



CE LVD TEST REPORT

For

SENSOR

Model No.: VT-8003, VT-8004, VT-8018, VT-8027, VT-8028, VT-8029, VT-8030, VT-8026, VT-8025, VT-8023, VT-8022, VT-8021, VT-8019, VT-8005, VT-8048, VT-8049, VT-8051, VT-8059, VT-8077, VT-8083, VT-8084, VT-8036, VT-8091, VT-8092, VT-8093, VT-8094

Applicant : V-TAC EXPORTS LIMITED

**ROOM NO.301, KAM ON BUILDING 176A QUEENS ROAD
CENTRAL, CENTRAL, HONGKONG**

Manufacturer : V-TAC EXPORTS LIMITED

**ROOM NO.301, KAM ON BUILDING 176A QUEENS ROAD
CENTRAL, CENTRAL, HONGKONG**

Issued By : Global-Standard Testing Service Co., Ltd.

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Report Number : J02.06.0189S-R2

Issued Date : December 26, 2019

Date of Report : December 26, 2019

Note:

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TEST REPORT EN60730-1 Automatic electrical controls for household and similar use – Part 1: General requirements – Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements	
Report reference No.:	J02.06.0189S-R2
Testing laboratory	Global-Standard Testing Service Co., Ltd.
Location.....:	Room 1505, Building B, Chuangxin Plaza, Pingshan Avenue, Pingshan District, Shenzhen, China
Applicant.....:	V-TAC EXPORTS LIMITED
Address:.....:	ROOM NO.301, KAM ON BUILDING 176A QUEENS ROAD CENTRAL, CENTRAL, HONGKONG
Manufacturer.....:	V-TAC EXPORTS LIMITED
Address:.....:	ROOM NO.301, KAM ON BUILDING 176A QUEENS ROAD CENTRAL, CENTRAL, HONGKONG
Standards.....:	EN 60730-1:2016 EN 60730-2-6:2016
Procedure deviation.....:	N/A
Non-standard test method.....:	N/A
Type of test equipment	SENSOR
Trade mark.....:	
Model/Type designation.....:	VT-8003, VT-8004, VT-8018, VT-8027, VT-8028, VT-8029, VT-8030, VT-8026, VT-8025, VT-8023, VT-8022, VT-8021, VT-8019, VT-8005, VT-8048, VT-8049, VT-8051, VT-8059, VT-8077, VT-8083, VT-8084, VT-8036, VT-8091, VT-8092, VT-8093, VT-8094
TRF originator.....:	Global-Standard Testing Service Co., Ltd.
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Test item particulars:	--
Operating Condition	Continuous
Protection against ingress of water	IP20


Possible test case verdicts :


test case does not apply to the test object	N(/A.)
test object does meet the requirement	P(ass)
test object does not meet the requirement	F(ail)

Name and address of the testing laboratory :

Global-Standard Testing Service Co., Ltd.
Room 1505, Building B, Chuangxin Plaza, Pingshan Avenue,
Pingshan District, Shenzhen, China

Tested by : 
Signature December 23, 2019
Date
Evan Chen / Engineer
Name/Title

Witnessed by: 
Signature December 26, 2019
Date
Gloria Wang / Project engineer
Name/Title

Approved by : 
Signature December 26, 2019
Date
Nico Xie / Manager
Name/Title



<p>General remarks:</p>	
<p>"(see remark #)" refers to a remark appended to the report.</p> <p>"(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a comma is used as the decimal separator.</p> <p>The test results presented in this report relate only to the object tested.</p> <p>This report shall not be reproduced except in full without the written approval of the testing laboratory.</p> <p>Unless otherwise specified, test are made under normal conditions at an ambient temperature within the range of 15°C to 35°C, RH45% to 75% and an air pressure of 860mbar of 1060mbar</p>	<p>Attachment with:</p> <p>1) Photo documentation</p>
<p>This report covers model VT-8003, VT-8004, VT-8018, VT-8027, VT-8028, VT-8029, VT-8030, VT-8026, VT-8025, VT-8023, VT-8022, VT-8021, VT-8019, VT-8005, VT-8048, VT-8049, VT-8051, VT-8059, VT-8077, VT-8083, VT-8084, VT-8036, VT-8091, VT-8092, VT-8093, VT-8094.</p> <p>This report is based on report J02.06.0189S-R1 which issued on January 17, 2019.</p>	

EN 60730-2-6			
Clause	Requirement – Test	Result	Verdict
4	General notes on tests		--
4.1	Conditions of test		P
4.1.1	Unless otherwise specified in this standard, the samples are tested as delivered, having been mounted as declared by the manufacturer, but, when significant, in the most unfavourable position.		P
4.1.2	If the test results are influenced by the room temperature, this shall be maintained at (20 + 5) °C, except that in cases of doubt, it shall be maintained at (23 ± 2) °C, unless otherwise specified in a particular clause.		P
4.1.3	Actuating members are placed in the most unfavourably located position, intermediate position or position of setting by the user, unless other instructions are given in a particular clause.		P
4.1.4	Unless otherwise specified in this standard, the tests are carried out in the order of the clauses of this standard.		P
4.1.5	During the tests of this standard, actuation may be performed by test equipment if so desired, except for the high-speed tests of 17.12.		P
4.1.6	During and for the purpose of the tests of this standard, other than for the tests of 17.12, the actuating means can be used to actuate the control, if an actuating member is not supplied by the manufacturer.		P
4.1.7	The rates of temperature change declared in 7.2 and used in clause 17 (that is $\alpha 1$, $\beta 1$, $\alpha 2$ and $\beta 2$) shall have test tolerances of ± 12 K/h.		P
4.1.8	In all tests the measuring instruments or the measuring means shall be such as not to affect appreciably the value being measured.		P
4.1.9 to 4.1.11	See annex H.		P
4.2	Samples required		P
4.2.1	One sample is used for the tests in clauses 5 to 11 and 18 to 23 inclusive. A set of three samples is subjected to the remaining tests.		P
4.2.2	Void		P

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Clause	Requirement – Test	Result	Verdict
4.2.3	Additional samples may be required for some destructive tests of this standard.		P
4.2.4	Controls which are intended to meet the requirements of more than one part 2 document shall, in general, be tested to each part 2 separately.		P
4.3	Instructions for test		P
4.3.1	According to submission		P
4.3.1.1	Controls, if submitted in or with an equipment, may either be tested in or with the equipment, in which case they are classified as for declared specific load or tested separately, in which case they may be classified as for declared specific load, resistive load or resistive and inductive load. In either of the latter two cases, the current in the appropriate circuit when the equipment is operating under normal load, is regarded as the rated current of the circuit.		P
4.3.1.2	For all controls submitted, in, on or with an equipment, all other relevant information as required by 7.2 may be obtained by inspection and measurement of the submitted equipment.		P
4.3.1.3	Integrated controls are classified as for declared specific load and are tested in the equipment, or part thereof, for which they are intended.		P
4.3.1.4	Controls not submitted in or with an equipment are tested separately.		P
4.3.1.5	Controls for use with non-detachable cords are tested with the appropriate cord connected.		P
4.3.2	According to rating		P
4.3.2.1	Controls for a.c. only are tested with a.c. at rated frequency if declared; those for d.c. only are tested with d.c. and those for a.c./d.c. at the more unfavourable supply.		P
4.3.2.2	Controls for a.c. only, which are not declared for a rated frequency, are tested at either 50 Hz or 60 Hz whichever is the more unfavourable. Controls with a rated frequency within a declared range other than 50 Hz to 60 Hz are tested at the most unfavourable frequency within the marked or declared range.		N

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Clause	Requirement – Test	Result	Verdict
4.3.2.3	When testing controls intended for d.c. only, the possible influence of polarity on the operation of the control is taken into consideration.		P
4.3.2.4	For controls with different a.c. and d.c. ratings the tests for clauses 12, 13, 14 and 17, are made on two sets of samples, one being tested according to the a.c. rating, and the other according to the d.c. rating.		P
4.3.2.5	Unless otherwise specified, controls declared for one or more voltage ranges, shall be tested at the most unfavourable voltage within the declared range, and this voltage being multiplied by the factor indicated in the appropriate clause (see 4.3.2.7).		P
4.3.2.6	For controls marked or declared for more than one rated voltage or rated current, the tests of clause 17 are made on sets of samples for each combination of rated voltage and rated current.		P
4.3.2.7	For controls declared for a voltage range, tests are made on one set of samples at each limit of the range, unless the difference between the limits does not exceed 10 % of the mean value of the range, in which case the tests are made on one set of samples at the upper limit of the range.		P
4.3.2.8	Controls intended to be operated from a specific supply, are tested with that specific supply.		P
4.3.3	According to protection against shock		P
4.3.3.1	If in class 0, class 0I or class I controls, or in controls for class 0, class 0I or class I equipment, it is necessary to have parts with double insulation or reinforced insulation, such parts are checked for compliance with the appropriate requirements specified for class II controls.		P

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Clause	Requirement – Test	Result	Verdict
4.3.3.2	In any class I control, and in any control used in a class I equipment, unearthed accessible metal or accessible insulating surfaces shall be provided with insulation complying with the requirements for a class II control (see 9.1.1).		P
4.3.3.3	If in class 0, class 0I, class I or class II controls, or controls for class 0, class 0I, class I or class II equipment, it is necessary to have parts operating at safety extra-low voltage, such parts are also checked for compliance with the appropriate requirements specified for class III controls.		P
4.3.4	According to manufacturing variants		P
4.3.4.1	Controls which are otherwise identical but which may be set by the manufacturer, or which may, by the inclusion at the manufacturing stage of alternative components or parts produce various operating values, operating times or operating sequences, are for the purpose of this standard normally treated as a single submission. Normally, controls set to the most arduous condition will be sufficient. However, the testing authority may require extra samples, set to other values, where it can be clearly shown that these are necessary to allow approval of the whole range.		P
4.3.4.2	In these cases due attention shall be paid to possible variations in manufacturing deviation and drift of any operating value, operating time or operating sequence, and, for sensing controls, to the minimum and maximum acceptable rates of rise and fall of the appropriate activating quantity which may be applicable to different parts of the range.		P
4.3.5	According to purpose		P
4.3.5.1	Multi-purpose controls shall, according to 6.3, in general be tested for each purpose separately. During the tests for any one purpose, the activating quantities and prime movers applicable to all other purposes, shall be maintained constant at the most arduous value or position within the declared range or ranges.		P

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Clause	Requirement – Test	Result	Verdict
4.3.5.2	Such controls without an appropriate section of clause 17 shall be tested in a manner agreed between the manufacturer and the testing authority so that the essential intended operating values, operating times and operating sequences are tested.		P
4.3.5.3	Any control with a purpose not classified in 6.3, or in the appropriate part 2, may be tested and approved to this specification, except for clause 17. A test schedule for clause 17 shall be based, wherever possible, on the intent of that clause and shall be agreed between the manufacturer and the testing authority.		N/A
4.3.5.4	See annex J.		P

5	Rating		P
5.1	Maximum rated voltage		P
	The rated voltage of controls, having terminals intended to be directly connected to the supply mains single phase, shall cover usage at 230 V and to the supply mains multi-phase, 400 V.		P
5.2	Maximum rated current		N/A
5.3	Compliance		P

6	Classification		P
6.1	According to nature of supply		P
6.2	According to type of load to be controlled by each circuit of the control		P
	A control having more than one circuit need not have the same classification for each circuit.		N/A
6.3	According to their purpose		P
	A control may be classified for more than one purpose, in which case it is referred to as a multi-purpose control.		P
6.4	According to features of automatic action		N/A
6.5	According to the degree of protection and control pollution situation		N/A
6.6	According to method of connection		N/A
6.7	According to ambient temperature limits of the switch head		N/A

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Clause	Requirement – Test	Result	Verdict
6.8	According to protection against electric shock		P
6.9	According to circuit disconnection or interruption:		P
6.10	According to number of cycles of actuation (M) of each manual action		N/A
6.11	According to number of automatic cycles (A) of each automatic action		N/A
6.12	According to temperature limits of the mounting surface of the control		N/A
6.13	According to value of proof tracking index (PTI) for the insulation material used		N/A
6.14	According to period of electrical stress across insulating parts supporting live parts and between live parts and earthed metal		N/A
6.15	According to construction:		N/A
6.16	According to ageing requirements (Y) of the equipment in which, or with which, the control is intended to be used		N/A
6.17	According to use of the thermistor		N/A
6.18	According to software class		N/A
7	Information		--
7.1	General requirements		P
7.2	Methods of providing information		P
7.3	Class II symbol		P
7.3.1	The symbol for class II construction shall be used only for controls classified according to 6.8.3.4.		P
7.3.2	The dimension of the symbol for class II construction shall be such that the length of the sides of the outer square is about twice the length of the sides of the inner square.		P
7.3.2.1	The length of the sides of the outer square of the symbol shall be not less than 5 mm, unless the largest dimension of the control is 15 mm in length or less, in which case the dimension of the symbol may be reduced but the length of the sides of its outer square shall be not less than 3 mm.		P
7.4	Additional requirements for marking		P
7.4.1	Required marking on a control shall preferably be on the main body of the control but may be placed on non-detachable parts.		P

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Clause	Requirement – Test	Result	Verdict
7.4.2	Terminals of controls intended for the connection of supply conductors shall be indicated by an arrow pointing towards the terminal, unless the method of connection to the supply mains is of no importance or is self-evident.		P
7.4.3	Terminals intended exclusively for a neutral external conductor shall be indicated by the letter "N".		P
7.4.3.1	Earthing terminals for external earthing conductors, and terminals for earthing continuity of class II and class III controls, shall be indicated by the earth symbol.		P
7.4.3.2	All other terminals shall be suitably identified, their purpose self-evident or the control circuitry visually apparent. The arrow, the letter "N" or the earth symbol shall not be used except as indicated above.		P
7.4.4	Controls intended to be set by the user or by the equipment manufacturer during installation shall be provided with an indication of the direction to increase or decrease the response value.		P
7.4.5	Parts destroyed during the normal operation of the control and which have to be replaced, shall be marked so as to enable them to be identified from a catalogue or the like, even after they have operated, unless they are intended to be replaced only during manufacturer servicing.		P

8.3.3.2	8 Protection against electric shock		--
	8.1 General requirements		P
	Controls shall be so constructed that there is adequate protection against accidental contact with live parts, in any unfavourable position which may occur in normal use, and after any accessible detachable parts, other than lamps located behind a detachable cover have been removed. However, during the insertion and removal of lamps, protection against accidental contact with live parts of the lamp cap shall be ensured.		P

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Clause	Requirement – Test	Result	Verdict
	8.2 Actuating members and actuating means		P
	An actuating member shall not be live.		P
	8.3 Capacitors		N/A
	8.3.1 For class II in-line cord controls and independently mounted controls, capacitors shall not be connected to accessible metal parts. For controls for class II equipment, capacitors shall not be connected to metal likely to be connected to accessible metal when the control is mounted in accordance with the manufacturers' declarations. Metal casings of capacitors shall be separated by supplementary insulation from accessible metal parts, and from other metal parts likely to be connected to accessible metal, when the control is mounted in accordance with the manufacturers' declarations.		P
8.3.2	Controls intended to be connected to the supply by means of a plug shall be so designed that in normal use there is no risk of electric shock from charged capacitors when touching the pins of the plug.		P
8.3.2.1	The control is supplied at rated voltage or at the upper limit of the rated voltage range.		P
8.3.2.2	The actuating member, if any, is then moved to the "OFF" position if one exists the control is disconnected from the supply by removing the plug from the socket-outlet.		P
8.3.2.3	One second after disconnection, the voltage between the pins of the plug is measured.		N/A
8.3.2.4	The voltage shall not exceed 34 V. The test is only performed if the capacitor exceeds 0,1 μ F.		N/A
8.4	Covers and uninsulated live or hazardous parts		N/A

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Clause	Requirement – Test	Result	Verdict
	Controls provided with a cover or cover plate of non-metallic material shall be so designed that the cover fixing screws are not accessible, unless they are either earthed or separated from hazardous live parts by double insulation or reinforced insulation or not accessible after mounting in the equipment.		N/A
9	Provision for protective earthing		N/A
9.1	General requirements		P
9.1.1	Accessible metal parts, other than actuating members, of in-line cord, free-standing and independently mounted controls of class 0I and class I which may become live in the event of an insulation fault, shall be permanently and reliably connected to an earthing terminal or termination within the control, or to the earthing contact of an equipment inlet.		P
9.1.2	Accessible metal parts, other than actuating members, of integrated and incorporated controls for class 0I and class I equipment which may become live in the event of an insulation fault shall have provision for earthing.		P
9.1.3	Earthing terminals, earthing terminations and earthing contacts shall not be electrically connected to any neutral terminal.		P
9.2	Class II and class III controls shall have no provision for protective earthing.		P
9.3	Adequacy of earth connections		P
9.3.1	General requirements		P
	The connection between an earthing terminal, earthing termination or earthing contact, and parts required to be connected thereto, shall be of low resistance.		N/A

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Clause	Requirement – Test	Result	Verdict
9.3.2	Fixed wiring and methods X and M		P
	Earthing terminals for the connection of fixed wiring or for non-detachable cords using methods X and M shall comply with the requirements of 10.1.		P
9.3.3	External conductors		P
	Earthing connections for external conductors shall not be made using screwless terminals.		P
9.3.4	Size of accessible earthing terminals		P
	Earthing terminals which are accessible in normal use shall allow the connection of conductors having nominal cross-sectional areas of 2,5 mm ² to 6 mm ² inclusive and it shall not be possible to loosen them without the aid of a tool.		N/A
9.3.5	Size of non-accessible earthing terminals		P
	Earthing terminals which are not accessible in normal use for external conductors shall be of a size equal to or larger than that required for the corresponding current-carrying terminal.		P
9.3.6	Locking of earthing terminals		P
	Clamping means of earthing terminals for external conductors shall be adequately locked against accidental loosening.		P
9.4	Corrosion resistance		P
	All parts of an earthing terminal shall be resistant to corrosion resulting from contact between those parts and the copper of the earthing conductor or any other metal that is in contact with those parts		N/A
9.4.1	Materials		P

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Clause	Requirement – Test	Result	Verdict
	The body of an earthing terminal shall be of brass, or other metal no less resistant to corrosion, unless it is a part of the metal frame or enclosure. Then any screws or nuts shall be of brass, plated steel or other metal complying with clause 22, or other metal no less resistant to corrosion.		P
9.4.2	Frames or enclosures of aluminum		P
	If the body of an earthing terminal is a part of a frame or enclosure of aluminum or aluminum alloy, precautions shall be taken to avoid the risk of corrosion resulting from contact between copper and aluminum or its alloys.		P
9.5	Other requirements		P
9.5.1	Detachable parts		N/A
	If a detachable part of a control has an earth connection, this connection shall be made before any current-carrying connections are established when placing the part in position, and any current-carrying connections shall be separated before the earth connection is broken when removing the part.		N/A
10	Terminals and terminations		--
10.1	Terminals and terminations for external copper conductors		P
10.1.1	Terminals for fixed wiring and for non-detachable cords using attachment methods X and M, except as specified in 10.1.3, shall be such that connection is made by means of screws, nuts or equally effective devices or methods, but without requiring a special purpose tool for connection or disconnection.		P

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Clause	Requirement – Test	Result	Verdict
10.1.1.1	Terminals or terminations for non-detachable cords using attachment methods Y and Z shall satisfy the appropriate requirements for terminals and terminations for internal conductors and may require the use of special purpose tools for connection or disconnection.		P
10.1.2	Screws and nuts which clamp external conductors shall have a metric ISO thread or a thread of equivalent effectiveness. They shall not serve to fix any other component, except that they may also clamp internal conductors if these are so arranged that they are unlikely to be displaced when fitting the external conductors.		P
10.1.1	Soldered, welded, crimped or similar terminations		P
	Soldered, welded, crimped or similar terminations shall not be used for the connection of non-detachable cords using attachment methods X and M unless such is permitted by the appropriate equipment standard. When such terminations are used for external conductors, they shall also comply with the requirements of 10.2.2 and 10.2.3.		P
10.1.4	Terminals for fixed wiring or non-detachable cords using attachment methods X or M shall allow at least the connection of conductors having nominal cross-sectional areas as shown in table 10.1.4.		P
10.1.4.1	If a terminal is designed to accommodate a wider range of fixed wiring or flexible cord conductor sizes than those indicated in columns 2 and 3 of table 10.1.4, then this shall be declared		P

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Clause	Requirement – Test	Result	Verdict
10.1.5	Terminals for fixed wiring or non-detachable cords using attachment methods X or M shall be so fixed that, when the clamping means is tightened or loosened, the terminal does not work loose, internal conductors are not subjected to stress, and creepage distances and clearances are not reduced below the values specified in clause 20.		P
10.1.5.1	<i>Compliance is checked by inspection and by measurement after fastening and loosening a conductor of the largest cross-sectional area used in 10.1.4 10 times, the conductor being moved each time it is loosened. For threaded parts, the full torque applied is either that shown in the table of 19.1, or the torque specified in the relevant figure (see figures 10 to 13), whichever is greater.</i>		P
10.1.6	Terminals for fixed wiring or non-detachable cords using attachment methods X or M shall be so designed that they clamp the conductor between metal surfaces with sufficient contact pressure and without undue damage to the conductor, except that for screwless terminals intended for circuits carrying a current not exceeding 2 A, one of the surfaces may be of non-metallic material.		P
10.1.7	Terminals for fixed wiring and non-detachable cords using attachment method X shall not require special preparation of the conductor in order to effect correct connection.		P
10.1.7.1	Terminals for attachment method X may also have alternative means of connection if at least one of the means conforms to this requirement, even if the original factory-made connection uses another means. In this case the original factory-made connection shall comply with the requirements for terminals and terminations for internal conductors.		P

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Clause	Requirement – Test	Result	Verdict
10.1.8	Terminals for fixed wiring and non-detachable cords using attachment methods X or M shall be so designed or placed that neither the conductor nor a wire of a stranded conductor can slip out while any clamping screws or nuts are being tightened, or while any equally effective device is being operated.		P
10.1.8.1	<i>Compliance is checked by the following test.</i>		P
10.1.8.2	<i>Terminals are fitted with conductors according to the use of the terminal, in accordance with table 10.1.8. The wires of fixed wiring conductors are straightened before inserting into the terminal.</i>		N/A
10.1.8.3	<i>The wires of flexible cables and cords are twisted so that there is an even twist of one complete turn in 20 mm. The conductor is inserted into the terminal for the minimum distance prescribed, or where no distance is prescribed, until it just projects from the far side of the terminal. The conductor is inserted into the terminal in the position most likely to assist a wire to escape and then the screw is tightened with a torque equal to two-thirds of the torque specified in the table of 19.1.</i>		P
10.1.8.4	<i>For flexible cords the test is repeated using a new conductor which is twisted as before, but in the opposite direction. After the test no wire of the conductor shall have escaped into the gap between the clamping means and the retaining device.</i>		P
10.1.9	Terminals shall be so designed that they clamp the conductor reliably.		P

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Clause	Requirement – Test	Result	Verdict
10.1.9.1	<i>The terminals are fitted with conductors of the smallest and largest nominal cross-sectional areas used in 10.1.4, fixed or flexible, whichever is appropriate, or the more unfavorable and the terminal screws are tightened, the torque applied being equal to two-thirds of the torque specified in the table of 19.1. Each conductor is subjected to a pull of the value shown in table 10.1.9. The pull is applied without jerks for 1 min, in the direction of the axis of the conductor space.</i>		P
10.1.9.2	This pull test is normally applied directly to the conductor adjacent to where it enters the terminal. If, however, an additional crimping or clamping device holding the conductor or the insulation around the conductor exists not more than 30 mm from the entry point for the conductor into the terminal and measured along the length of the conductor, this test should apply to the crimping or clamping device, and not to the actual terminal.		P
10.1.9.3	During the test the conductor shall not move appreciably in the terminal.		N/A
10.1.10	Terminals shall be so designed that they do not attain excessive temperature in normal use, so as to damage the material of the supporting insulation, or the insulating covering of the clamped conductors.		P
10.1.11	Terminals shall be so located that each core contained within any fixed wiring sheath or flexible cord sheath can be terminated in reasonable proximity to the other cores within the same sheath, unless there is a good technical reason for the contrary.		P

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Clause	Requirement – Test	Result	Verdict
10.1.12	Terminals for non-detachable cords using attachment methods X or M shall be so located or shielded, that should a wire escape when the conductors are fitted, there is no risk of accidental contact between live parts and accessible metal parts, and for class II controls and controls for class II equipment, between live parts and metal parts separated from accessible metal parts by supplementary insulation only. Furthermore, there shall be no risk of short-circuiting a declared action providing a full-disconnection or a micro-disconnection.		P
10.1.13	Terminals shall be so designed that circuit continuity is not maintained by pressure transmitted through insulating material other than ceramic, or other insulating material with characteristics no less suitable, unless there is sufficient resilience in the appropriate metal parts to compensate for any shrinkage or distortion.		P
10.1.14	Screws and threaded parts of terminals shall be of metal.		P
10.1.15	Terminals of the pillar type and the mantle type shall be so designed as to allow an adequate length of conductor to be introduced into, and pass beyond the edge of the screw, to ensure that the conductor does not fall out.		N/A
10.1.16.1	In Canada and the U.S.A., flying leads shall be provided with strain relief to prevent mechanical stress from being transmitted to terminal, splices (e.g., twist-on connections) or internal wiring.		P
10.2	Terminals and terminations for internal conductors		P
10.2.1	Terminals and terminations shall allow the connection of conductors having nominal cross-sectional areas as shown in table 10.2.1.		P

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Clause	Requirement – Test	Result	Verdict
10.2.2	Terminals and terminations shall be suitable for their purpose. Terminations for making soldered, crimped and welded connections shall be capable of withstanding the stresses which occur in normal service.		P
10.2.3	When soldered terminals are used, the conductor shall be so positioned or fixed that reliance is not placed upon the soldering alone to maintain the conductor in position, unless barriers are provided such that creepage distances and clearances between live parts and other metal parts cannot be reduced to less than 50 % of the values specified in 20.1 should the conductor break away at the soldered joint.		P
10.2.4	Flat push-on connectors		N/A
10.2.4.1	Tabs forming part of a control shall comply with the dimensional requirements of figure 14 or 15.		P
10.2.4.2	Tabs forming part of a control shall consist of material and plating appropriate to the maximum temperature of the tabs as indicated in table 10.2.4.2.		P
10.2.4.3	Tabs forming part of a control shall have adequate strength to allow the insertion and withdrawal of receptacles without damage to the control such as to impair compliance with this standard.		P
10.2.4.4	Tabs forming part of a control shall be adequately spaced to allow the connection of the appropriate receptacles.		P
10.3	Terminals and terminations for integrated conductors		P
	There are no specific requirements or tests for terminals or terminations for integrated conductors under clause 10, but the relevant requirements of the other clauses may apply.		N/A
11	Constructional requirements		--
11.1	Materials		P

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Clause	Requirement – Test	Result	Verdict
11.2	Protection against electric shock		P
11.3	Actuation and operation		P
11.4	Actions		P
11.5	Openings in enclosures		P
11.6	Mounting of controls		P
11.7	Attachment of cords		P
11.8	Size of cords – non-detachable		P
11.9	Inlet openings		P
11.10	Equipment inlets and socket-outlets		P
11.11	Requirements during mounting, maintenance and servicing		P
11.12	Controls using software		P
11.Z1	Protective controls and components of protective control systems		N/A
12	Moisture and dust resistance		N/A
12.1	Protection against ingress of water and dust		N/A
12.2	Protection against humid conditions		N/A
12.3.1	The control is connected to a supply voltage equal to 1,06 times the rated voltage. The test is conducted at the maximum rated current and the maximum declared ambient temperature.		P
13	Electric strength and insulation resistance		P
13.1	Insulation resistance		P
13.1.1	Compliance is checked by the test of 13.1.2 to 13.1.4 inclusive. This test is made when specified in clause 12.		P
13.1.2	When measuring reinforced or supplementary insulation to other than metal parts, each appropriate surface of the insulation is covered with a metal foil to provide an electrode for the test.		P
13.1.3	The insulation resistance is measured with a d.c. voltage of approximately 500 V applied, the measurement being made 1 min after application of the voltage.		P

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Clause	Requirement – Test	Result	Verdict
13.1.4	The insulation resistance shall not be less than that shown in table 13.1.		P
13.2	Electric strength		P
13.2.1	Compliance is checked by the following test of 13.2.2 to 13.2.4 inclusive. This test is made when specified in clause 12 and clause 17.		P
13.2.2	When measuring reinforced or supplementary insulation to other than metal parts, each appropriate surface of the insulation is covered with a metal foil to provide an electrode for the test.		N/A
13.2.3	The insulation is subjected to a voltage of substantially sine-wave form, having frequency of 50 Hz or 60 Hz. Voltage is applied for 1 min across the insulation or disconnection indicated in table 13.2 and has the value shown in the table.		P
13.2.4	Initially not more than half the prescribed voltage is applied, then it is raised rapidly to the full value. No flashover or breakdown shall occur. Glow discharges without drop in voltage are neglected.		P
13.3.1	A test voltage, d.c. for controls for d.c. only and a.c. for all other controls, is applied between any live part and		P
13.3.2	The test voltage is		P
13.3.3	The leakage current is measured within 5 s after the application of the test voltage.		P
13.3.4	The maximum leakage current to accessible metal parts and metal foil shall not exceed the following values:		P
4	1 Heating		P
14.1	Controls and their supporting surfaces shall not attain excessive temperatures in normal use.		P

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Clause	Requirement – Test	Result	Verdict
14.2	Terminals and terminations which are intended for the connection of external conductors, other than those for non-detachable cords using attachment methods M, Y or Z, shall be fitted with conductors of the intermediate cross-sectional area appropriate to the type of conductor and rating used in 10.1.4.		P
14.3	In-line cord controls are stood or rested on a dull black painted plywood surface.		P
14.4	All circuits and terminals intended to control external loads shall be loaded as declared in table 7.2, requirement 3, such that each circuit or terminal carries that current between 0,9 and 1,1 of its declared rating that will prove most arduous. All controls shall be tested at a voltage between 0,9 and 1,1 times rated voltage but controls that are not sensitive to voltage may be tested at a lower voltage provided that 1,1 times rated current is passed. Internal circuits shall be connected as specified by the manufacturer.		P
14.5	Controls are tested in an appropriate heating and/or refrigerating apparatus such that the conditions in 14.5.1 and 14.5.2 are obtained.		P
14.6	The temperatures specified for the switch head, the mounting surfaces and sensing element shall be attained in approximately 1		P
14.7	The temperature of the medium in which the switch head is located, and the value of the activating quantity to which the sensing element is exposed, shall be measured as near as possible to the center of the space occupied by the samples and at a distance of approximately 50 mm from the control.		P
15	Manufacturing deviation and drift		P

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Clause	Requirement – Test	Result	Verdict
15.1	Those parts of controls providing a Type 2 action shall have adequate consistency of manufacture with regard to their declared operating value, operating time, or operating sequence.		P
15.2	Compliance is checked by the appropriate tests of this clause.		P
15.3	For those controls which are completely or partially destroyed during their normal operation, the tests of the appropriate subclauses of clause 17 are deemed to be sufficient.		P
15.4	For those controls which are dependent on the method of mounting on, or incorporation in an equipment for their operation the manufacturing deviation and the drift shall be declared separately and be comparative values. The declared manufacturing deviation should be expressed as a bandwidth or spread (for example 10 K) and the drift by an alteration of value (for example ± 10 K or +5 K, -10 K)		P
15.5	The consistency shall be determined as follows:		P
15.6	For those controls which are not dependent for their operation on the method of mounting on, or incorporation in, an equipment (for example timers, current sensing controls, voltage sensing controls, energy regulators or the drop-out current of electrically operated controls); the determination of consistency shall be as follows:		P
15.7	See annex J.		P
16	Environmental stress		P
16.1	Controls which are sensitive to the environmental stresses of temperature shall withstand the level of the appropriate stress likely to occur in transportation and storage.		P

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Clause	Requirement – Test	Result	Verdict
16.2	Environmental stress of temperature		P
16.2.1	The effect of temperature is tested as follows:		P
16.2.2	The control is not energized during either test.		P
16.2.3	After each test a control with an actuating member or actuating means shall be capable of being actuated to provide correctly the class of circuit disconnection declared, in so far as this can be determined without dismantling the control. This test is carried out at normal room temperature.		P
16.2.4	In addition, for controls with Type 2 actions, the appropriate test of clause 15 shall be repeated after each of the above tests. The value measured in these tests shall not differ from the value recorded in clause 15 for the same sample, by an amount greater than the drift declared in requirement 42 of table 7.2.		P
17	Endurance		P
17.1	General requirements		N/A
17.2	Electrical conditions for the tests		P
17.3	Thermal conditions for the tests		P
17.4	Manual and mechanical conditions for the tests		P
17.5	Dielectric strength requirements		P
17.5.1	After all the tests of this clause, the requirements of 13.2 shall apply, with the exception that the samples are not subjected to the humidity treatment before the application of the test voltage. The test voltages shall be 75 % of the corresponding test voltages shown in that subclause.		P
17.6	Ageing test		P
17.7	Overvoltage ___ test of automatic action at accelerated rate		P

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Clause	Requirement – Test	Result	Verdict
17.8	Test of automatic action at accelerated rate		P
17.9	Test of automatic action at slow rate		P
17.10	Overvoltage __ test of manual action at accelerated speed		N/A
17.11	Test of manual action at slow speed		P
17.12	Test of manual action at high speed		P
17.13	Test of manual action at accelerated speed		P
17.14	Evaluation of compliance		P
17.16	Test for particular purpose controls		P
18	Mechanical strength		P
18.1	General requirements		P
18.2	Impact resistance		P
18.4	Free-standing controls		N/A
18.5	In-line cord controls		P
18.6	Pull-cord actuated controls		P
18.7	Foot actuated controls		P
18.8	Actuating member and actuating means		P
19	Threaded parts and connections		P
19.1	Threaded parts moved during mounting or servicing		P
19.2	Current-carrying connections		P
20	Creepage distances, clearances and distances through solid insulation		P
20.1	Clearances		N/A

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Clause	Requirement – Test	Result	Verdict
20.2	Creepage distances		P
20.3	Solid insulation		P
21	Resistance to heat, fire and tracking		P
21.1	General requirements		P
21.2	Integrated, incorporated and in-line cord controls		P
21.3	Independently mounted controls		P
22	Resistance to corrosion		P
22.1	Resistance to rusting		P
23	Electromagnetic compatibility (EMC) requirements – emission		N/A
23.1	Free standing and independently mounted controls, which cycle during normal operation, shall be so constructed that they do not generate excessive radio interference. Integrated and incorporated controls are not subjected to the tests of this clause, as the result of these tests can be affected by the incorporation of the control in equipment. They may, however, be carried out on such controls if requested by the manufacturer.		P

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Clause	Requirement – Test	Result	Verdict
23.1.1	Test conditions		P
23.1.2	Test procedure		P
24	Components		P
24.1	Transformers intended to supply power to a safety extra-low voltage circuit (SELV) shall be of the safety isolating type and shall comply with the relevant requirements of IEC 60742.		P
24.1.1	Controls that incorporate a transformer as the source of supply to an external SELV circuit are subjected to an output test with the primary energized at full rated voltage as indicated in 17.2.2, 17.2.3.1 and 17.2.3.2.		P
24.2	Components other than those detailed in 24.1 are checked when carrying out the tests of this standard		P
24.2.1	However, for components which have previously been found to comply with a relevant IEC safety standard, to reduce the testing necessary, assessment is limited to the following:		P
25	Normal operation		N/A

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Clause	Requirement – Test	Result	Verdict
26	Electromagnetic compatibility (EMC) requirements – immunity		P
27	Abnormal operation		P
27.1	See annex H.		P
27.2	_ Locked mechanism test		P
27.2.1	The control mechanism is blocked in the position assumed when the control is de-energized. The control is then energized at rated frequency and rated voltage as indicated in 17.2.2, 17.2.3.1 and 17.2.3.2.		P
27.2.2	After this test the control shall be deemed to comply if:		P
27.3	Overvoltage and undervoltage test		P

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Clause	Requirement – Test	Result	Verdict

TABLE: Heating Test			P
	Test voltage (V)..... :		—
	Ambient (°C)..... :		—
Thermocouple Locations	dT(K)	required dT(K)	
Ambient	25 °C	--	
position 1	23.5	65	
position 2	21.3	65	
position 3	23.2	65	
position 4	22.1	65	
Enclosure	24.6	40	
supplementary information:			

TABLE: Dielectric Strength			P
Test voltage applied between:	Test potential applied (V)	Breakdown / flashover (Yes/No)	
All poles together to enclosure	1500	No breakdown or flashover	
supplementary information:			

TABLE: insulation resistance measurements			P
Insulation resistance R between:	R (MΩ)	Required R (MΩ)	
All poles together to enclosure	>200	1	
supplementary information:			

TABLE: Critical components information					
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity1)
Enclosure	Sabic Innovative Plastics China Co Ltd	940(f1)	94V-0 105°C	UL94	UL E161723
supplementary information:					

Appendix 1

Photo documentation

Photo 1

View:

front

rear

right side

left side

top

bottom

internal

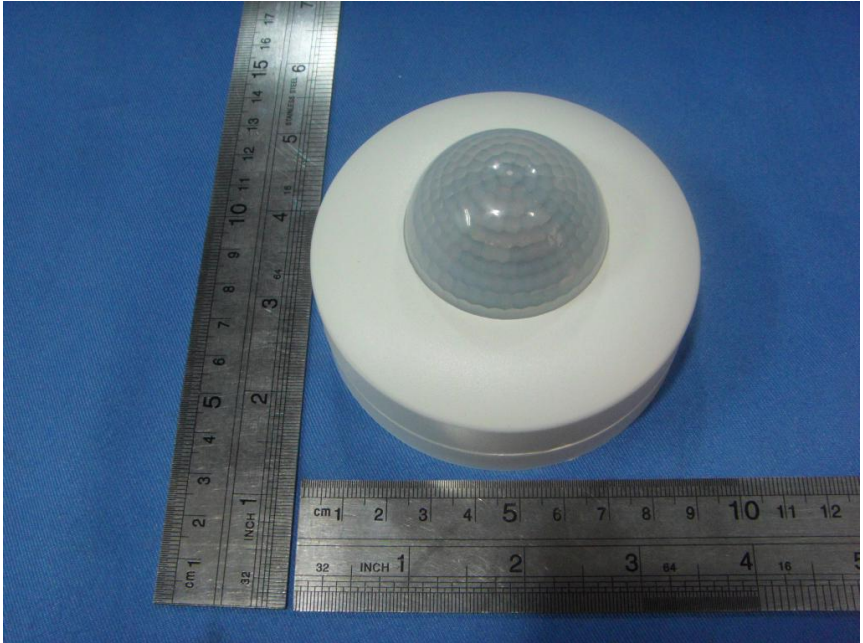


Photo 2

View:

front

rear

right side

left side

top

bottom

internal



--THE END--