Safehouse

The power to protect

Guide to Sockets

Introduction

The history of standards for sockets in South Africa goes back 80 years, starting with the British System and continuing through to the IEC standards that followed in the 1990s. We now have nine standard configurations with an additional 12 dedicated versions to complete a range of products legally available in South African Electrical Installations.

This guide does not cover industrial sockets, which fall under a separate standard and, although referred to in the Wiring Code, are not normally used in household and light commercial applications and are not covered by compulsory safety specifications.

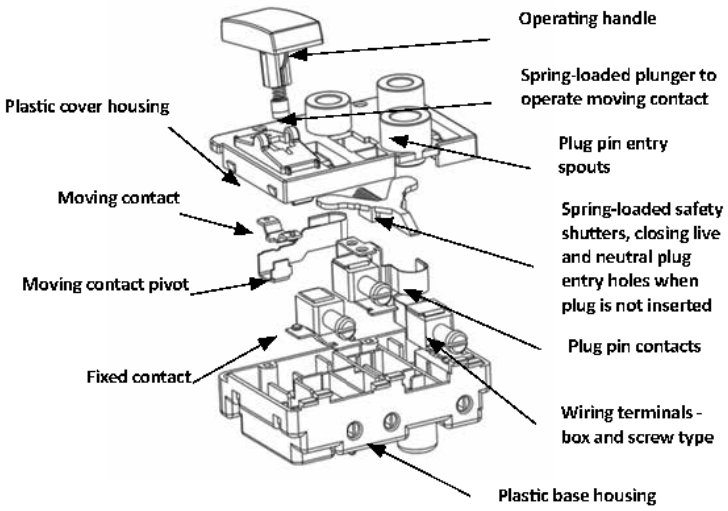
Socket outlets are, of course, a reflection of PLUG configurations which are applied to any type of socket outlet, whether part of a fixed installation or of products such as cord extension sets and adaptors. It is important to note that plugs, socket outlets, cord extension sets and socket-outlet adaptors are covered by compulsory safety specifications (see applicable standards further on in this guide).

What do socket outlets do?

- Make and break current supply to an appliance by means of a plug.
- In the case of switched outlets, provide power On/ Off functions and indication.
- Provide other functions such as USB-connection.
- Provide aesthetics to complement room decor.

What does a socket-outlet consist of and how does it work?

A typical view of the internal structure of a switched socket outlet, complying with SANS 164-1 (16 A, 250 V~), shows the components and their functions:



Socket safety features

Socket outlets are the ultimate 'point of consumption' of electricity and at the front line of a user's electrical connection. Consequently, wherever they may be installed, several safety precautions are required. These are:

Earth leakage protection

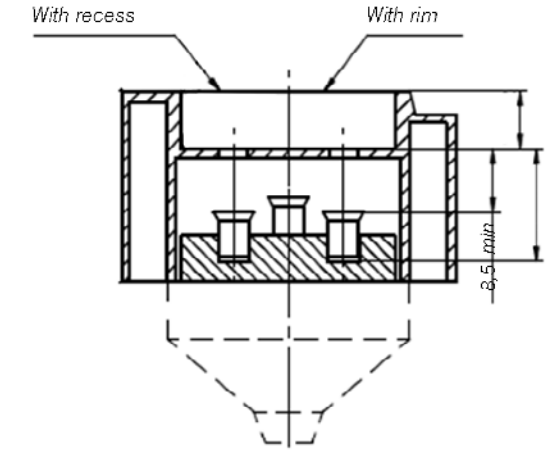
According to the Wiring Code, all socket outlets are to be protected by sensitive earth leakage protection. With a nominal tripping current of 30 mA, this is an effective way of preventing electrocution if touching live and earth simultaneously.

Safety shutters

It is compulsory that all socket outlets in SA are shuttered. In this way it is very difficult, if not impossible, to insert a single pin or metal rod into a live socket-entry spout, thereby reducing the likelihood of electrocution.

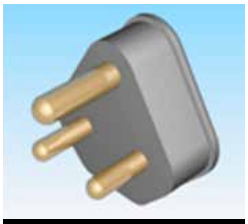
Socket entry well

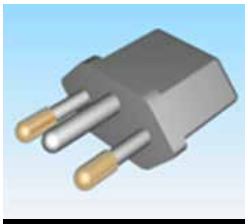
In certain socket configurations; such as SANS 164-2 and SANS 164-6, a 10 to 12 mm well is required so that, as the plug is inserted into the socket, the plug pins cannot be touched, even by a small child's fingers, thereby eliminating the possibility of electric shock.



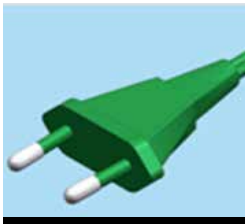
The well incorporated into SANS 164-2, together with the depth of contacts below the pin entry surface, make it impossible to touch the active pins (L&N) on plug entry. This makes it one of the SAFEST plug and socket configurations in the world.

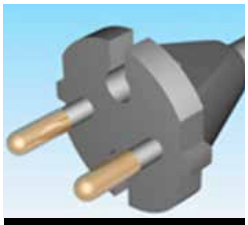
Legal plug and sockets configurations in South Africa

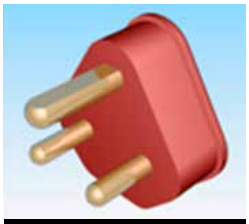

SANS 164-1: 16 A - 3 PIN

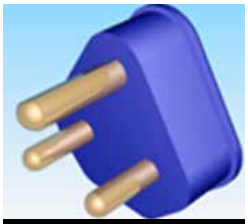

SANS 164-2: 16 A - 3 PIN

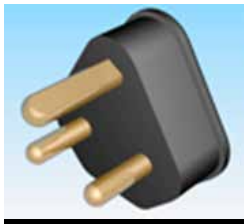

SANS 164-3: 6 A - 3 PIN

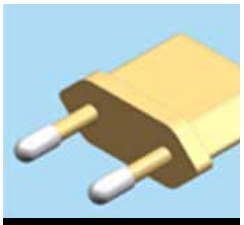

SANS 164-5: 2.5 A - 2 PIN


SANS 164-6 16 A - 2 PIN


SANS 164-4: 16 A - 3 PIN DEDICATED RED


SANS 164-4: 16 A - 3 PIN DEDICATED BLUE


SANS 164-4: 16 A - 3 PIN DEDICATED BLACK


SANS 164-2: 16 A - 2 PIN

Socket outlet combinations and features

Switched socket-outlets:
For general purpose in building reticulation.

Adaptors & Extension cords:
Convenient accommodation of different plug standards and provision of power where needed, particulary for domestic use.

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Socket outlet modules:
For modular trunking and office-type applications.

Illuminated:
On/Off indication and location in the dark.

Multiple outlet configurations:
For convenient use of different plugs.

Additional functions:
Surge protection and USB outlets.

Automation:
Programmable electronic functions.

Robust applications:
Special housings for outdoor use and other weatherproof applications.

As part of assemblies:
For example, inverters and portable generators. Whether in building installations or as part of other products,the same standards are applicable.

What are the applicable standards?

In the early 1990s, SABS adopted many IEC standards to replace those developed in South Africa. The only one remaining from the previous era is the plug and socket outlet configuration, SANS 164-1, -3 and -4. The SANS 164 series of documents, which over the years has grown to seven standards, is listed from SANS 164-0 through to SANS 164-6.

SANS 60884-1	Plugs and socket outlets for households and similar purposes. Part 1: General requirements.	SA National standard for plugs and socket outlets, fixed and portable, and also general requirements for plug-in adaptors. This standard, which is applied in most IEC countries, does not include 'standard sheets', which are specified by the different countries' National Committees
SANS 60884-2-3	Plugs and socket outlets for households and similar purposes. Part 2-3: Particular requirements for switched socket outlets without interlock for fixed installations.	As for switched socket outlets. This standard is read in conjunction with SANS 60884-1.
SANS 164-0	Plugs and socket outlets for households and similar purposes for use in South Africa. Part 0: General and safety requirements.	The first part of the SANS 164 series of standards where the 'standard sheets' for the different plug and socket outlet configurations are listed. Part 0 covers aspects common to all configurations, i.e. shutters, surge protection and USB outlets.
SANS 164-1	Plugs and socket outlets for households and similar purposes for use in South Africa. Part 1: Conventional system, 16 A 250 V ac.	See configuration chart. Applied to general household, commercial and light industrial installations up to 16 A.
SANS 164-2	Plugs and socket outlets for households and similar purposes for use in South Africa. Part 1: Conventional system, 16 A 250 V ac.	See configuration chart. New configuration, replacing SANS 164-1: Applied to general household, commercial and light industrial installations up to 16 A.
SANS 164-2-1	Plugs and socket outlets for households and similar purposes for use in South Africa. Part 2-1: Partially dedicated system, 16 A 250 V ac.	SANS 164-2-1, consisting of six different configurations. The partially dedicated version, which is a NEW configuration, replacing SANS 164-4: Applied to partially dedicated circuits for general household, commercial and light industrial installations up to 16 A.
SANS 164-2-2	Plugs and socket outlets for households and similar purposes for use in South Africa. Part 2-2: Fully dedicated system, 16 A 250 V ac.	SANS 164-2-2, consisting of six configurations. The partially dedicated version, which is a NEW configuration, replaces SANS 164-4: Applied to partially dedicated circuits for general household, commercial and light industrial installations up to 16 A.

SANS 164-3	Plugs and socket outlets for households and similar purposes for use in South Africa. Part 3: Conventional system, 6 A 250 V ac.	See configuration chart. Applied to lighting circuits for general household, commercial and light industrial installations up to 6 A.
SANS 164-4	Plugs and socket outlets for households and similar purposes for use in South Africa. Part 4: Dedicated system, 16 A 250 V ac.	See configuration chart. The dedicated system based on SANS 164-1 comprises three variations (RED, BLUE and BLACK) considered partially dedicated. Applied to partially dedicated circuits for general household, commercial and light industrial installations up to 16 A.
SANS 164-5	Plugs and socket outlets for households and similar purposes for use in South Africa. Part 5: Two-pole, non-rewireable plugs, 2.5 A 250 V ac, with cord, for connection of class II equipment.	This standard covers the 'Europlug' or EN50075 standard, and only describes the plug. The socket version is unnecessary since the plug is compatible with both SANS 164-2 and SANS 164-6. Applied to small appliances and plug-in chargers, up to 2.5 A.
SANS 164-6	Plugs and socket outlets for households and similar purposes for use in South Africa. Part 6: Two-pole systems, 16 A 250 V ac, for connection of class II equipment.	What is commonly referred to as the 'Unearthed Schuko'. Applied to power tools and small appliances, up to 16 A.
VC8008	The SA Compulsory Specification for plugs, socket outlets, and socket outlet adaptors.	Legislation issued under Government Gazette Nr 33763 of 19 November 2010: making compliance with SANS 164-0 a mandatory requirement for the selling and distribution of these products.
SANS 10142-1	Wiring of premises.	Table 4.1 specifies VC8008 as the mandatory safety specification for socket outlets, including the various parts of SANS 164 (and the dedicated versions of SANS 164-2-1 and 164-2-2).

Dedicated plugs and socket outlets

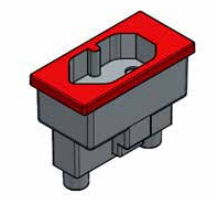
The system of dedicated plugs and socket outlets for the SANS 164-2 configuration was recently added to replace the SANS 164-4 range. It includes fully-dedicated versions that were not previously available. Products made to the latter standard will, in the foreseeable future, be replaced by the SANS 164-2 series. Although the SANS 164-4 range will not be banned from use in installations, its use will decline, as will be the case with the SANS 164-1 plug and socket.

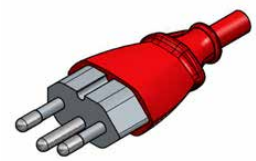
SANS 164-2-1 and SANS 164-2-2 dedicated system

The standards, published in 2014, are not widely in use at present. Twelve dedicated configurations are specified to allow for non-standard circuits for defined and special applications.

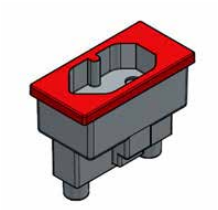
Note: The following clause in SANS 10142: Wiring of premises: makes it mandatory for new installations to install SANS 164-2 socket outlets:

To suit the interior design, the purchaser has a wide variety of aesthetics from which to choose, including colours and finishes of wall plates.





Example of a partially-dedicated SANS 164-2-1 socket and plug: Type PD-A (Red), one of six variations. Partially-dedicated means the plug does not only plug into the corresponding dedicated socket, but also into the non-dedicated or standard SANS 164-2 socket outlet.

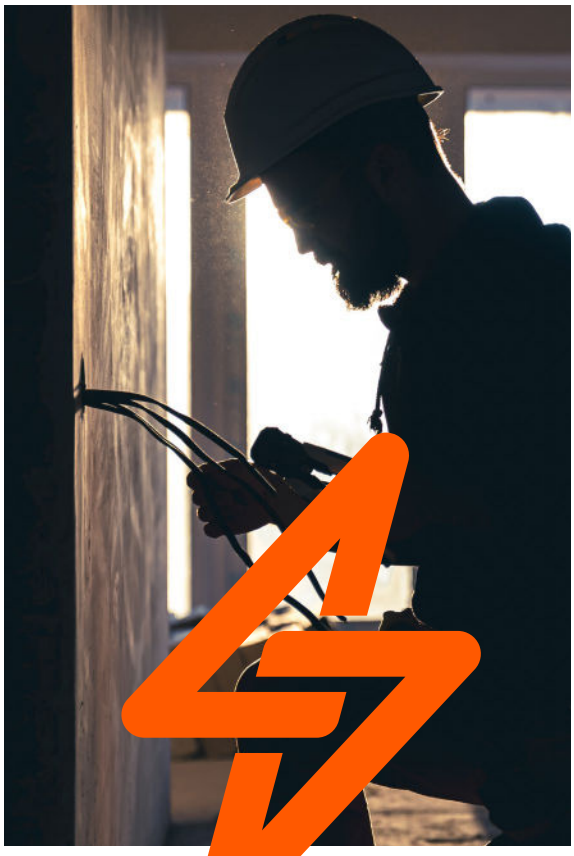


Example of a fully-dedicated SANS 164-2-1 socket and plug: Type FD-A (Red), one of six variations: Fully-dedicated means the plug can only plug into the corresponding dedicated socket and no other socket outlet.

Note: The following clause in SANS 10142: Wiring of premises: makes it mandatory for new installations to install SANS 164-2 socket outlets:

> *6.15.1.1.1 Except where otherwise specified in this part of SANS 10142, single-phase socket-outlets for general use (see also 6.14.1.4) shall*
>
> *a) be of the two-pole and earthing contact type,*
>
> *b) comply with SANS 164-0,*
>
> *c) effective from January 2018 all socket-outlet points for new electrical installations shall include at least one socket-outlet complying with the dimensions of SANS 164-2. Socket-outlets points may also include socket-outlets complying with the dimentions of SANS 164-1.*

To suit the interior design, the purchaser has a wide variety of aestheticqs from which to choose, including colours and finishes of wall plates.



Examples of typical socket outlets

Industrial plugs and sockets: compulsory standards

Because the National Regulator for Compulsory Specifications (NRCS) has not issued a Compulsory Specification for industrial plugs and sockets, these products are not required to have a Letter of Authority (LOA) for sale in SA. However, there are applicable safety standards referred to in SANS 10142-1: The wiring of premises (commonly referred to as the 'Wiring Code'),

Part 1: Low voltage installations, Clause 4: Compliance, and in particular Clause 4.1.1, which states: 'Table 4.1 gives a list of commodities and the applicable standards. The commodities given in column 1 shall comply with the applicable standards given in column 3'.

The image below depicts industrial sockets which are not covered in this guide. Although referred to in the 'Wiring Code', they are not normally used in household and light commercial applications.

Table 4.1 lists the safety standard of socket outlets (industrial type) rated ≤690 V, ≤250 A: as SANS 60906-1 and SANS 60906-3

In terms of the EIR and the Occupational Health & Safety Act, compliance with SANS 10142-1 is mandatory and each electrical installation (within the specified parameters) shall be issued with a COC by the registered electrical contractor who carried out the installation work.

Compliance of the industrial products to the standard (SANS 60906-1) is demonstrated by the manufacturer, importer or retailer by producing a test report, issued by an ILAC accredited laboratory, for the particular product or range of products. The report should in all cases not be older than five years.

There are many sub-standard, unsafe electrical products being distributed in South Africa. What can a purchaser do to help ensure a product is compliant and safe?:

Some guidelines

- Determining the required product specification for the desired function is best left to qualified persons.
- Buy brands you know and can trust.
- Buy from reputable distributors and outlets.
- Beware of copies of prominent brands.
- Be suspicious of prices substantially lower than for other, similar products or services on offer.
- Make contact with the seller's supplier and judge responses critically.
- Be suspicious of lack of information on or with the product packaging and on the product itself. Specifications require certain minimum markings. Packaging should describe the electrical capacities and the correct application of the product. Look out for contradictions between data provided e.g. different voltage ratings for the same product.
- If the purchase warrants it, ask the supplier for references to other users – and make the effort to contact them.
- When dealing with an electrical contractor, ask about membership of the ECA and call the ECA in your region to check credentials. Be critical of a suspect installation or a COC that is issued too easily.
- Ask the supplier to prove compliance with regulations: NRCS approval in the form of a LOA for the products used that are subject to regulations (see above and the SAFEhouse Guide to the Regulation of Electrical Products in South Africa for a list of other products subject to compulsory specifications).
- Look for the test specification marking: 'Tested to SANS 60884-1 and/or SANS 164-0' or 'VC8008'.
- Look for certification marks such as SABS and VDE (note the SABS mark is not necessarily a substitute for the LOA).
- Beware of fraudulent use of well-known certification emblems, such as the SABS mark.
- Be careful - A 'CE' mark is not necessarily proof of conformity or of independent testing.
- Report any electrical product failure to the dealer, manufacturer, the NRCS and, if applicable, the National Consumer Commission.

If in doubt, check with the SAFEhouse Association for information it may possibly have to help you.

List of abbreviations used in this guide

CE: European Conformity (Self certification)

COC: Certificate of Compliance

ECA: Electrical Contractors Association

EIR: Electrical Installation Regulation

ILAC: International Laboratory Accreditation

L&N: Live and Neutral

LOA: Letter of Authority

NRCS: National Regulator for Compulsory Specifications

SABS: South African Bureau of Standards

SANS: South African National Standards

VC: SA Compulsory Specification

VDE: International Certification Body

About Safehouse

Safehouse is a non-profit organisation that protects South African businesses and people from preventable harm caused by unsafe electrical products and services.

We're a voluntary group of electrical industry stalwarts, technical experts and leaders of our respective businesses and fields.We believe it's our civic and commercial duty to protect our industry and fellow South Africans from suppliers of unsafe electrical products and services.

We work to eradicate dangerous products from the market, to make electrical safety information understandable and accessible and to hold one another, and our industry, to the highest standards of excellence.

Safehouse members have signed a code of conduct that commits them to dealing only in safe electrical products and to responsible behaviour.

If you have doubts about a particular product or service, contact Safehouse for guidance.

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