rail equipment



| MCB - DX-H 10000



| MCB - DX 6000



| MCB - DX 6000



| MCB - DX 6000



| RCD - DX

Unic Din-Rail equipment



| UNIC - MCB



| UNIC - MCB



| UNIC - DPS



| UNIC - RCD



| UNIC - RCD

Wiring accessories by Legrand Group

Legrand, the leading supplier of electrical wiring accessories in Brazil for 30 years, offers a comprehensive range for every market segment. Driven by the ongoing pursuit of excellence, the Legrand Group delivers solutions that provide customers with ever greater comfort, safety, connectivity and energy efficiency.

The Axolute and Living&Light ranges from Bticino for the luxury segment.

The Pialplus and Vela from Legrand for the standard and premium segments.

Axolute by Bticino



WHITE LIMOGES
Switch



RED CHINA
Switch



BRUSHED BRONZE
Switch



BLACK GLASS
Switch



LIQUID WHITE
Switch



MATT GOLD
Switch



CHERRY WOOD
Switch



SHINY INOX ALESSI STEEL
Switch

Living, Light, Light Tech by Bticino



LIVING - CHERRY WOOD
Switch



LIVING - SOLID RED
Switch



LIGHT - SATIN COPPER
Switch



LIGHT TECH - BRIGHT CHROME
Switch

 Home automation
See page 64 to 67

Vela by Legrand



SATIN WHITE
Switch and socket



METALLIZED PEARL
Switch



METALLIZED TITANIUM
Switch



METALLIZED SILVER
Switch



ANTHRACITE
Switch

PiaPlus by Legrand



GLOSS WHITE
Switch



GLOSS WHITE
3 + 3 module switch



SATIN WHITE
Switch

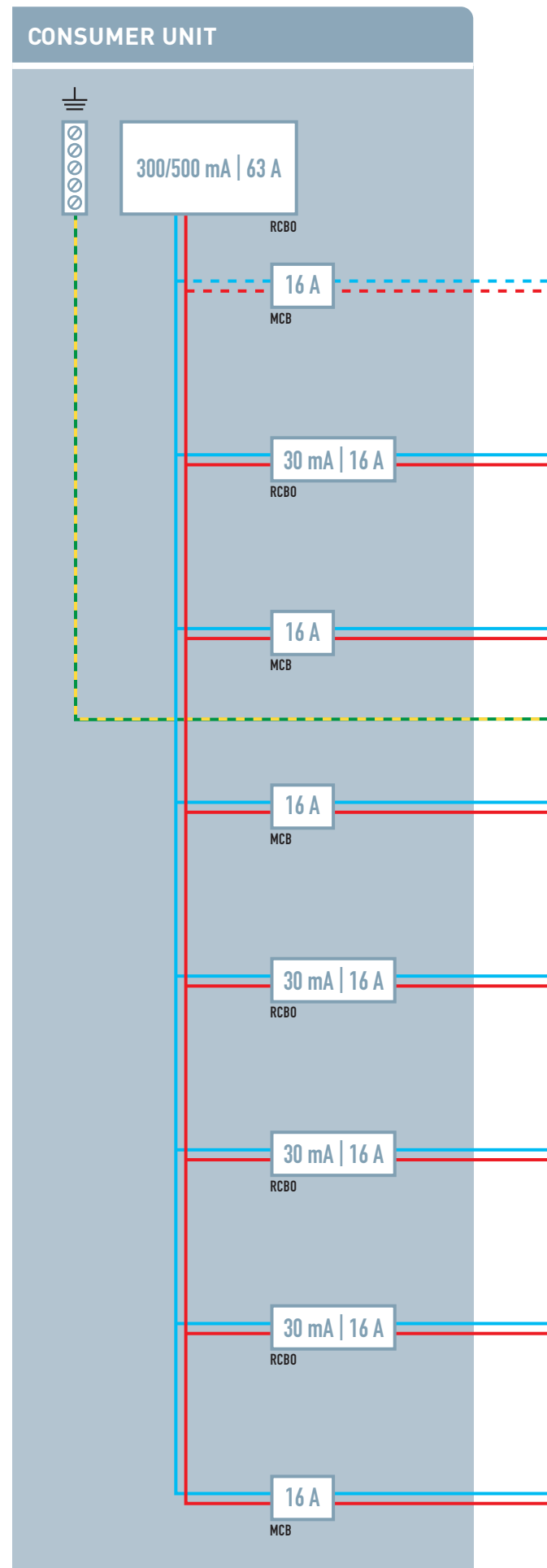


SATIN WHITE
Switch and socket

IEC | Chinese standard

Typical residential wiring diagram issued from GB 50054 requirements for electrical installations.

Wiring accessories by Legrand Group **44-45**

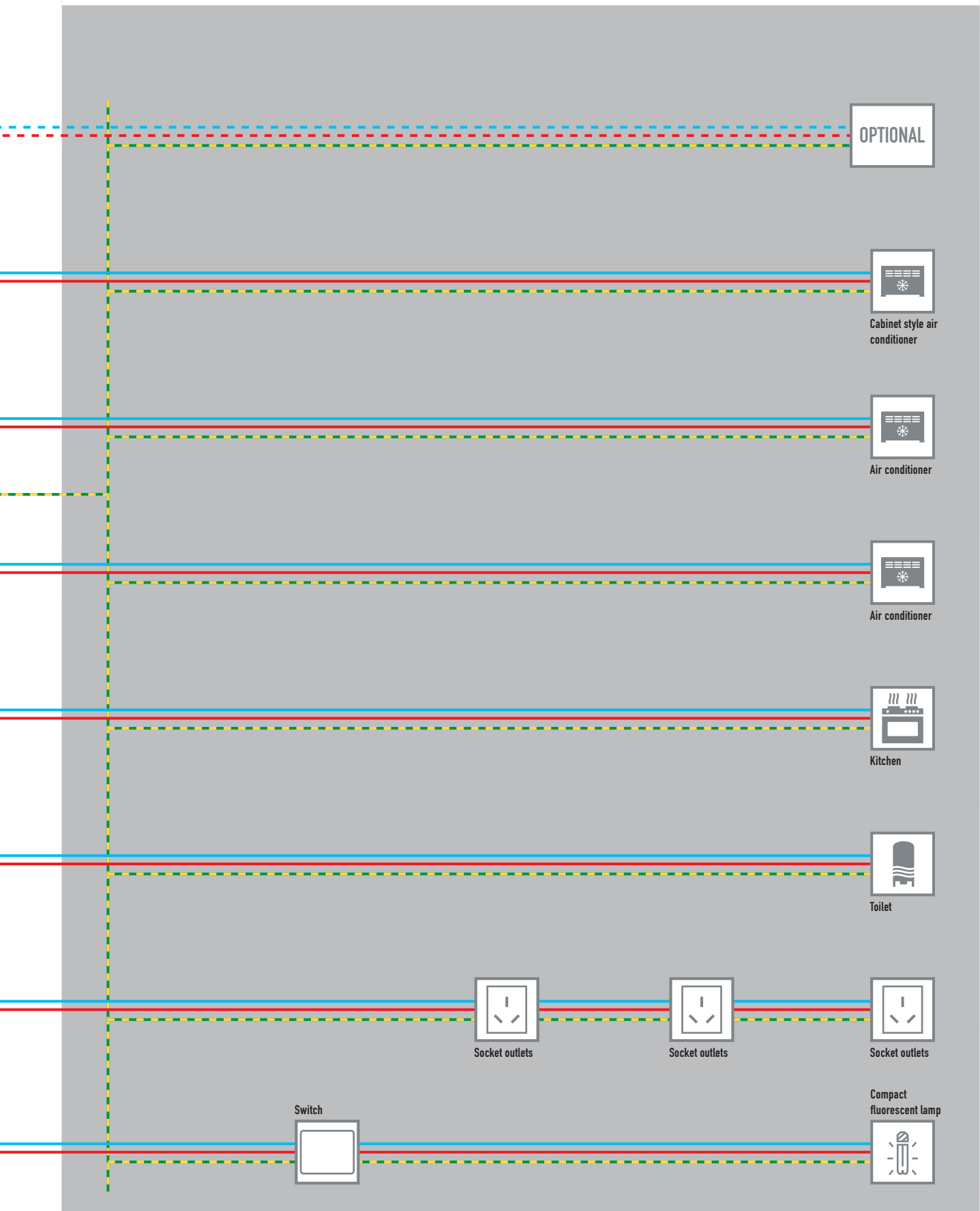


For more details on countries
See maps page 02 to 05

COLOUR CODE OF SOLID STRANDED FLEXIBLE CONDUCTORS

- Phase
- Neutral
- - - Earth

CB: Circuit breaker
 MCB: Miniature circuit breaker
 RCBO: Residual current operated circuit breaker with integral overcurrent protection



Wiring accessories by Legrand Group

In China, Legrand stand-out offering comes in a wide spectrum of combinations and colours, including market-leading white. With its modular mechanisms as well as flexible installation options, the functional possibilities are endless.

Arteor by legrand



TATOO - EDITION 1
Switch



GRAPHIC - FORMAL
Switch



BRUSHED METAL - STAINLESS STEEL
Switch



WOOD - WENGE STYLE
Switch



MIRROR BLACK
Micropush switch



MIRROR WHITE
Shutter control



GALUCHAT
Sensitive switch

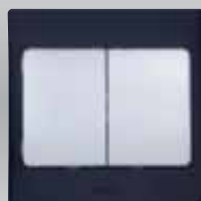


SIGNATURE
Universal dimmer

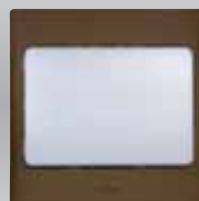
Major by legrand



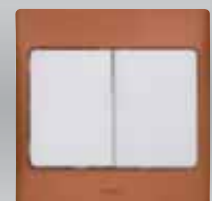
DARK SILVER - PEARL
Switch



SILVER - BLACK
Switch



SILVER - BRONZE
Switch



PEARL - COPPER
Switch



Home automation
See page 64 to 67

A6 by TCL/Legrand



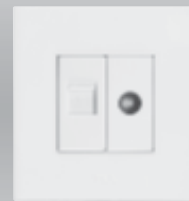
WHITE
Switch



WHITE
Switch



WHITE
Socket



WHITE
Computer-TV socket

A8 by TCL/Legrand



SILVER
Switch



BROWN
Switch



ROSE - GOLD
Socket



EGGPLANT
Computer socket

Living, Light by Bticino



LIVING - NATIVE
Switch



LIVING - SOLID RED
Switch



LIGHT - SATIN GOLD
Switch



LIGHT - SATIN TITANIUM
Switch

Other IEC based Installation rules

↓ AUSTRALIA

Installation reference code:

AS/NZS 3000, Electrical installation as edited in The Australia and New Zealand Wiring Rules 2007.

Standards organization:

Standards Australia International Ltd (SAI)
286 Sussex Street AU-Sydney,
NSW 2000 GPO Box 5420
Sydney NSW 2001
Tel: + 61 2 82 06 60 00
Fax: + 61 2 82 06 60 01
Email: intsect@standards.org.au
Web: www.standards.com.au

↓ SOUTH AFRICA

Installation reference code:

SABS 0142-1: 2001.
The wiring of premises.
Part 1: Low-voltage installations.

Standards organization:

South African Bureau of Standards (SABS)
1 Dr Lategan Rd, Groenkloof
Private Bag X191
ZA-Pretoria 0001
Tel: + 27 12 428 79 11
Fax: + 27 12 344 15 68
Email: info@sabs.co.za
Web: www.sabs.co.za

↓ INDIA

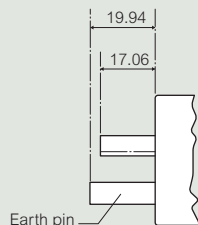
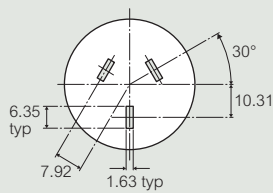
Installation reference code:

Specifications for electrical works (internal), published by S&QCD, 2001.

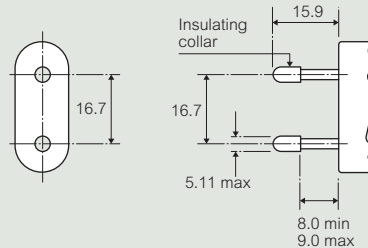
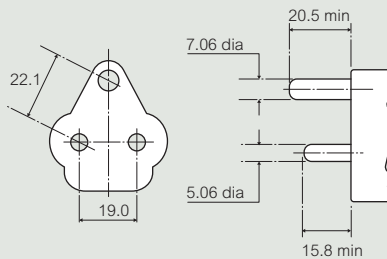
Standards organization:

Bureau of Indian Standards (BIS)
Manak Bhavan
9 Bahadur Shah Zafar Marg
IN-New Delhi 110002
Tel: + 91 11 23 23 79 91
Fax: + 91 11 23 23 93 99
Email: hisird@vsnl.net
Web: www.bis.org.in

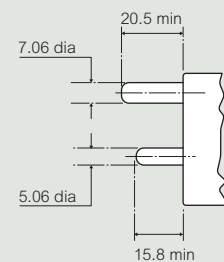
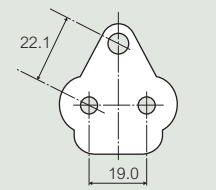
■ AUSTRALIA
Plug diagram + Plug type



■ BRITISH STANDARD
Plug diagram + Plug type



■ BRITISH STANDARD
Plug diagram + Plug type



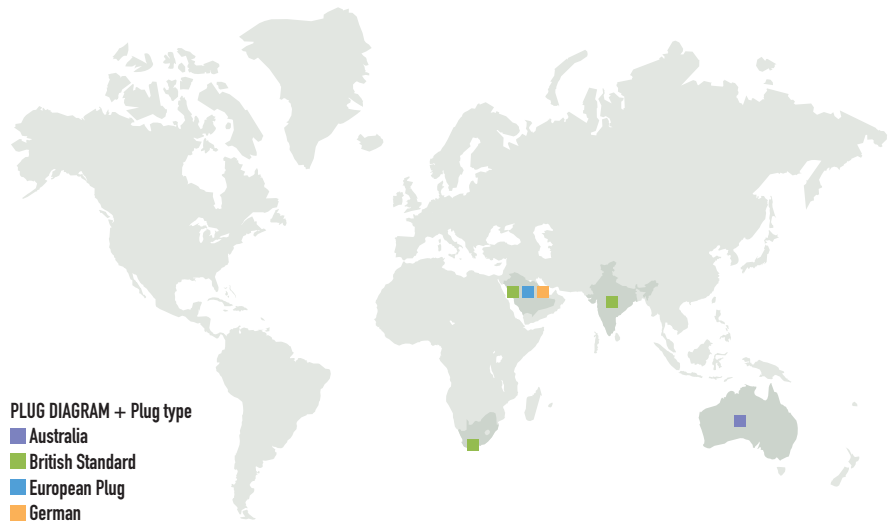
SAUDI ARABIA

Installation reference code:

National Saudi Code
(under preparation).

Standards organization:

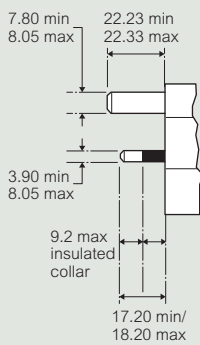
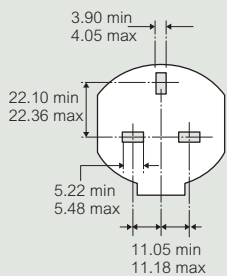
Saudi Arabian Standards
Organization (SASO)
Imam Saud Bin Abdul-Aziz
Bin Mohammed Road
(West End)
PO Box 3437 Riyadh 11471
Tel: + 966 1 452 00 00
Fax: + 966 1 452 00 86
Email: saso@saso.org.sa
Web: www.saso.org.sa



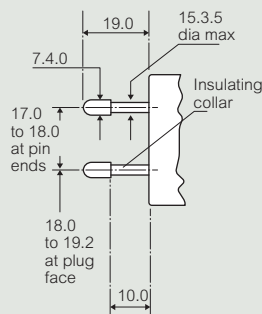
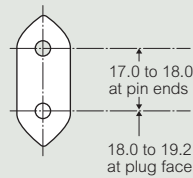
PLUG DIAGRAM + Plug type

- Australia
- British Standard
- European Plug
- German

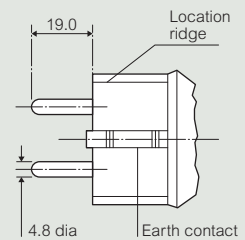
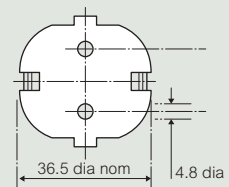
BRITISH STANDARD
Plug diagram + Plug type



EUROPEAN PLUG
Plug diagram + Plug type



GERMAN
Plug diagram + Plug type

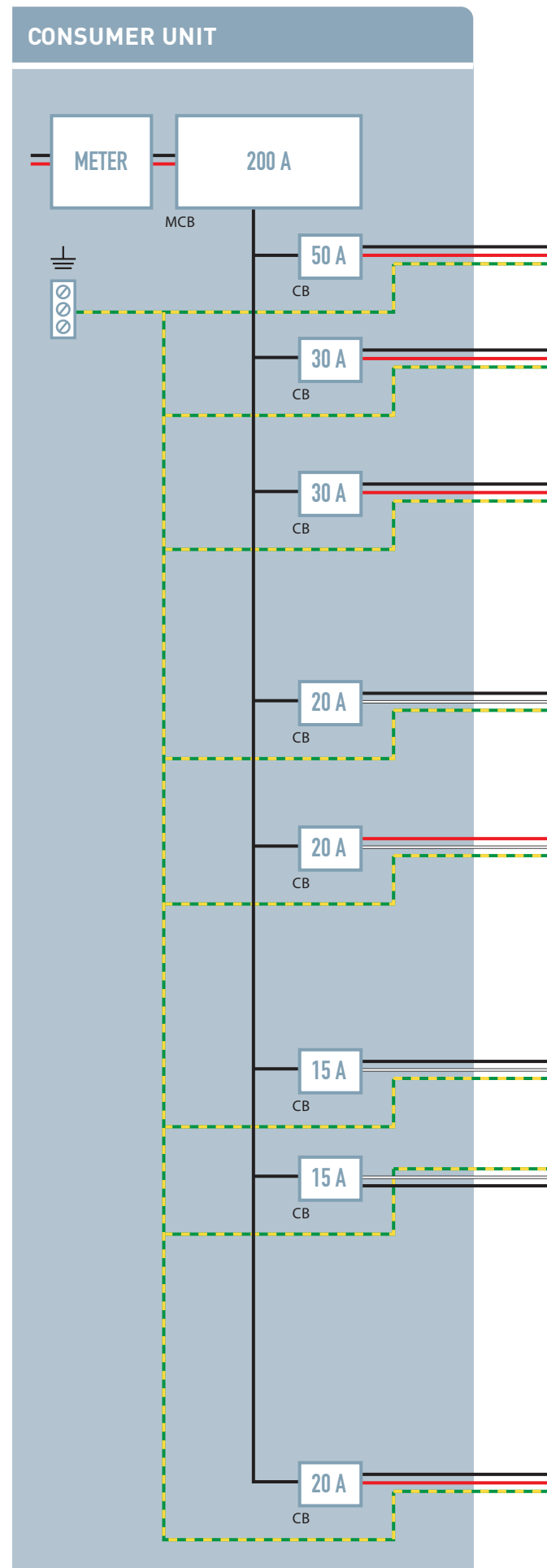


NEC | American standard

Typical residential wiring diagram issued from NEC (2008) requirements for electrical installations.

I Consumer units and Plug-in type equipment by Legrand Group **52-53**

II Wiring accessories by Legrand Group **54-55**



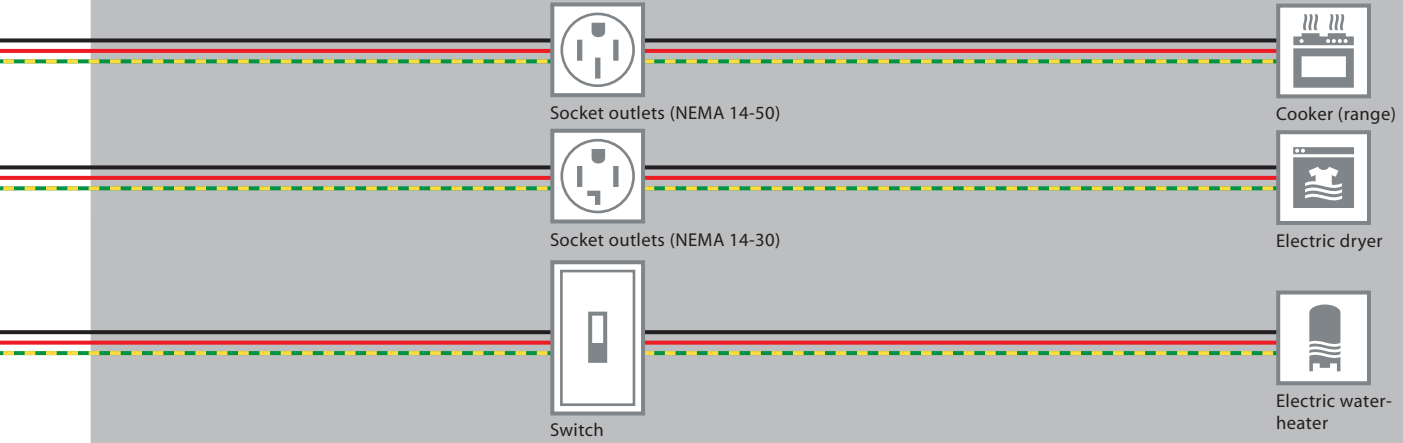
For more details on countries
See maps page 02 to 05

COLOUR CODE OF SOLID STRANDED FLEXIBLE CONDUCTORS

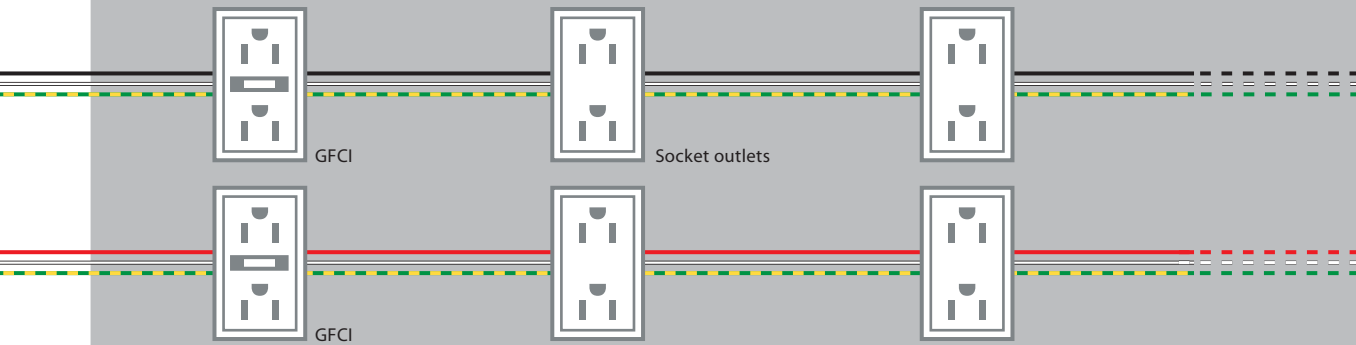
-  Live or hot
-  Neutral
-  Earth

- CB: Circuit breaker
- MCB: Main circuit breaker
- GFCI: Ground fault circuit interruptor

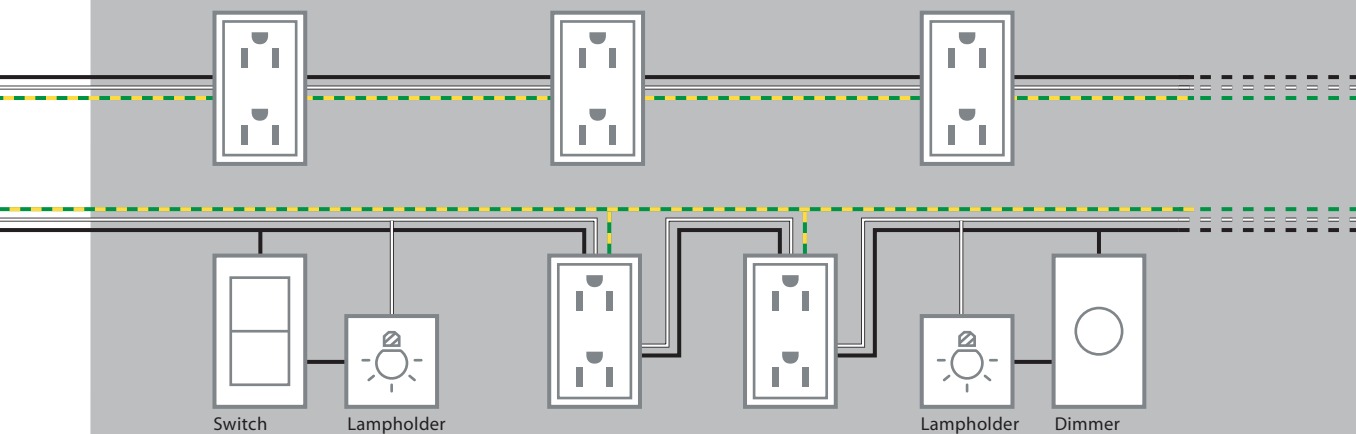
POWER CIRCUITS



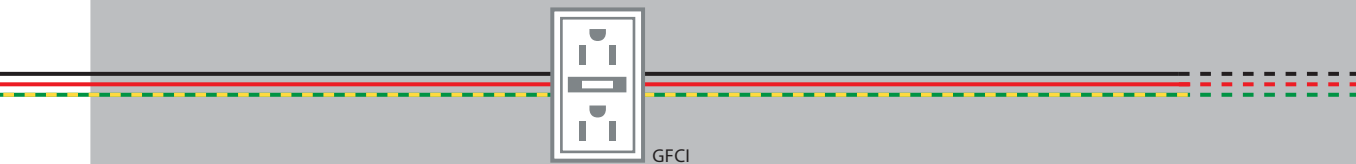
APPLIANCE CIRCUITS / BEDROOMS



GENERAL PURPOSE CIRCUITS



BATHROOM



Overview of the installation and related wiring accessories standard

↓ SUPPLY

Domestic supply is usually 2 phases (120 V/240 V - 60 Hz). 2 phases + neutral are supplied. Neutral is re-earthed at entry. Earth is local.

↓ METER

Usually a weatherproof unit outside the house.

↓ SERVICE PANEL

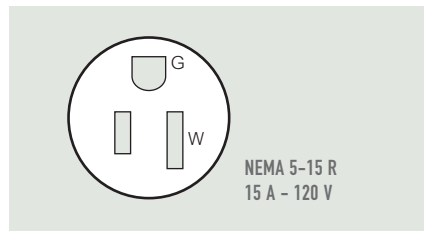
Ratings of 60 A, 100 A, 150 A and 200 A exist. The Service Panel (or Service Entrance Panel) usually contains a Main Disconnect device and the necessary protective devices for the sub-circuits.

↓ POWER CIRCUITS

Appliances having heavy power consumption (ranges, water-heaters, etc.) are supplied on a specific circuit, often 120/240 V. Various socket outlets of appropriate ratings are available, these are non-interchangeable, thus 2 Phase + Neutral + Earth plug cannot be fitted to a 2 Phase + Earth socket, etc.

↓ GENERAL PURPOSE CIRCUITS

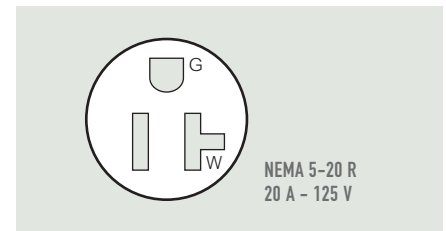
These are 120 V-15 A and supply socket outlets (1P+N+G). These circuits supply bedrooms, etc. where the use of a large number of appliances is unlikely. Note that all general purpose socket outlets must be of the grounding type.



↓ APPLIANCE CIRCUITS

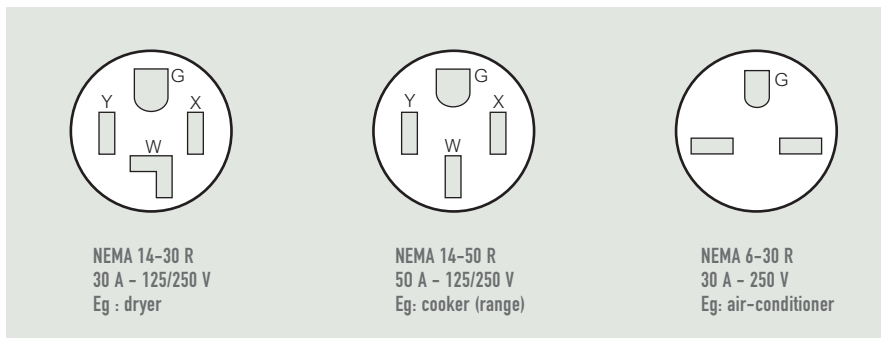
The 120 V-20 A circuits supply areas such as kitchens, dining-rooms. etc., when there is a likelihood of more intensive use of appliances. The NEC [National Electrical Code] requires at least two appliance circuits for a domestic installation. Only socket outlets may be supplied on an appliance circuit.

All domestic use NEMA 5-15R and 5-20R receptacles must be tamper resistant.



AMERICAN WIRE GAUGE AWG (approximate equivalence)

20	0.52 mm ²
18	0.82 mm ²
16	1.3 mm ²
14	2.1 mm ²
12	3.3 mm ²
10	5.3 mm ²
8	8.4 mm ²
6	13.3 mm ²
4	21.2 mm ²
2	33.6 mm ²
1	42.4 mm ²
1/0	53.5 mm ²
2/0	67.4 mm ²
3/0	85.0 mm ²
4/0	107.2 mm ²



↓ PLUGS

Various types of plugs exist to match the various configurations of socket outlets.

↓ OUTDOORS

Outdoor socket outlets must have 6 mA GFCI protection and be housed in a weatherproof enclosure.

INSTALLATION RULES

The "National Electrical Code" gives rules governing all types of electrical installation.

Copies are available from:

NATIONAL FIRE PROTECTION ASSOCIATION
1, Batterymarch Park
QUINCY, MA 02269 U.S.A.

Standards governing the construction of accessories are published by various organisations, the most important being:

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA),

1300 North 17TH Street Suite 1752
ROSSLYN, VIRGINIA 2009 USA
UNDERWRITERS LABORATORIES INC (UL)
333 Pflingsten Road
NORTHBROOK, IL 60062-2096 USA

Note that local building regulations are very important in the U.S.A. Common practices in one area can be prohibited in another even though the NEC prescribes the method. It is wise to gain local knowledge.

↓ GROUND-FAULT CIRCUIT-INTERRUPTERS (GFCI)

All domestic use 125 V - 15 A and 20 A socket outlets in the following locations must be protected by GFCI having a trip level sensitivity of 6 mA:

- Bathrooms
- Garages
- Kitchens
- Basements
- Outdoors
- Laundry and utility sinks (when socket outlets is within 6 feet).

↓ ARC-FAULT CIRCUIT-INTERRUPTERS (AFCI)

All domestic use 120 V - 15 A and 20 A branch circuits supplying outlets in living rooms, dining rooms, family rooms, bedrooms and similar areas must be AFCI protected.

↓ TAMPER RESISTANT (SHUTTERED) SOCKET OUTLETS

All domestic use 125 V - 15 A and 20 A socket outlets must be Tamper Resistant (shuttered).

↓ EARTHING (GROUNDING)

The use of ungrounded (2P) sockets in domestic installations is no longer allowed by the NEC. Earth can be distributed in the installation in one or two ways:

- By a specific earth conductor distributed along with live + neutral
- By using metallic boxes, conduit and sheathed cables and using this metallic system as earth.

All conductive non-current carrying parts of the electrical system should be effectively bonded to earth.

Polarity:

Polarity is conserved throughout the installation.

Live (hot):

Terminal screws brass colour; conductors insulated in black
Neutral:

Terminal screws silver or marked white or W; conductor insulated in white.

Ground:

Terminals green colour or marked G; conductors insulated in green or wire is left bare.

Cabling:

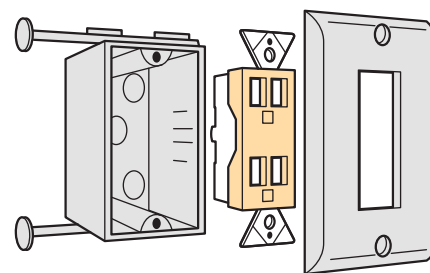
Various types of cables are used in domestic installations, the most frequent are:
NM, Non-metallic sheathed;
AC, Metal-clad cable.

Similarly various types of conduits are also encountered:

- Rigid steel conduit
- Intermediate metal conduit
- Thinwall metal conduit
- Flexible metal conduit
- Rigid non-metallic conduit
- Surface raceway.

↓ ELECTRICAL ACCESSORY INSTALLATION

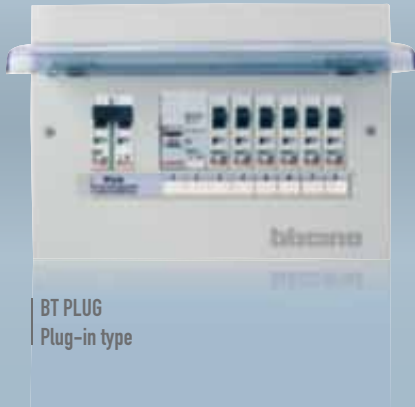
Accessories are fitted in standard boxes, either metal or plastic, the most common sizes being 2 inches by 4 inches and 4 inches by 4 inches.



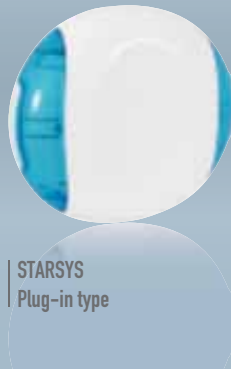
Consumer units and Din-Rail* equipment by Legrand Group

Our systems comply with different rules of installation in America and the Caribbean. In this way, a broad portfolio of protection and distribution products allows us to provide solutions in residential buildings following local adaptations, including among others NEC in USA, NMX in Mexico, COVENIN in Venezuela, NTC in Colombia,...

Consumer units and distribution boards



BT PLUG
Plug-in type



STARSYS
Plug-in type



TIVEN
Plug-in type



BT PLUG 2
Plug-in type



BT PLUG
Plug-in type



TIBRA
Bolt-on type

*or Plug-in or Bolt-on types

 **Power protection**
See page 56 to 57

Din-Rail equipment



MCB - BT PLUG
Plug-in type 3/4"



MCB - BT PLUG
Plug-in type 3/4"



MCB - TIVEN
Plug-in type 1"



MCB - DSE
Plug-in type 1"



MCB - TIBRA
Bolt-on type 1"



MCB - DSA
Bolt-on type 1"

Wiring accessories by Legrand Group

The Studio Collection from Legrand seamlessly blends innovative function with elegant design. The Studio wall plates are offered in 17 contemporary color options in a design and form-factor never before available to homeowners. The design, a sculptural flow of curves featuring titanium edging and a screwless finish, offers customers a new way to integrate Home Systems products with personal style and taste throughout the entire home.

Studio by Legrand



WHITE
GFCI Nightlight
Tamper-Resistant



KHAKI
GFCI Nightlight



WHITE
Deco Rotary Dimmer



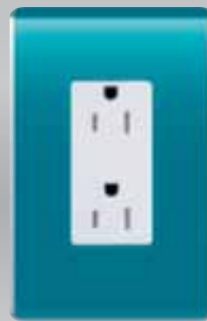
WHITE
Decorator Switch



NIRVANA
GFCI Nightlight
Tamper-Resistant



SAND
GFCI Nightlight
Tamper-Resistant




CYAN
Decorator Tamper-
Resistant Receptacle



MOSS
Deco Rotary Dimmer

Axolute by Bticino (a Legrand Group brand) is the best choice for prestigious environments. The richness of the aesthetic options and the technology within the devices will enhance your electric system like never before. Combinations of materials, finishes and shapes let you match every space with the most appropriate solution. An innovative modular system that offers a complete UL product range.

 Home automation
See page 64 to 67



ENERGY DISTRIBUTION

To ensure the best possible performance of production tools, buildings need to benefit from high-performance, lasting solutions which provide an optimum quality of service.



A COMPLETE OFFER UP TO 4 000 A

From XL³ distribution enclosures to cabinets, from standard or optimised busbar distribution through to terminals, the Legrand Group offers a complete offer of solutions for energy distribution up to 4 000 A. DMX, DPX and DX protection devices ensure optimum selectivity with a very high breaking capacity to protect the installation effectively. Remote installation supervision equipment is also available for greater security.



A SET OF RELATED SERVICES

Technical guides, design software, product training, technical and commercial support and indeed on-site assistance – are provided to help you day by day in the achievement of your project.



DMX
Air circuit-breaker: a headline device for protection and control of low voltage installations up to 4 000 A



DPX
A range of MCCBs that ensure optimum dynamic or logical selectivity to protect the installation



DX
Designed to protect devices up to 125 A



STOP & GO
Motorized control to restore the power supply in the event of unwanted tripping

PUTTING A STOP TO ENERGY WASTE

It's the vision of Legrand with its new range of lighting management products & systems. Energy-efficient lighting managements ensure just the right amount of light when and where you need it.

They are reliable and easy to use, provide safety and security, reduce expenses and are code compliant, sustainable and environmentally friendly. Legrand has everything you need to make your lighting management project a success, from a comprehensive range of products to informative tools and services.



**THE RIGHT LIGHT LEVELS
AT THE RIGHT TIMES AND LOCATIONS:**
Conference rooms, open offices,
hallways, cubicles...



ENERGY EFFICIENCY

Lighting is a significant consumer of energy in commercial buildings:

- 20 % of total site energy is consumed by lighting in commercial buildings.
- Lighting is the first electricity end-user in a commercial building with up to 40 % electricity consumed.

NB: Energy end-use distribution greatly varies depending on the activity of the building and across geographical and climate regions (sources: Department of Energy Buildings and Energy Information Administration, USA).

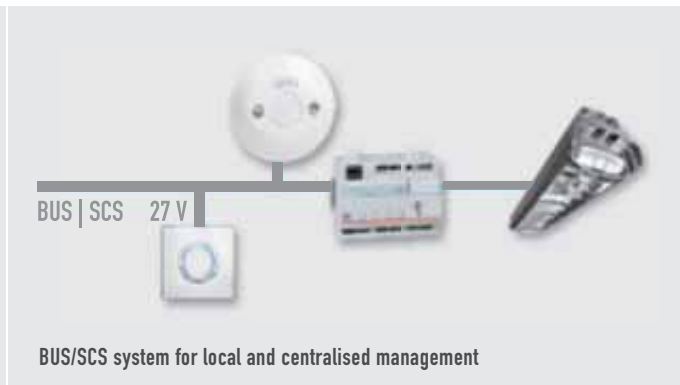
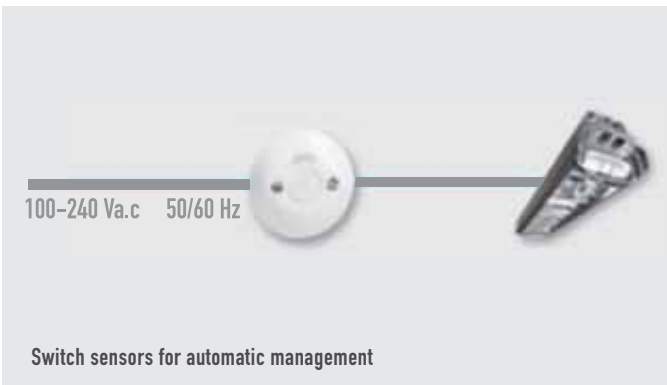
With heating and air-conditioning, lighting accounts for the greatest energy consumption and costs of a building.

These significant costs can be managed more effectively through the use of lighting management.

Each year, more organizations implement lighting management because they recognize the wide range of benefits:

Energy savings, Economic savings, Code compliance, Sustainability building practice...

2 types of solutions



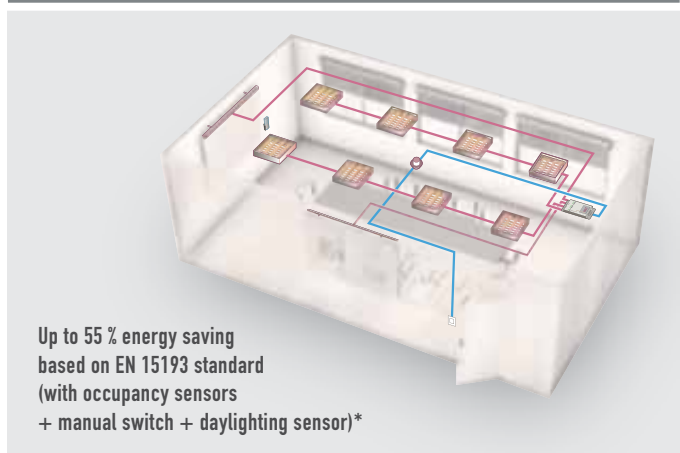
THE RIGHT PRODUCT FOR EACH APPLICATION

Because of different types of spaces, most projects require multiple solutions to maximize energy savings and occupant's satisfaction.

By installing lighting management and other automated controls, energy waste is totally avoided and the building only consumes the necessary amount of energy when needed.

Legrand commits to providing customers with complete and transparent information on actual savings for its lighting management solutions. Please contact us for more information.

Solution and application in large conference rooms



The Legrand lighting management offer can be associated with all wiring accessories international ranges: Arteor, Mosaic, Céliane, Axolute...



*The level of savings that can be achieved with sensors depends on the type of building and the type of area (activity).

FROM TECHNICAL ROOMS TO WORKSTATIONS

Legrand offers complete solutions from technical rooms to workstations with the latest technologies: Cat. 6A, Wi-Fi and fibre optic

- Copper patch panels, fibre optic drawers, 19" cable management accessories, enclosures
- Cable distribution and cable management
- Connection to information (Voice, Data, Images) via dedicated sockets, Wi-Fi access points, multi-outlets extensions, desk modules, columns... plus a wide selection of complete ranges of wiring accessories such as Mosaic, Arteor, Céliane by Legrand and Mâtix, Living, Light, Axolute by Bticino.



Association with Legrand Group ranges.



LCS² 19" PANELS

In the LCS² panels, running and organising cables is easy. There is plenty of room for fixing cables on their cable guides, and the plinth and linking interface provide a large space for running cables under the panel. The LCS² panels are very easy to assemble and dismantle: saving a considerable amount of on-site time, and providing full accessibility with their removable sides and rear panels and structure that can be totally dismantled.



SOLUFLEX FLOOR SYSTEM AND LCS² ZONE DISTRIBUTION BOXES

In the Soluflex cable floor system, all power cables, data and telecommunication are conveniently organized, completely out of sight, accessible at any moment. The LCS² zone distribution boxes used with Mosaic feedthrough sockets also provide total flexibility. LCS² ensures perfect performance.

- Takes two 6-connector units, for connecting up to 12 RJ 45 sockets
- Fibre optic/RJ 45 can be used together
- Fibre optic coiling rack.



CABLE MANAGEMENT SYSTEMS FOR ALL INSTALLATION HABITS



METALLIC CABLE TRAYS FOR INDOOR OR OUTDOOR



PARTICULARY SUITABLE FOR DATA CENTER



HEAVY DUTY PERFORMANCE WITH CABLE LADDERS

Metal or wire mesh cable trays, light or heavy duty cable ladders: the Legrand cable management catalogue covers all market requirements from small tertiary to heavy industrial, offering the world's largest solutions panel and the world's most certified products.

CONNECTION TO INFORMATION

A wide selection of equipment to connect information to workstations.



COLUMNS



TRUNKING SYSTEM



DESK MODULES



OFFICE MODULES



FLOOR BOXES

RESIDENTIAL MULTIMEDIA NETWORKS

The worldwide consumer IP traffic is increasing dramatically and will represent more than half of the world total IP flow, because of the growing demand from the households for the entertainment purpose, including internet surfing, music enjoyment, and video watching. More leisure time is spent on the multimedia, more digital content is available, more consumer electronic equipment are networkable: we are entering an era of digital multimedia explosion.

A HOME STRUCTURED CABLING SYSTEM

Legrand offers a sustainable infrastructure, with mobility based on the wireless technology, to enhance the inhome multiconnection experience. Legrand adapts its technology to:

Copper

Based on copper cable, known for years for its reliability and high performance, it is the sustainable way to share and distribute multimedia content in the home:

- Create network for video streaming
- Multiple internet access
- Distribute phone lines (e.g home office)
- Multi-room audio diffusion.

Fibre optic

The large band optic fibers transmission will allow to handle a great amount of digital data in living spaces.

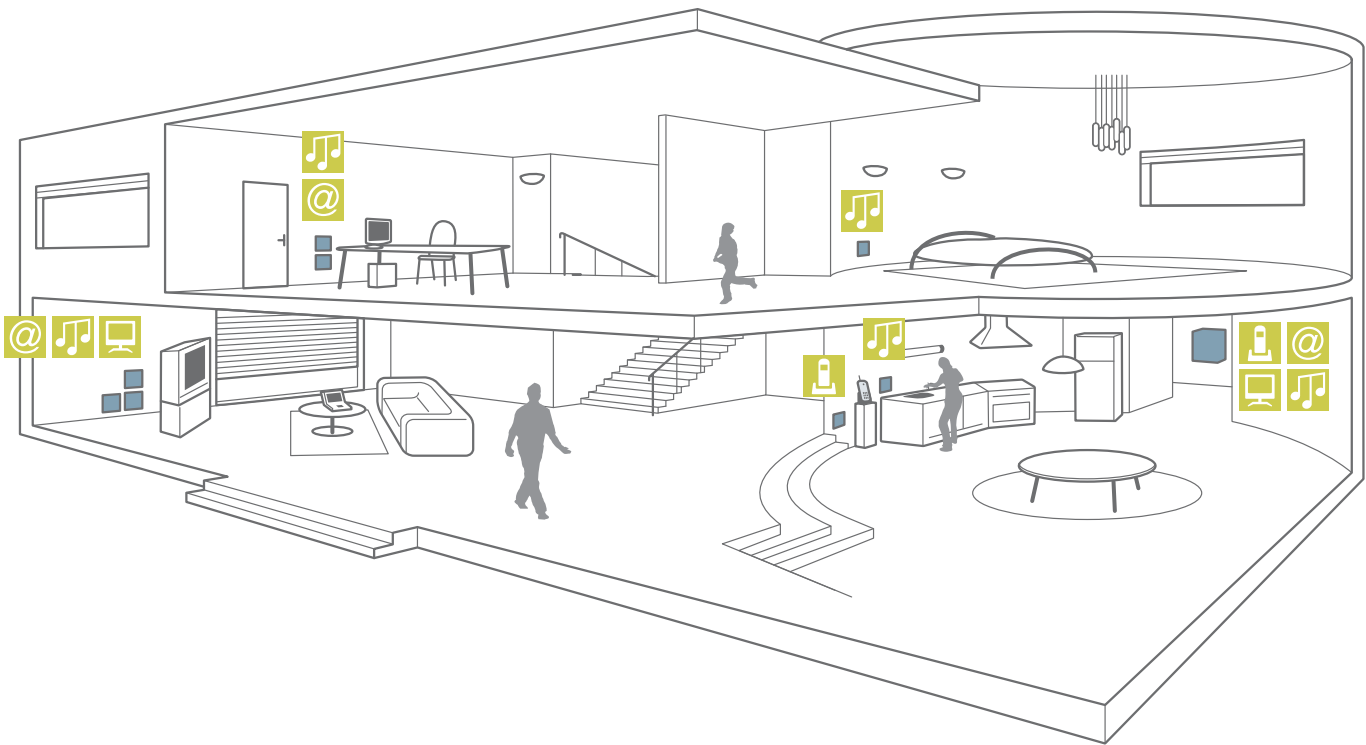
Coaxial cable

The traditional way today to connect a TV to your favourite programmes.



COMPLIANCE TO INTERNATIONAL AND AMERICAN STANDARDS

Legrand Group ranges are compliant to ISO/IEC 15018 (residential premises) and EN 50173-4 and to the North-American standards TIA/EIA-570 (residential cabling).



International offer based on IEC standard



MULTIMEDIA DISTRIBUTION BOARD



LOUDSPEAKER SOCKET
Céliane



LOUDSPEAKER SOCKET
Arteor



MULTIMEDIA SOCKET
Céliane



MULTIMEDIA SOCKET
Arteor

Offer based on American standard



HOME NETWORKS
STRUCTURED WIRING



HOME NETWORKS
TELEPHONE MODULE



MULTI-ROOM
AUDIO DEVICE
Studio collection

HOME AUTOMATION FOR EVERYONE

**LEGRAND AND BTICINO, the perfect duo:
Technology and Aesthetics.**

**The Group, the world n°1 in the electrical
wiring accessories, is the unique provider
to propose not only the technology, but also
a wide range of user interfaces in the
harmonized aesthetics.**

**The Home Automation devices are integrated
into its international electrical wiring
accessories ranges, made for specific
geographic zones with respect to the local
standard, covering the full home applications.**



SUSTAINABILITY AND FULL APPLICATION

Based on Legrand Group 2-wire BUS technology, it is a unique offer in the market to perform a perfect interoperation between: lighting, shutters, security, climate, door entry system, and multi-room audio / video diffusion.

Mood setting, event sequence scenarios enhance the home comfort and efficiency. It is an ideal solution for the one looking for an auto-managing home.

Thanks to its full solution on the same technology, the whole-home control becomes possible from any place inside the home, or from distance by mobile or internet.

FLEXIBILITY AND FUTURE EXTENSION

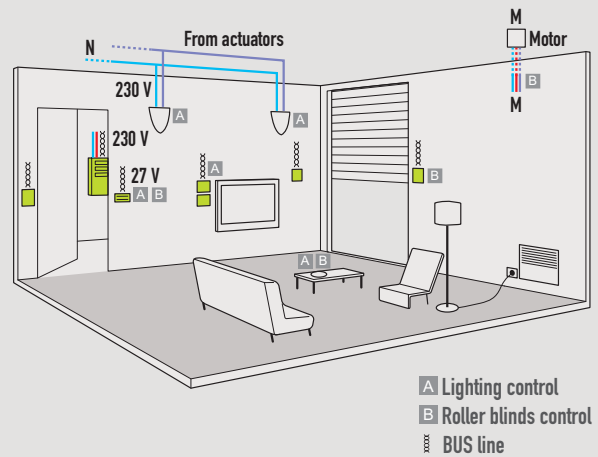
Based on its ZigBee® Radio and Power Line Carrier technology, the system communication protocol is transported on the electrical cables or by wireless in a frequency of 2.4 Ghz, internationally accepted.

It is an ideal solution for renovation by taking the existing electrical networks, or any home owners who want to start the first experience with a partial installation with a possibility of future extension.

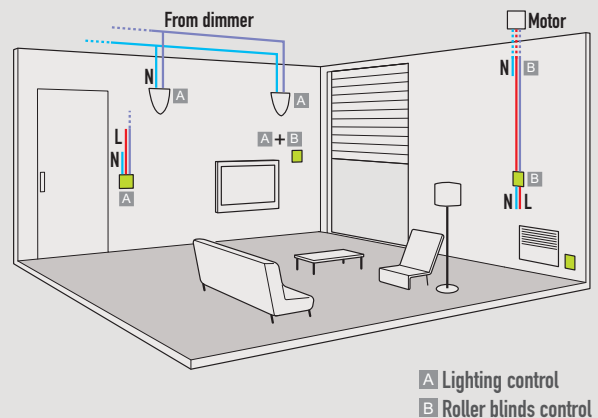
It only needs to replace a traditional lighting or shutter switch by the intelligence embedded control device, to transform a traditional electrical installation to a smart home.

Zigbee® Certified product - Manufacturer Specific Profile.

2-WIRE BUS/SCS TECHNOLOGY | Example of wiring



RADIO ZIGBEE® TECHNOLOGY | Example of wiring



HOME AUTOMATION devices integrated into international ranges either by Legrand or Bticino



3.5" TOUCH SCREEN
Arteor Mirror | by Legrand



TOUCH PLATE DIMMER
Arteor Mirror | by Legrand



VIDEO DISPLAY
Axolute Kristal | by Bticino



LIGHTING CONTROL
Céliane | by Legrand

HOME AUTOMATION PRESTIGE

Synonym with luxury and unprecedented comfort, destined to the prestige residential project, Legrand completes its offering with Vantage, the specialist in the high-end tailor-made home, through system integrators.



ENDLESS POSSIBILITIES OF SOPHISTICATION

The Infusion technology by Vantage is empowered by its sophisticated however easy for us software, allowing endless possibilities in the customization to reply to the prestige home owner's specific demand.

NUMEROUS APPLICATIONS

Powerful integration platform for numerous applications: lighting, heating, audio, video, bathroom, swimming pool, etc. The keypad in a sheer simplicity style is made to simplify the whole-house control on one finger despite the innovative technology behind.

SUPERVISION AND COMMAND

Colour Touch Screen, flush-mounted in the wall, or portable, is certainly the modern user interface to supervise and command the whole home installation.



COLOUR TOUCH SCREEN AND KEYPAD



VANTAGE HOME
Each project, is a unique master piece



HOME CINEMA
Controlled by Vantage

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COMPLETE SOLUTIONS FOR MANY OTHER PROJECTS

In a context of accelerated globalisation and increasingly complex projects, the support of a reliable and competent partner is absolutely essential, a real key to the success of your company.

Our comprehensive and reliable solutions and services enable you to fully express your vision worldwide.



A VERY BROAD RANGE OF APPLICATIONS

Beyond the examples of products and solutions we have just shown you, the Legrand Group boasts expert know-how in a large number of other applications. Our consistent research efforts and the complementarity of our offers and brands allow us to respond to the needs of countless different projects. Infrastructure: railway stations, harbours, tunnels, naval installations...



SHOPS AND MALLS
Commercial



RAILWAY STATIONS
Infrastructure



PETROCHEMICALS
Industry



BRIDGES
Building services



Sustainable development: a priority

By signing up to the Global Compact* in 2006, this approach has been given a wider dimension. The Group's environmental commitment is centred on 3 guiding lines: taking on board environmental management in the running of its industrial sites, reducing the environmental impact of its products by eco-design, providing environmentally friendly solutions that contribute to energy savings.







































*www.unglobalcompact.org

Electrical symbols in the world

This table is for guidance only. Symbols other than those given are frequently encountered. The information in this document is published for guidance only. The company cannot be held responsible or liable for errors existing in the document, nor for errors arising from the use of the information given.

AMERICAN		ARABIC		CHINESE	
Wire gauge	AWG	2 مم ع طقم	— —	线缆截面积	mm ²
Power	kW	(وك) ةردق		线缆截面积	kW
Current	A	(ري بم) رايتلا ةدش	⚡	电流	A
Voltage	V	(تلوف) دهجلا	ف	电压	V
Frequency	Hz	ددرت		频率	Hz
Service entrance panel (or fuse box)		عيزوت ةحول		用户端	
Enclosure		ةحول		配电箱	
Fuse		رهصم		熔断器	
Circuit Breaker		رايت عطاق		断路器	
Ground fault circuit interruptor		يضرأ بي رست عنام		剩余电流动作保护器	
Equipment circuit breaker		لزع حاتفم		隔离开关	
Hot wire	—	يداحا لصوم	—	相线	—
Neutral wire		دياحم لصوم		中性线	—
Ground wire		(يضرأ) هي امح لصوم		保护线	—
Single phase & neutral & ground cable	— — —	(يضرأ دي اح م) يداحا لباك		单相+中性线+保护线	— — —
Triple phase & neutral & ground cable	— — —	(يضرأ دي اح م) يثالث لباك		三相+中性线+保护线	— — —
Single pole 2 way switch	S ₁	حاتفم		单联开关	
3 way switch	S ₃	طخا حاتفم		双控单极开关	
Push button		طغاض حاتفم		按钮	
Single receptacle		سبقم / شيف		明装五孔插座	
Single grounded receptacle		ضرؤم سبقم / شيف			
Switched grounded receptacle		حاتفم ب ضرؤم سبقم / شيف		带单极开关的插座	
Duplex receptacle		يئانث سبقم / شيف		暗装五孔插座	
Junction box		ليصوت قودنص		接线盒	
Emergency lighting unit		ئراوط ةراد! ةدحو		事故照明灯	
Building permit		ءانب قصخر		规划许可	
Developer		روطم		发展商	
-		لمعلا قيرف سيئر		监理	
Architect		يرام عم		建筑师	
Electrical consulting engineer		يراشتسا يئابرهك سدنم		电气顾问工程师	
Specifications		تافصراوملا		技术规格书	
BID		ضرع بلط		招标	
General contractor		يسبيئر لواقم		总承包商	
Electrical sub-contractor		قيئابرهكلا لامعألا عاطق		电气分包	
Electrical contractor		ءابرهكلا لواقم		电气承包商	
Wiring devices		حي تافصو سبقم/شاي فا		电气附件	

ENGLISH		FRENCH		GERMAN	
Cross-section	mm ²	Section	mm ²	Querschnitt	A [mm ²]
Power output	kW	Puissance	kW	Leistung	P [kW]
Current rating	A	Courant	A	Strom	I [A]
Voltage	V	Tension	V	Spannung	U [V]
Frequency	Hz	Fréquence	Hz	Frequenz	F [Hz]
Consumer unit		Tableau d'abonné		Verteilung	
Cabinet or enclosure		Armoire		Verteiler Schrank	
Fuse		Fusible		Sicherung	
Circuit breaker		Disjoncteur		Schutzschalter	
Residual current device		Interrupteur différentiel		FI-Schutzschalter	
Isolator switch		Interrupteur sectionneur		Trennschalter Trenner	
Phase conductor	—	Conducteur de phase (PH)	—	Aussenleiter Phase	—
Neutral conductor	—	Conducteur de neutre (N)	—	Neutralleiter Null	—
Protective conductor (earth)	—	Conducteur de protection (T)	—	Schutzleiter PE	—
Single phase + N + E cable	—	Câble PH + N + T	—	Leitung 1/N/PE	—
3 phase + N + E cable	—	Câble 3 PH + N + T	—	Leitung 3/N/PE	—
One way switch		Interrupteur		Schalter Ausschalter	
Two way switch, single pole		Va-et-vient		Wechselschalter	
Push button		Bouton poussoir		Taster	
Socket outlet		Prise de courant (PC)		Steckdose	
Earthed socket outlet		Prise de courant avec terre (PC + T)		Schutzkontakt-Steckdose	
Switched socket outlet, single pole		Prise de courant avec terre commandée		Schutzkontakt Steckdose abschaltbar	
Double socket outlet		Prise de courant double		2-fach Steckdose	
Junction box		Boîte de jonction / Boîte de dérivation		Abzweigdose	
E.L.U. (Emergency Lighting Unit)		Blocs autonome d'éclairage de sécurité (BAES)		Sicherheits-leuchte	
Planning permission		Permis de construire		Baugenehmigung	
Developer		Maître d'ouvrage promoteur		Bauherr	
Supervisor		Maître d'œuvre		Bauleiter	
Architect		Architecte		Architekt	
Electrical consulting engineer		Bureau d'études électricité		Elektroplaner	
Specifications		Descriptif cahier des charges		Pflichtenheft	
Invitation to tender		Appel d'offre		Ausschreibung anfrage	
Main contractor		Entreprise générale		Generalunternehmer	
Electrical work		Lot électricité		Elektrisches Gewerk	
Electrical contractor		Installateur électricien		Elektroinstallateur	
Wiring accessories		Appareillage électricité		Installationsmaterial	

Electrical symbols in the world (continued)

ITALIAN		KOREAN		PORTUGUESE/BRAZILIAN	
Sezione	mm ²	단면적	mm ²	Secção	mm ²
Potenza	kW	출력	kW	Potência	kW
Corrente	A	전류	A	Corrente	A
Tensione	V	전압	V	Tensão	V
Frequenza	Hz	주파수	Hz	Frequência	Hz
Centralino		분전반		Quadro	
Quadra generale		배전반		Quadro geral de baixa tensão	
Fusibile		퓨즈		Fusivel	
Interruttore automatico		배선용 차단기		Disjuntor	
Interruttore differenziale		누전 차단기 (GFCI)		Interruptor diferencial	
Interruttore sezionatore		개폐기		Interruptor seccionador	
Conduttore di fase	—	상시선	—	Condutor de fase	L
Conduttore di neutro	—	중성선	—	Condutor de neutro	N
Conduttore di protezione (terra)	—	접지선		Condutor de terra	
Cavo di fase + neutro + terra	—	단상3선식		Condutor de fase + neutra + terra	
Cavo di fase + neutro + terra	—	삼상3선식		Condutor trifasico+ neutra + terra	
Interruttore		단로스위치	•	Interruptor	
Deviatore		3로스위치	• ₃	Commutador de escada	
Pulsante		푸쉬버튼		Botão de pressão	
Presa di corrente		1구콘센트		Tomada de corrente	
Presa di corrente con terra		접지콘센트		Tomada de corrente con terra	
Presa di corrente con terra comandata		스위치부 접지콘센트		Tomada de corrente com interruptor	
Presa di corrente doppia		2구 콘센트		Tomada de corrente dupla	
Scatola di derivazione		정크션 박스		Caixa de derivação	•
Lampada d'emergenza		비상등		Bloco autonomo de iluminação de emergencia	
Licenza di costruzione (Edile)		건축허가		Licença de construção	
Committente		개발자		Promotor	
-		감독관		Director de obra	
Architetto		건축사		Arquitecto	
Studio tecnico (Engineering)		전기설비설계회사		Gabinete de projectos de electrotecnia	
Capitolato		기술규격서		Caderno de encargos	
Richiesta d'offerta		입찰		Consulta	
Impresa generale		건설회사		Empreiteiro geral	
Parte elettrica		전기하도급업체		Empreiteiro de electricidade	
Installatore (Elettrico)		전기공사업체		Instalador eléctrico	
Apparecchiature elettriche		배선기구		Aparelhagem electrica	



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