

PAKISTAN STANDARD

PLUGS AND SOCKET-OUTLETS FOR HOUSEHOLD AND SIMILAR PURPOSES –

PART 2-3: PARTICULAR REQUIREMENTS FOR SWITCHED SOCKET-OUTLETS WITHOUT INTERLOCK FOR FIXED INSTALLATIONS



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**PAKISTAN STANDARDS AND QUALITY CONTROL AUTHORITY,
STANDARDS DEVELOPMENT CENTRE,
PSQCA Complex Street 7 A Block –3
Scheme –36 Gulistan –e- johar Karachi**

**PLUGS AND SOCKET-OUTLETS FOR HOUSEHOLD AND SIMILAR
PURPOSES - PART 2-3: PARTICULAR REQUIREMENTS FOR SWITCHED
SOCKET-OUTLETS WITHOUT INTERLOCK FOR FIXED INSTALLATIONS**

0. FOREWORD

- 0.1 This Pakistan Standard was adopted by the authority of the Board of Directors for Pakistan Standards and Quality Control Authority after approval by the Technical Committee for “Plugs and socket-outlets for household and similar purposes - Part 2-3: Particular requirements for switched socket-outlets without interlock for fixed installations” had been approved and endorsed by the Electrotechnical National Standards Committee on _____.
- 0.2 This Pakistan Standard was adopted on the basis of IEC: 60884-2-3 since IEC Standard have been established in 2006, hence it is deemed necessary to adopt the International standard to keep abreast with the latest technology and as per with IEC standard.
- 0.3 This Pakistan Standard is an adoption of IEC: 60884-2-3 “Plugs and socket-outlets for household and similar purposes - Part 2-3: Particular requirements for switched socket-outlets without interlock for fixed installations” and its use hereby acknowledged with thanks.
- 0.4 This standard is subject to periodical review in order to keep pace with the development in industry. Any suggestions for improvement shall be recorded and placed before the revising committee in due course.
- 0.5 This standard is intended chiefly to cover the technical provisions relating to this standard and it does not include all the necessary provisions of a Contract.

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PLUGS AND SOCKET-OUTLETS FOR HOUSEHOLD AND SIMILAR PURPOSES –

Part 2-3: Particular requirements for switched socket-outlets without interlock for fixed installations

1 Scope

This clause of Part 1 is applicable except as follows.

Replacement of the first paragraph:

This part of IEC 60884 applies to switched socket-outlets without interlock, for fixed installation, for a.c. only, with or without earthing contact, with a rated voltage not exceeding 440 V and a rated current not exceeding 32A, intended for household and similar purposes, either indoors or outdoors.

NOTE 101 Switched socket-outlets can also be produced by combining a socket-outlet of IEC 60884-1 and a switch of IEC 60669-1¹⁾.

2 Normative references

This clause of Part 1 is applicable.

3 Definitions

This clause of Part 1 is applicable except as follows.

Addition:

3.101

switched socket-outlet

factory assembled unit consisting of a socket-outlet with a switch controlling the socket-outlet

3.102

multiple switched socket-outlet

accessory incorporating more than one switched socket-outlet, each socket-outlet being controlled by its own switch

3.103

switch

device designed to make or break the current in one or more electric circuits

3.104

one operation

transfer of the moving contacts from one operating position to another

¹⁾ IEC 60669-1, *Switches for household and similar fixed-electrical installations - Part 1: General requirements*

4 General requirements

This clause of Part 1 is applicable.

5 General notes on tests

This clause of Part 1 is applicable.

6 Ratings

This clause of Part 1 is applicable except as follows.

Addition:

6.101

Switches of switched socket-outlets shall have current and voltage ratings not less than the socket-outlets they control.

7 Classification

This clause of Part 1 is applicable except as follows.

7.2 Addition:

7.2.101 Switched socket-outlets are classified:

7.2.101.1 According to the method of actuating the switch:

- rotary switches;
- tumbler switches;
- rocker switches;
- push-button switches;
- cord-operated switches.

7.2.101.2 According to the switching of the neutral:

- switched neutral;
- unswitched neutral.

8 Marking

This clause of Part 1 is applicable except as follows.

8.1 *Addition after the seventh dash:*

- symbol for mini-gap construction, if applicable.

8.2 *Addition before the first note:*

- Mini gap construction m
- Open position (off).....O
- Close position (on) I

Addition:

8.101 Terminals intended for the connection of line conductors shall be identified unless the method of connection is not important, is self-evident or is indicated on a wiring diagram. Such identification may take the form of a letter L or, in the case of more than one such terminal, the letters L1, L2, L3, etc., which may be accompanied by an arrow or arrows pointing to the relevant terminal or terminals.

For two-, three-, and four-pole switches, terminals associated with any one pole shall have similar identification, if applicable, differing from that of the terminals associated with the other poles, unless the relationship is self-evident.

These indications shall not be placed on screws or any other easily removable parts.

Compliance is checked by inspection.

8.102 Two-, three-, and four-pole switches and switches having a rated voltage exceeding 250 V or a rated current exceeding 16 A shall be so marked that either the direction of movement of the actuating member to its different positions or the actual switch position is clearly indicated.

The indications shall be clearly visible on the front of the switched socket-outlet when fitted with its cover or cover plate. If these indications are placed on the cover or cover plate, it shall not be possible to fix it in a position such that the indications are incorrect.

For the indication of direction of movement of the operating means, symbols may be used.

The closed position (on) shall be clearly indicated.

Compliance is checked by inspection.

9 Checking of dimensions

This clause of Part 1 is applicable.

10 Protection against electric shock

This clause of Part 1 is applicable except as follows.

Addition:

10.101 Knobs, operating levers, push-buttons, rockers and the like, for operating switches in switched socket-outlets, shall be of insulating material, unless their accessible metal parts are separated from the metal parts of the mechanism by double insulation or reinforced insulation or, as an alternative, they are reliably connected to earth.

Compliance is checked by inspection and by the tests of Clauses 17 and 21.

10.102 Metal parts of the switch mechanism, such as the spindle or the pivot of the dolly or rocker, that are not insulated from live parts, shall not protrude from the enclosure.

Compliance is checked by inspection, if necessary, after the actuating member has been removed or broken.

NOTE If the actuating member has to be broken, compliance is checked after the test of Clause 28.

10.103 Metal parts of the switch mechanism, such as the spindle or the pivot of the dolly or rocker shall not be accessible when the switched socket-outlet is fixed as in normal use.

In addition, they shall be insulated from accessible metal parts, including metal frames supporting the base of flush-type switched socket-outlets, liable to be mounted in a metal box, and from screws for fixing the base to its support.

The additional requirement does not apply if the metal parts of the mechanism are separated from live parts in such a way that the creepage distances and clearances have at least twice the values specified in 27.1 or alternatively, if they are reliably connected to earth.

Compliance is checked by inspection and if necessary by measurement and by tests of Clauses 17 and 20.

11 Provision for earthing

This clause of Part 1 is applicable.

12 Terminals and terminations

This clause of Part 1 is applicable.

13 Construction of fixed socket-outlets

This clause of Part 1 is applicable except as follows.

Addition:

13.101 Switches shall be constructed to match the number of poles on the socket-outlet, except that the neutral pole is not switched in unswitched neutral socket-outlets.

The earthing contact is not considered as a pole and the earth circuit shall not be switched.

The position of the switch-operating member shall be such that it does not prevent, nor shall its correct operation be prevented by, the proper insertion of the corresponding plug or plugs.

13.102 Knobs of rotary switches shall be securely coupled to the shaft or part operating the mechanism.

The knob is subjected for 1 min to an axial pull of 100 N.

After this, knobs of switches having only one direction of operation are turned, if possible, without undue force, 100 times in the reverse direction.

During the test, the knob shall not become detached.

13.103 The actuating member of a switch, when released, shall automatically take up the position corresponding to that of the moving contacts, except that, for those with a single push-button, the actuating member may take up a single rest position.

Compliance is checked by inspection and by manual test.

13.104 Switches shall be so constructed that the moving contacts can come to rest only in the "on" or "off" position, an intermediate position being, however, permissible if it corresponds to the intermediate position of the actuating member, and if the insulation between the fixed and moving contacts is then adequate.

Compliance is checked by inspection and if necessary by the test of 17.2 with the voltage applied between the fixed and moving contacts when in intermediate position.

13.105 Switches shall be constructed so that undue arcing cannot occur when the switch is operated slowly.

Compliance is checked by actuating the switch, at the end of the test of Clause 21, to break the circuit a further ten times, the actuating member being, however, moved steadily by hand over a period of 2 s. If possible, the contacts shall be stopped in an intermediate position, the actuating member then being released.

During the tests, no sustained arcing shall occur.

13.106 Switched socket-outlets with switches operating more than one pole shall make and break all poles substantially simultaneously, except that for multi-pole switches with switched neutral, the neutral shall not make after or break before other poles.

Compliance is checked by inspection and by manual test.

13.107 The action of the mechanism, if the covers or cover plate are removable for installation purposes, shall be independent of the presence of the covers or cover plate.

Compliance is checked by connecting the switch, without cover or cover plate fitted, in series with a lamp and by operating the actuating member without undue force as in normal use.

During the test, the lamp shall not flicker.

14 Construction of plugs and portable socket-outlets

This clause of Part 1 is not applicable.

15 Interlocked socket-outlets

This clause of Part 1 is not applicable.

16 Resistance to ageing, protection provided by enclosures, and resistance to humidity

This clause of Part 1 is applicable.

17 Insulation resistance and electric strength

This clause of Part 1 is applicable except as follows.

17.1 Replacement of the last sentence:

The insulation resistance shall be not less than 5 M Ω , except for items g) and h) of 17.1.1, where the resistance shall not be less than 2 M Ω .

17.1.1 Addition after Note 2:

For switches of switched socket-outlets, the insulation resistance is measured consecutively

- f) between all poles connected together and the body, with the switch in the closed position (on);*
- g) between each pole in turn and all others connected to the body, with the switch in the closed position (on);*
- h) between the terminals which are electrically connected together when the switch is in the closed position (on), the switch being in the open position (off).*

The term "body" used in f) and g) includes accessible metal parts, metal frames supporting the base of flush type switched socket-outlets, operating keys, metal foil in contact with the outer surface of accessible external parts and operating keys of insulation material, the point of anchorage of the cord, chain or rod for switches operated by such means, fixing screws of bases or covers and cover plates, external assembly screws, earthing terminals and any metal part of the mechanism if required to be insulated from live parts (see 10.102).

18 Operation of earthing contacts

This clause of Part 1 is applicable.

19 Temperature rise

This clause of Part 1 is applicable.

20 Breaking capacity

This clause of Part 1 is applicable except as follows.

Addition:

Switches incorporated in switched socket-outlets shall have adequate making and breaking capacity.

The tests are made by means of an apparatus, the principle of which is as shown in Figure 101 and which is arranged to simulate normal operation.

Switches are fitted with conductors as for the test of Clause 19.

Switches are tested at 1,1 times the rated voltage and 1,25 times the rated current. They are subjected to 200 operations at a uniform rate of:

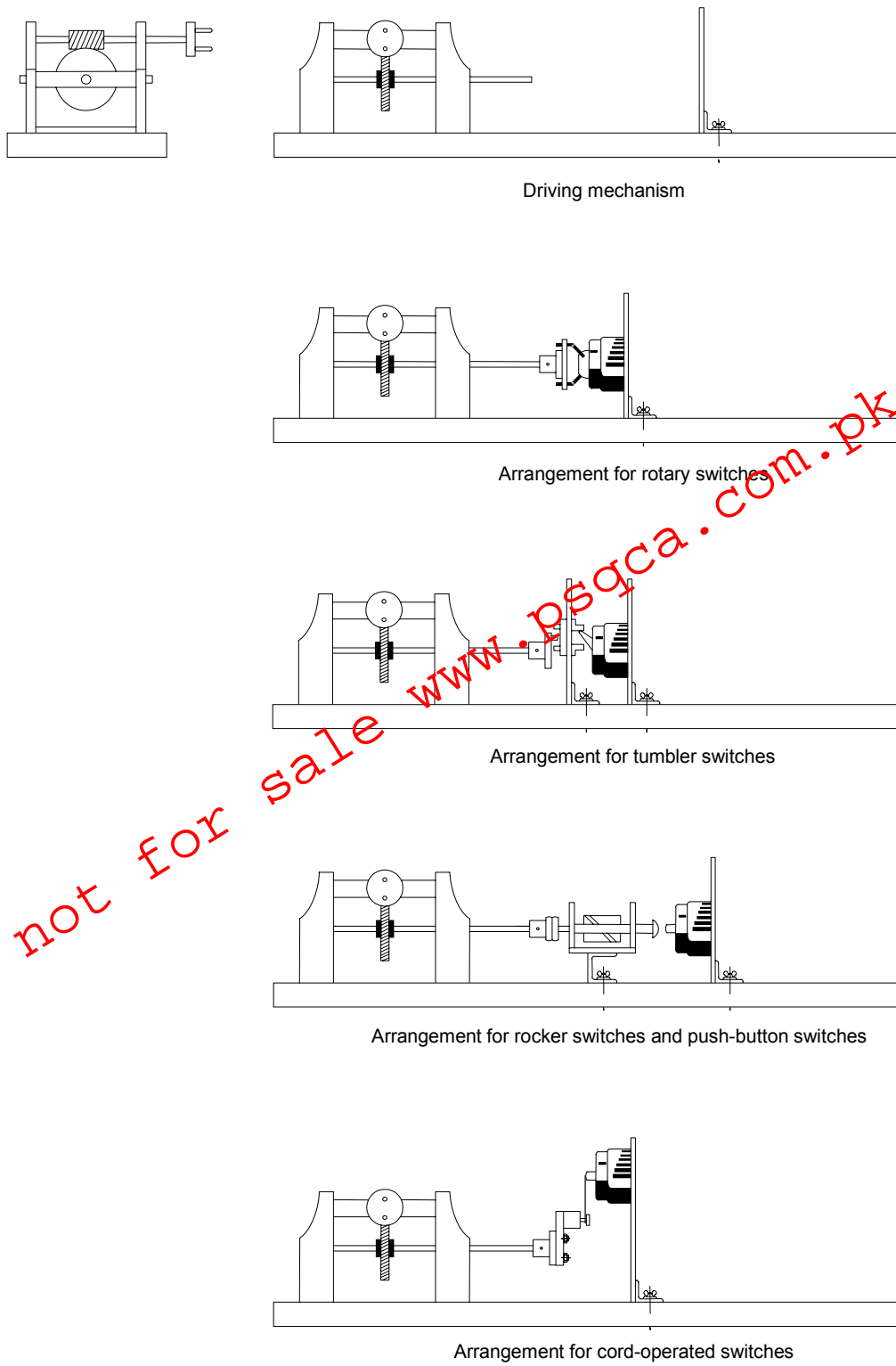
- 30 operations per minute, if the rated current does not exceed 10 A;
- 15 operations per minute, if the rated current exceeds 10 A but is less than 25 A;
- 7,5 operations per minute, if the rated current is 25 A or more.

For rotary switches intended to be operated in either direction, the actuating member is turned in one direction for half the total number of operations, and in the reverse direction for the remainder.

The test is carried out by using an alternating current ($\cos \varphi = 0,6 \pm 0,05$).

During the test no sustained arcing shall occur.

After the test, the specimen shall show no damage which may impair its further use.



IEC 1793/06

Figure 101 – Example of apparatus for testing the making and breaking capacity and the normal operation of switches in switched socket-outlets

21 Normal operation

This clause of Part 1 is applicable except as follows.

Addition:

Switches of switched socket-outlets shall withstand, without excessive wear or other harmful effect, the mechanical, electrical and thermal stresses occurring in normal use.

Compliance is checked by the following test:

The switches are tested at rated voltage and rated current ($\cos \varphi = 0,8 \pm 0,05$) in the apparatus as specified in Clause 20.

The number of operations is as shown in Table 101.

Table 101 – Number of operations for normal operation test

Rated current	Number of operations
Up to and including 16 A for switches having a rated voltage not exceeding 250 V a.c.	40 000
Up to and including 16 A for switches having a rated voltage exceeding 250 V a.c.	20 000
Over 16 A up to and including 32 A	10 000

The rate of operations is according to Clause 20.

For rotary switches intended to be operated in either direction, three-quarters of the total number of operations shall be in the clockwise direction and the remainder in the reverse direction.

During the test, the specimens shall function correctly.

After the test, the specimens shall withstand an electric strength test as specified in Clause 17, and a temperature rise test as specified in Clause 19, the test current however being reduced to the rated current.

The specimens shall then not show

- wear impairing their further use;
- discrepancy between the position of the actuating member and that of the moving contacts, if the position of the actuating member is indicated;
- deterioration of enclosures, insulating linings or barriers to such an extent that the switch cannot be further operated or that the requirements of Clause 10 are no longer complied with;
- loosening of electrical or mechanical connections;
- seepage of sealing compound;
- relative displacement of the moving contacts of switches.

The humidity treatment according to 16.3 is not repeated before the dielectric strength test of this subclause.

During the test, the specimens are not lubricated.

22 Force necessary to withdraw the plug

This clause of Part 1 is applicable.

23 Flexible cables and their connection

This clause of Part 1 is not applicable.

24 Mechanical strength

This clause of Part 1 is applicable.

25 Resistance to heat

This clause of Part 1 is applicable.

26 Screws, current-carrying parts and connections

This clause of Part 1 is applicable.

27 Creepage distances, clearances and distances through sealing compound

This clause of Part 1 is applicable except as follows.

Addition:

27.101 For switches incorporated in switched socket-outlets, creepage distances, clearances and distances through sealing compound shall be not less than the values shown in Table 102.

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Table 102 – Creepage distances, clearances and distances through sealing compound

Description	mm
Creepage distance	
1) Between live parts which are separated when the contacts are open	3
2) Between live parts and: – metal parts of the mechanism, if required to be insulated from live parts (see 10.102)	3
3) Between metal parts of the mechanism, if required to be insulated from accessible metal parts (see 10.103) and: – screws or devices for fixing bases, covers or cover plates – metal frames supporting the base of flush-type switched socket-outlets – accessible metal parts	3
Clearance	
4) Between live parts which are separated when the contacts are open	3*
5) Between live parts and metal parts of the mechanism, if required to be insulated from live parts (see 10.102)	3
6) Between metal parts of the mechanism, if required to be insulated from accessible metal parts (see 10.103) and: – screws or devices for fixing bases, covers or cover plates – metal frames supporting the base of flush-type switched socket-outlets – accessible metal parts	3
* This value is reduced to 1,2 mm when the contacts are open, for live parts of switches of mini-gap construction which are moved during the separation of the contacts.	

Compliance is checked by measurement.

28 Resistance of insulating material to abnormal heat, to fire and to tracking

This clause of Part 1 is applicable.

29 Resistance to rusting

This clause of Part 1 is applicable.

30 Additional tests on pins provided with insulating sleeves

This clause of Part 1 is not applicable.
