TEST REPORT

EN 60670-1 & EN 60670-22

Boxes and enclosures for electrical accessories for household and similar fixed electrical installations

Part 1: General Requirements

Part 22: Particular requirements for connecting boxes and enclosures

Report Number ..... :	**1299.005.3.01**
Date of issue ..... :	**17/04/2024**
Total number of pages ..... :	**25 (+Attachment 2 pages)**
Applicant's name ..... :	DABLER S.A.
Address ..... :	Dimokratias 11, Makrigialos Pieria, 60066, Greece
Test specification:	
Standard(s) ..... :	EN IEC 60670-1:2021+ A11:2021 EN 60670-22:2006
Test procedure ..... :	As above mentioned standards
Non-standard test method ..... :	NA
Test Report Form No ..... :	EN 60670-22 V3.0
Test Report Form(s) Originator ..... :	Labor S.A.
Master TRF ..... :	12/02/2024
Test item description ..... :	OCTAGON CONNECTING BOX FOR SWITCHES
Trade Mark ..... :	DABLER
Manufacturer ..... :	Same as applicant
Model/Type reference ..... :	010/40

Tested by (name + signature):	**Approved by (name + signature):**
ILIAS KANTAS MECHANICAL ENGINEER NTUA LAB MANAGER	ANTONIOS POLITIS ELECTRICAL ENGINEER GENERAL LABORATORY DIRECTOR

Testing procedure and testing location:	
☑ Testing Laboratory ..... :	LABOR S.A.
Testing location/ address ..... :	84 ETHNIKIS ANTISTASEOS STR 15351 PALLINI
☐ Associated Testing Laboratory..... :	NA
Testing location/ address ..... :	NA

List of Attachments (including a total number of pages in each attachment):

- Instructions (2 pages)

Summary of testing:

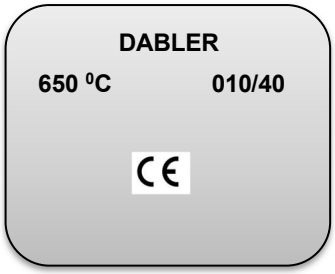
SAMPLES OF THE PRODUCT HAVE BEEN TESTED ACCORDING TO THE ABOVE- MENTIONED STANDARDS AND COMPLIED WITH THEIR APPLICABLE REQUIREMENTS

Tests performed (name of test and test clause):	**Testing location:**
All applicable clauses	LABOR S.A. 84 ETHNIKIS ANTISTASEOS STR 15351 PALLINI

Summary of compliance with National Differences: -

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Model	**Marking of inner surface**
DABLER 010/40	

Test item particulars:

.....:

Possible test case verdicts:

- test case does not apply to the test object ..... : NA (Not Applicable)
- test object does meet the requirement ..... : P (Pass)
- test object is not tested the requirement ..... : NT (Not Tested)
- test object does not meet the requirement ..... : F (Fail)

Testing:

Date of receipt of test item ..... : 05/02/2024

Date (s) of performance of tests ..... : 09/02/2024 - 12/04/2024

General remarks:

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

This test report does not entitle to carry or approval any safety mark on this or similar(s) products.

The clauses marked with (*) sign are currently out of accreditation scope.

After agreement with the customer, the measurement uncertainty is taken into consideration, regarding the compliance assessment, according to decision rule B.3.

We use w - Bandwidth w = 1U, so that the probability of incorrect acceptance is <2.5%, in the case of normal distribution and for a single limit. So, if the sum of the measurement result with the increased uncertainty, in a 95% confidence interval, is below the threshold then the conformity is declared.

General product information:

Connecting Box for switches
Model: 010/40
Diameter: Φ67
Depth: 50mm

Glow wire Test temperature: 650°C

Clause	Requirement - Test	Result - Remark	Verdict

7	Classification	
7.1	Nature of material	☒ 7.1.1 Insulating ☐ 7.1.2 Metallic ☐ 7.1.3 Composite ☐ 7.1.4 Natural or synthetic rubber or a mixture of both
7.2	Type of installation	☐ 7.2.1 Flush, semi-flush in solid walls, ceilings or floors ☒ 7.2.1.1 Not suitable for installation into concrete ☐ 7.2.1.2 Suitable for installation into concrete with maximum temperature during the the casting process 0f +60 ^{0}C ☐ 7.2.1.3 Suitable for installation into concrete with maximum temperature during the the casting process 0f +90 ^{0}C ☐ 7.2.2 Flush or semi-flush in hollow walls, hollow ceilings, hollow floors or furniture: ☐ 7.2.2.1 Class Ha ☐ 7.2.3 Surface mounting on walls, ceilings floors or furniture
7.3	The type(s) of inlets (outlets)[a]	☐ 7.3.1 With inlets for sheathed cables for fixed installations ☐ 7.3.2 With inlets for flexible cables ☐ 7.3.3 With inlets for plain or corrugated conduits ☐ 7.3.4 With inlets for threaded conduits ☐ 7.3.5 With inlets for other types of conductors/cables or conduits ☐ 7.3.6 With spouts (hub) ☒ 7.3.7 Without inlets. Inlet openings wil be made during installation
7.4	The clamping means	☐ 7.4.1 With cable retention ☐ 7.4.2 With cable anchorage ☐ 7.4.3 With clamping means for flexible conduit ☒ 7.4.4 Without clamping means
7.5	The minimum temperature during installation	☒ 7.5.1 -5 °C ☐ 7.5.2 -15 °C ☐ 7.5.3 -25 °C
7.6	The degree of protection against access to hazardous parts and against harmful effects due to the ingressof solid foreign objects according to IEC 60529 with a minimum degree of IP 2X	

Clause	Requirement - Test	Result - Remark	Verdict
7.7	The degree of protection agai nst harm fu l effects due to the ingress of water according to IEC 60529		
7.8	The degree of protection of the part mounted inside the hollow walls of the boxes classified according to 7.2.2.1	☐ 7.8.1 IP 2X ☐ 7.8.2 > IP 2X	
7.9	The provision for fixing accessories	☐ 7.9.1 Boxes supplied with screws ☐ 7.9.2 Boxes intended to receive screws ☐ 7.9.3 Boxes intended to receive claws ☐ 7.9.4 Boxes intended to receive other means	
7.101	Method of fixing the terminals or connecting devices in the connecting box	☐ 7.101.1 With integrated clamping units ☐ 7.101.2 With incorporated terminals or connecting devices ☐ 7.101.3 With provisions for subsequent incorporation of terminals or connecting devices ☒ 7.101.4 Without fixing (for floating terminals or connecting devices)	

Clause	Requirement - Test	Result - Remark	Verdict
8	**MARKING**		P
8.1	Boxes and enclosures shall be marked with:		-
	a) The name, trade mark or identification mark of the manufacturer or the responsible vendor	DABLER	P
	In addition, enclosures shall be marked with:		-
	b) the first characteristic numeral for the degree of protection against access to hazardous parts and against harmful effects due to ingress of solid foreign objects, if declared to be higher than 4 in which case the second characteristic numeral shall also be marked;		NA
	c) the second characteristic numeral for the degree of protection against harmful effects due to ingress of water, if declared to be higher than 2 in which case the first characteristic numeral shall also be marked;		NA
	d) the following marking IPXX on the cover of flush enclosures intended to be mounted on rough surfaces and where the IP is dependent on the surface (see Figure 5). The IP code, if applicable, shall be marked on the outside of the enclosure so as to be easily discernible when the enclosure is mounted and wired as for normal use;		NA
	e) the type reference, which may be a catalogue number; NOTE In the following country the marking of the type reference is not used: UK.	010/40	P
	f) void		-
	The following information shall be marked on the boxes and enclosures or provided by the manufacturer on the smallest package unit or in the manufacturer's instructions which need not be provided with the product:		-
	g) +90 °C for boxes and enclosures classified according to 7.2.1.3;		NA
	h) the necessary information concerning the openings which can be made during installation in the case of boxes and enclosures classified according to 7.3 .7;	See attached Document	P
	i) the minimum temperature during installation for boxes classified according to 7.5.2 and 7.5.3;		NA
	j) the letter Ha or information for boxes and enclosures classified according to 7.2.2.1.		NA
EN 60670-22	k) rated insulation voltage for boxes with integrated or incorporated terminals or connecting devices (see note 1),		NA
EN 60670-22	l) rated connecting capacity		NA
EN 60670-22	m) maximum number of conductors to be placed in the box		NA

Clause	Requirement - Test	Result - Remark	Verdict
	Unless self-evident, further information for the correct installation and use of the box or enclosure shall be given in the manufacturer's instructions which need not be provided with the product. E.g. information on dimensions to ensure compatibility with the accessories to be accommodated.	See attached Document	P
	In special cases, in order to achieve a higher degree of protection by the use of special parts an instruction sheet should be provided and should indicate the higher degree of protection. In such a case, the marking covers the initial degree of protection.		NA
8.101 EN 60670-22	When symbols are used they shall be as follows: Volt ..... V Rated connecting capacity..... mm^2 or □		NA
*8.2	The marking on the boxes and enclosures shall be durable and easily legible.	Rubbing test 15 s with water and 15 s with petroleum spirit. After the test marking still legible.	P
9	**DIMENSIONS**		NA
	Boxes and enclosures comply with the appropriate standard sheets if any, see Annexes ZB and ZC for the countries concerned		NA
***10**	**PROTECTION AGAINST ELECTRIC SHOCK**		P
	Boxes and enclosures shall be so designed that, when they are assembled, equipped and installed as for normal use in accordance with the manufacturer's instructions, live parts are not accessible	No accessible parts after installation as for normal use	P
	Where enclosures are supplied without a cover, cover-plate or an accessory they are tested with the appropriate parts fitted according to the information given in the manufacturer's instructions	Tested with a switch	P
11	**PROVISION FOR EARTHING**		NA
11.1	Boxes and enclosures with exposed conductive parts		NA
	Boxes and enclosures with exposed conductive parts shall be provided with an earthing means of low resistance or have provision for the fitting of such an earthing means. For the purpose of this requirement, small screws and the like, for fixing bases, covers or cover plates, etc. isolated from live parts, are not considered as exposed conductive parts.	No exposed conductive parts	NA
	The earthing means or the provision for the fitting of such an earthing means shall be located so that:		NA
	- the means is readily accessible through the open face of the box		NA

Clause	Requirement - Test	Result - Remark	Verdict
	- the removal of an accessory mounted in the box does not disturb the continuity of the earthing circuit		NA
	- the means is not part of a removable cover, back, or side of the box or enclosure		NA
11.3	Boxes or enclosures with removable sides according to 7.1.2		NA
	A box or enclosure classified according to 7.1.2 that has removable sides shall be constructed so that the electrical bond between separable parts includes at least one threaded screw connection	Non metallic box	NA
11.4	Earthing terminal threads		NA
	The threads of the earthing terminal delivered with or integrated in boxes and enclosures shall not be stripped when the torque shown in the relevant column of Table 4 is applied		NA
12	**CONSTRUCTION**		P
12.1	**General**		P
	Boxes and enclosures shall be constructed without sharp edges	No sharp edges	P
	Burrs shall be removed from mould lines of interior surfaces so that there are no sharp edges or undue obstructions to the passage of wiring or coupling of parts in the intended use of the product		P
	The inner and outer surfaces of a box or cover shall not be subject to peeling, scaling or flaking and shall be smooth and free from blisters, cracks, and other defects		P
EN 60670-22	In connecting boxes where the fixing means of covers or cover-plates serve also to fix the connecting device, it shall maintain the connecting device in the correct position after removal of the cover or cover-plate.		NA
12.101 EN 60670-22	Connecting boxes shall have adequate space to allow the correct connection of conductors which are specified in the relevant sections of the particular requirements of Parts 2 of IEC 60998, concerning the number and cross-sectional area of the conductors.		NA
12.102 EN 60670-22	Retention means for terminals or connecting devices shall withstand the mechanical stresses occurring during installation and normal use.		NA
12.103 EN 60670-22	Connecting boxes classified according to 7.101.1, 7.101.2 and 7.101.3 shall comply with the temperature rise requirements of Clause 16.102.		NA

Clause	Requirement - Test	Result - Remark	Verdict
12.2	Lids, covers or cover-plates or part of them		NA
12.2.1	General		NA
	Lids, covers, or cover-plates or parts of them, such as protective membranes, which are intended to ensure protection against electric shock, shall be held in place effectively		NA
12.2.2	Screw-type fixing		NA
	A box or enclosure intended to accept a lid, cover, or cover plate by means of screw fixing shall be provided with means to accommodate the intended screws		NA
12.2.3	Non-screw-type fixing operable without the use of a tool or a key		NA
12.2.3.1	General		NA
	A box or enclosure intended to accept a lid, cover, or cover plate with non-screw-type fixing operable without the use of a tool or a key shall be provided with means to fix the lid, cover, or cover plate.		NA
	For lids, covers or cover-plates whose removal is obtained by applying a force according to the requirements in Table 2 in a direction approximately perpendicular to the mounting/supporting surface when their removal may give access with test probe B of /EC 61032:		NA
	to live parts;		NA
	to non-earthed conductive parts separated from live parts by basic insulation;		NA
	only to • insulating parts, or, • earthed conductive parts, or • conductive parts separated from live parts by double or reinforced insulation, or • live parts of SEL V circuits according to /EC 61140 having a voltage not greater than 25 V a.c. or 60 V d.c.		NA
12.2.3.2	Verification of the non-removal of the lids, covers or cover-plates		NA
	Forces are gradually applied in one smooth and continuous movement in a direction perpendicular to the mounting surfaces, in such a way that the resulting force acting on the centre of the lids, covers or cover-plates, or parts of them, is as specified in the relevant column of Table 2. The force is applied for 1 min. The lids, covers or cover-plates, shall not come off.		NA

Clause	Requirement - Test	Result - Remark	Verdict
	For flush -mounting boxes or enclosures, the test is then repeated on new specimens, the lid, cover or cover-plate is mounted on the box, after a sheet of hard material (1 ± 0, 1) mm thick, has been fitted on the wall around the supporting frame, as shown in Figure 5.		NA
12.2.3.3	Verification of the removal of the lids, covers or cover-plates		NA
	A force not exceeding that specified in the relevant column of Table 2 is gradually applied in one smooth and continuous movement, in a direction perpendicular to the mounting/supporting surfaces, to lids, covers or cover-plates, or parts of them by means of a hook placed in turn in each of the grooves, holes, spaces or the like, provided for removing them. The lids, covers or cover-plates shall come off. The test is made 10 times on each separable part the fixing of which is not dependent on screws (equally distributing as far as practicable the application points); the removal force is applied each time to the different grooves, holes or the like provided for removing the separable part.		NA
	For flush-mounting boxes or enclosures the test is then repeated on new specimens. The lid, cover or cover-plate is mounted on the box after a sheet of hard material (1 ± 0, 1) mm thick has been fitted on the wall around the supporting frame, as shown in Figure 5. After the test, the specimens shall show no damage within the meaning of this standard.		NA
12.2.3.4	Verification of the outline of lids, covers and cover-plates		NA
	The gauge shown in Figure 6 is pushed towards each side of each lid, cover or cover-plate which is fixed without screws on a mounting or supporting surface, as shown in Figure 7. The face B resting on the mounting/supporting surface, with the face A perpendicular to it, the gauge is applied at right angles to each side under test.		NA
	In the case of a lid, cover or cover-plate fixed without screws to another lid, cover or coverplate or to a mounting box, having the same outline dimensions, the face B of the gauge shall be placed at the same level as the Junction; the outline of the lid, cover or cover-plate shall not exceed the outline of the supporting surface.		NA
12.2.3.5	Verification of grooves, holes and reverse tapers		NA

Clause	Requirement - Test	Result - Remark	Verdict
	A gauge according to Figure 9, applied with a force of (1 ± 0,2) N, shall not enter more than 1,0 mm from the upper part of any groove, hole or reverse taper or the like when the gauge is applied parallel to the mounting/supporting surface and at right angles to the part under test, as shown in Figure 10..		NA
12.2.4	Non screw-type fixing operable with the use of a tool or a key		NA
	For lids, covers or cover-plates whose fix ing is not dependent on screws and whose removal is obtained by using a tool and/or a key, in accordance with the manufacturer's instructions, compliance is checked by the same tests of 12.2.3 except that the lids, covers or cover-plates or parts of them need not come off when applying a force not exceeding 120 N in directions perpendicular to the mounting/supporting surface.		NA
12.3	Drain holes		NA
	Surface and semi-flush mounting enclosures with a degree of protection IPX1 to IPX6 shall be designed to allow the opening of a drain hole of at least 5 mm in diameter or 20 mm2 in area with a minimum width or length of 3 mm.		NA
	Drain holes shall be so located and available in such a number that one of the holes can always become effective in any intended mounting position of the enclosure.		NA
*12.4	Mounting of enclosures		P
	Enclosures shall have provisions for their suitable attachment according to the method of installation (see 7.2)		P
	Enclosures of insulating material shall be constructed in such a way that any conductive parts of fixing means inside the box or enclosure intended to be used for mounting the enclosure are surrounded by insulation which projects above the top of the fixing means by an amount of not less than 10 % of the maximum width of the cavity for the fixing means.		NA
	In case there is a cavity, the head of the screw can be protected by an additional cap of insulating material. In this case the manufacturers instruction shall give information concerning the cap to be used. In case there is no cavity the head of the screw shall be protected with a cap of insulating material and in this case, the cap shall be delivered with the box. The cap shall stay in position during normal use.		NA

Clause	Requirement - Test	Result - Remark	Verdict
12.5	Boxes and enclosures with inlets for flexible cables		NA
	Inlets (outlets) provided in boxes and enclosures classified according to 7.3.2 shall be so designed and constructed that the flexible cables can be easily introduced, and will not damage the flexible cable where it enters the box or enclosure impairing its further use.		NA
*12.6	Boxes and enclosures with inlets for applications other than flexible cables		P
	Inlet openings classified according to 7.3 other than 7.3.2, if any, shall allow the introduction of - a conduit or suitable fitting connecting it to the box or enclosure, and/or - the protective covering of the cable so as to provide mechanical protection of the conductors where they enter the box or enclosure.		P
	An inlet opening for conduit entries, or at least two of them if there is more than one, shall be capable of accepting either conduits of sizes, or a combination of sizes, in accordance with the requirements of IEC 60423		P
	Inlet openings of adequate size may also be obtained by the use of knock-outs or suitable insertion pieces or by means of an appropriate cutting tool.		NA
12.7	Boxes and enclosures with a cable anchorage(s)		NA
	Clamping means of boxes and enclosures classified according to 7.4.2 shall be such that the connection of the conductors of the flexible cable are relieved from strain when this flexible cable is accessible and likely to be stressed after installation. It shall be clear how the relief from strain and the prevention of twisting are intended to be effected.		NA
	Cable anchorages shall be - suitable for the different types of flexible cable for which the box is intended to be used; - constructed in such a way that at least one part of it is integra l with, or permanently fixed to, one of the component parts of the box; - of insulating material or be provided with an insulating lining fixed to the metal parts.		NA
12.8	Boxes and enclosures with cable retention means		NA
	Cable retention means of boxes and enclosures classified according to 7.4.1 shall retain the cable in place.		NA
	For boxes and enclosures classified according to 7.5.2 or 7.5.3, the test shall be carried out at (-15 ± 2) ^{0}C and (-25 ± 2) ^{0}C respectively.		NA
*12.9	Knock-outs intended to be removed by mechanical impact		P

Clause	Requirement - Test	Result - Remark	Verdict
12.9.1	General		P
	It shall be possible to remove knock-outs without damaging the box.		P
	Knock-outs intended for use with cables shall be free from chips or burrs.		P
	In knock-outs intended for use with conduits and/or a grommet or a membrane, chips and burrs are disregarded.		NA
	In order to close an open knock-out in a box or an enclosure classified according to 7.1 .2 a blanking-plug can be used.		NA
	This blanking-plug used without a locknut - shall not become dislodged or damaged, and - its effectiveness shall not be impaired, and - it shall fulfil all requirements for knock-outs. This requirement does not apply to a blanking-plug which is assembled by threading into athreaded inlet.		NA
12.9.2	Knock-out retention		NA
	For boxes and enclosures having knock-outs that		NA
	— Do not provide access to live parts and are accessible after installation, a force of (30 ± 1) N shall be applied to a knock-out for (15 ± 1) s,		NA
	— Provide direct access to live parts after installation, a force of (40 ± 1) N shall be applied to a knock-out for (60 ± 1)s, by means of a 6 mm diameter mandrel with a flat end		NA
	The force is to be applied without a blow in a direction perpendicular to the plane of the knock-out and at a point most likely to cause movement. When the box is provided with a multi-stage knock-out, the force shall be applied to the smallest knock-out.		NA
	The knock-out shall remain in place and the degree of protection of the box or enclosure shall be unchanged when measured 1 h after the force has been removed.		NA
12.9.3	Knock-out removal		P
	The knock-outs shall be removed by means of a tool, as stated by the manufacturer. The side edge of a screwdriver may be run along the edge of the knock-out opening once to remove any fragile tabs remaining along the edge.		P

Clause	Requirement - Test	Result - Remark	Verdict
	For boxes or enclosures according to 7.1.1 or 7.1.3 the test is repeated with one previously untested box or enclosure which has been conditioned for 5 h ±10 min in air maintained at the minimum temperature during installation as specified according to 7.5. Immediately following this conditioning, the knock-out is to be removed as above.	Test conducted at -5°C.	P
	For a box or enclosure employing multi-stage knock-outs, there shall be no displacement of a larger stage when a smaller stage is removed.		NA
	After the test, there shall be no sharp edges, except for knock-outs for conduits and/or for use with a grommet or a membrane, and the box and enclosure shall not be damaged.		P
12.9.4	Flat surfaces surrounding knock-outs		NA
	Knock-outs intended for the use of grommets, glands or fittings shall be located in flat surfaces to permit grommets, glands or fittings to be placed fully against these surfaces when installed as intended.		NA
	Projections or indentations in the flat surface area shall be prohibited, however holes shall be allowed. The flat surface areas of adjacent knock-outs that partially or wholly overlap meet the intent of this requirement.		NA
12.10	Screw fixings		NA
	Fixing means for covers, accessories, terminals, connecting devices, strain reliefs, etc. effected by screws shall be so designed and constructed that these means withstand the mechanical stresses occurring during installation and normal use.		NA
	Screws or other fixing means made from insulating material similar to screws without standardised thread which have to be tightened by any tool for fixing covers shall be tested according to the manufacturer's instructions		NA
	Thread-forming and thread-cutting screws intended only for mechanical assembly may be used provided they are supplied together with one of the pieces with which they are intended to be assembled. For thread-forming and thread-cutting screws, the screw assembly operation shall be done before carrying out the tests.		NA
*12.11	Fixing of boxes and enclosures classified according to 7.2.1		P
	Flush type boxes and enclosures other than for hollow walls, and as otherwise indicated below, shall be provided with fixing means for their suitable attachment to the wall, ceiling or floor. Screws intended to fix the box or enclosure to the building structure need not be supplied with the box or enclosure but can be provided by the installer according to the manufacturer's instructions.		P

Clause	Requirement - Test	Result - Remark	Verdict
	Separately supplied fixing means for a box or enclosure shall comply with the requirements for the fixing means of the box or enclosure with which they are intended to be used and shall include a means for fixing to the box or enclosure		NA
	Screws, additional mechanical supports or design features, which prevent the displacement of the box or the enclosure, are considered to be adequate fixing means		-
12.12	Fixing of flush type and semi-flush type boxes and enclosures classified according to 7.2.2.1		NA
	Boxes and enclosures for hollow walls or the like classified according to 7.2.2.1 shall have suitable means for fix ing the box or the enclosure to hollow walls, hollow ceilings, hollow floors or furniture.		NA
	The fixing means shall not rely on the cable management system.		NA
12.14	Cable gland entry		NA
	Cable glands shall not damage the box or enclosure when used as intended		NA
12.15	Boxes and enclosures with inlets (outlets) or spouts (hubs) for conduits		NA
12.15.1	Boxes and enclosures classified according to 7.3.4 and conical spouts as in 7.3.6 shall withstand the tests of 12. 15. 2, 12. 15.3 and 12. 15.4.		NA
	Boxes and enclosures classified according to 7.4.3 shall withstand the tests of subclauses 12.15.2 and 12.15.3.		NA
12.15.2	Enclosures with the inlet spout for conduits, if any, shall be tested so that a minimum size piece of conduit is pressed for 1 min ± 5 s with a force of (100 ± 2) N. The inlet spout shall prevent further entry of the conduit into the box.		NA
12.15.3	A pull-out test shall be carried out after the test according to 12. 15. 2, as follows. The conduit with the minimum size corresponding to the insert opening shall be loaded axially for 1 min with a tensile force of (20 ± 2) N. The conduit shall not come loose from the inlet spout of the enclosure.		NA

Clause	Requirement - Test	Result - Remark	Verdict
12.15.4	The resistance to bending strain of an inlet spout shall be tested as follows. A piece of a conduit shall be inserted into the inlet spout with a compressible force of (100 ± 2) N and loaded with a bending moment of 3 Nm. The strain shall slowly rise from zero to full value and the test shall be done in six different directions through the centre line of the inlet spout with an interval of $(60 \pm 2)^0$. At each angle position the inlet spout shall be loaded for 1 min. The inlet spout shall not come loose or be damaged and the conduit shall stay within the inlet spout.		NA
***13**	**RESISTANCE TO AGEING, PROTECTION AGAINST INGRESS OF SOLID OBJECTS AND AGAINST HARMFUL INGRESS OF WATER**		P
13.1	Resistance to ageing		P
13.1.1	Insulating and composite boxes and enclosures, glands, seals, grommets and replaceable membranes shall be resistant to ageing	After the test there was no harmful deformation or similar damage	P
13.1.2	Grommets, blanking plug and entry membranes in inlet openings and protecting membranes are reliably fixed and are not displaced by the mechanical and thermal stresses occurring in normal use		NA
13.1.3	Grommets, blanking plug and entry membranes in inlet openings of boxes and enclosures classified according to 7.5.2 and 7.5.3 shall be so designed and made of such material that the introduction of the cables and conduits is permitted when ambient temperature is low.		NA
13.2	Protection against the ingress of solid objects	IP2X with the intended accessory being fitted.	P
13.3	Protection against harmful ingress of water		NA
13.3.1	Enclosures with a degree of protection higher than IPX0 shall provide a degree of protection against harmful ingress of water in accordance with the declared IP Code.		NA
	Compliance is checked by the appropriate tests of IEC 60529 under the following test conditions.		NA
	For surface enclosures and flush and semi-flush enclosures with dimensions S ≤ 0, 04 m^2 or perimeter ≤ 0,8 m, see 13.3.2 and 13.3.3.		NA
	For surface enclosures and flush and semi-flush enclosures with dimensions S ≥ 0,04 m^2 and perimeter ≥ 0,8 m, see 13.3.2 and 13.3.4.		NA
	The reference surface S to be chosen for verification is calculated as follows.		NA

Clause	Requirement - Test	Result - Remark	Verdict
	— For square and rectangular boxes and enclosures, the surface to take into account is the smallest interior width (/) multiplied by the depth (h) (see Figure 18 a)).		NA
	— For round boxes and enclosures, the surface to take into account is the interior depth (h) of the box or enclosure multiplied by the smallest diameter (d) divided by 4 (see Figure 18 b)).		NA
	Enclosures with screwed glands or grommets are fitted with cables having the smallest and the largest cross-sectional area and/or conduit having the smallest and the largest diameter/dimensions, if any, as declared by the manufacturer.		NA
	Fixing screws of the cover or cover-plate of the box are tightened with a torque equal to twothirds of the values from Table 4 used for the test of 12. 10.		NA
13.3.2	Surface-mounting enclosures are mounted as for normal use according to the manufacturer's instructions with any open drain holes in the lowest position unless otherwise specified.		NA
	Flush type and semi-flush type enclosures are fixed in a test wall in accordance with the manufacturer's instructions.		NA
	In this case, the manufacturer's instructions shall specify a type of wall, as well as the mounting. These shall be described in sufficient detail to ensure reproducible tests.		NA
	Where the manufacturer's instructions do not specify a type of wall, the test wall according to Figure 19 is used.		NA
	Enclosures are mounted as in normal use and fitted with cables having conductors of the largest and smallest cross-sectional area as declared by the manufacturer.		NA-
	During the tests of enclosures of degree of protection higher than IPX4, drain holes, if any, shall not be opened.		NA
	Care shall be taken not to disturb, for example, to knock or shake, the enclosure, in such a manner that the test result will be affected.		NA
13.3.3	Immediately after the test, there shall be no more than 0,2 ml x S (cm^2) water in the enclosure.		NA
EN 60670-22	The specimens, except connecting boxes classified according to 7.101.4, shall withstand an electric strength test specified in 14.2 which shall be started within 5 min of the completion of the test according to this subclause.		NA

Clause	Requirement - Test	Result - Remark	Verdict
13.3.4	Ingress of water is verified by the use of dry absorbent paper positioned to cover the base area of the protected volume.		NA
	Unless it is decided otherwise by the manufacturer the protected volume shall correspond to the total internal space of the box reduced by 5 % on each face of the box, i.e. 10 % on each dimension of the enclosure (See Figure 20) .		NA
	For doors or covers a strip of paper, bent to form a 90° angle profile, is attached to the cover or lid in the lowest position in order to protrude inside the box until it reaches the internal protected volume of the box		NA
14	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		P
*14.1	The insulation resistance and the electric strength of enclosures classified according to 7.1.1, 7.1.3 and 7.1.4 shall be adequate.		P
	Compliance is checked by the tests of 14.2 and 14.3, these tests being made immediately after the following humidity treatment. The specimens are placed in a humidity cabinet containing air with a relative humidity maintained between 91 % and 95%.The temperature of the air where the specimens are placed is maintained within ± 1 •c of anyconvenient value t between +20 •c and +30 °C.Before being placed in the humidity cabinet, the specimens are brought to a temperature between t and (t + 4) °C.The specimens are kept in the cabinet for		P
	- 2 days (48+2) h for enclosures classified IPX0;	IP20	P
	- 7 days (168+2) h for other enclosures.		NA
	After this treatment, the specimen shall show no damage impairing its further use and shall pass the following tests.		P
14.2	When a solid material is intended to provide electrical insulation between live parts and the body, the insulation resistance between the body and a metal foil in contact with the internal surface of the box and enclosure, is measured with a d.c. voltage of approximately 500 V, the measurement being made 1 min after application of the voltage.	See table 14.2	P
14.2.101 EN 60670-22	For boxes with integrated or incorporated terminals or connecting devices, the measurements are made consecutively as indicated below.		NA

Clause	Requirement - Test	Result - Remark	Verdict
	Each clamping unit of a connecting device shall be connected alternatively with conductors of the smallest and the largest cross-sectional area. The insulation resistance is then measured with a d.c. voltage of approximately 500 V applied, the measurement being made 1 min after application of the voltage.		NA
	a) between all clamping units connected together and the body for connecting devices without fixing means or between all clamping units connected together and the mounting base for connecting devices with fixing means;		NA
	b) between each clamping unit and all others connected to the body for connecting devices without fixing means or between each clamping unit and all others connected to the mounting base for connecting devices with fixing means. The metal foil is applied in such a way that the sealing compound, if any, is effectively tested.		NA
14.3	The electric strength is tested by applying a voltage of a substantially sinusoidal waveform, having a nominal frequency of 50 Hz or 60 Hz and a value as specified in Table 6, for 1 min between the parts listed in 14.2.	See table 14.3	P
15	**MECHANICAL STRENGTH**		P
15.1	**General**		P
	Boxes and enclosures shall have adequate strength to withstand the mechanical stresses occurring during installation and normal use		P
15.2	Impact test at low temperature		NA
15.3	Compression test		NA
*15.4	Impact test for boxes and enclosures		P
15.5	Compression test for enclosures made of natural or synthetic rubber or a mixture of both		NA
16	**RESISTANCE TO HEAT**		P
16.1	Parts of insulating material necessary to retain current-carrying parts		NA

Clause	Requirement - Test	Result - Remark	Verdict
	Parts of insulating material necessary to retain current-carrying parts and/or parts of the earthing circuit in position are subjected to a ball-pressure test by means of the apparatus according to IEC 60695-10-2 except that insulating parts necessary to retain earthing terminals in position shall be tested as specified in 16.2.		NA
16.2	Parts of insulating material not necessary to retain current-carrying parts		P
	Parts of insulating material not necessary to retain current-carrying parts and/or parts of the earthing circuit in position, even though in contact with them, and parts necessary to retain earthing terminals in position: ball-pressure test according to 16.1 but at (70 ± 2) °C	See table 16.2	P
	Parts of insulating material of flush-mounted enclosures classified according to 7.6.2: ball-pressure test according to 16.1 but at (90 ± 2) °C		NA
16.101 EN 60670-22	Connecting devices having parts of insulating material shall be sufficiently resistant to heat.		NA
16.101.1 EN 60670-22	The specimens or portions of the specimens are kept for 1 h in a heating cabinet at a temperature of (85 ± 2)°C.		NA
16.101.2 EN 60670-22	Parts of the insulating material not necessary to retain current carrying parts and parts of the earthing circuit in position, even though they are in contact with them, are subjected to a ball-pressure test as described in clause 16.1 of Part 1 but at a temperature of (70 ± 2) °C or (40 ± 2) °C, plus the highest temperature rise determined for the relevant part during the test of 16.102.4, whichever is the higher.		NA
16.101.3 EN 60670-22	Parts of the insulating material necessary to retain current carrying parts and parts of the earthing circuit in position are subjected to a ball pressure test in a heating cabinet at a temperature of (125 ± 2) °C.		NA
16.102 EN 60670-22	Connecting devices integrated or incorporated in connecting boxes shall be so constructed that the temperature rise in normal use does not exceed the value specified in 16.102.4.		NA
16.102.1 EN 60670-22	Connecting devices with a single terminal (see Figure 101) having one or more clamping units shall be connected to conductors in the intended manner and the most unfavourable conditions.		NA

Clause	Requirement - Test	Result - Remark	Verdict
16.102.2 EN 60670-22	For multiway terminal devices a maximum of 3 adjacent terminals are connected in series. If single pole connecting devices are designed to be mounted side by side, 3 devices are placed in the intended manner and connected together (see Figure 102).		NA
16.102.3 EN 60670-22	The connections are made with new rigid or flexible conductors of the largest cross-sectional area appropriate to the clamping units, the clamping units being connected according to the specifications of the relevant part of IEC 60998. Conductor length shall be 1 m for a cross-sectional area up to and including 10 mm2 and 2 m for a cross-sectional area above 10 mm2. Conductor length may be reduced in agreement with the manufacturer.		NA
16.102.4 EN 60670-22	Temperature rise measurements are made when the device under test has reached thermal equilibrium. It is generally accepted that the temperature is stable when the temperature of the part under test does not increase by more than 1 K/h. During the test the devices are loaded with an alternating current having the value shown in Table 101 for the corresponding rated connecting capacity.		NA
17	**CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND**		NA
EN 60670-22	Creepage distances, clearances and distances through sealing compound shall not be less than the value shown in Table 102.	Box classified according to 7.101.4	NA
18	**RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT AND FIRE**		P
	Parts of insulating material which might be exposed to thermal stresses due to electric effects, the deterioration of which might impair safety, shall not be unduly affected by abnormal heat and by fire.	See table 18	P
19	**RESISTANCE TO TRACKING**		NA
	For boxes and enclosures with protection degree higher than IPX0, all parts of the insulating material retaining live parts in position shall be made of a material resistant to tracking.		NA
20	**RESISTANCE TO CORROSION**		NA
	Ferrous parts of boxes and enclosures shall be adequately protected against rusting.		NA
21	**ELECTROMAGNETIC COMPABILITY (EMC)**		NA

Clause	Requirement - Test	Result - Remark	Verdict

12.9	**TABLE: Mechanical strength of screws**					NA
Threaded part identification (e.g. fixing means for cover)	Diameter of screw thread (mm)	Column number - Table 4 (I, II, III or IV)	Applied torque - Table 4 (Nm)	Times (5/10)	No damage	
Fixing means of cover	-	-	-	-	-	
Supplementary information:-						

14.2	**TABLE: Insulation resistance**	P
Test voltage applied between: in-/outside enclosure:	measured	required
500V / Cover	> 100 MΩ	>5 MΩ
Supplementary information: Applied for 1 min		

14.3	**TABLE: Electric strength**	P
Rated insulation voltage (V) .....:	450 V	—
Test voltage applied between: in-/outside enclosure	Test voltage (V)	Flashover/ breakdown (Yes/No)
Cover	2500	No
supplementary information: Applied for 1 min		

16.1-16.2	**TABLE: Ball pressure test of insulating materials**	P
Allowed impression diameter (mm) .....:	< 2 mm	—
Part under test	test temperature (°C)	impression diameter (mm)
Cover	70	1.19
supplementary information: -		

Clause	Requirement - Test	Result - Remark	Verdict

18	**TABLE: Glow-wire test**					P
Part under test		Material designation	Test temperature (°C)	Visible flame and sustained glowing (Y/N)	Flames and glowing extinction time	Ignition of the tissue paper (Y/N)
Box		insulating	650	N	-	N
Supplementary information: -						

19	**TABLE: Resistance to tracking**			NA
Part under test	Material designation	Test voltage (V)	Flashover/ breakdown (Yes/No)	
-	-	-	-	
Supplementary information: -				

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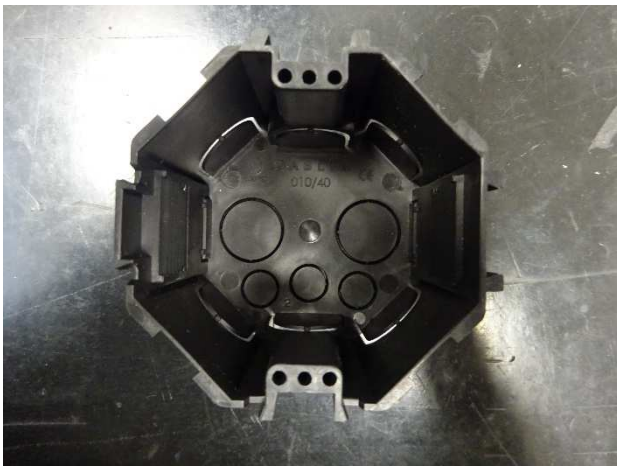	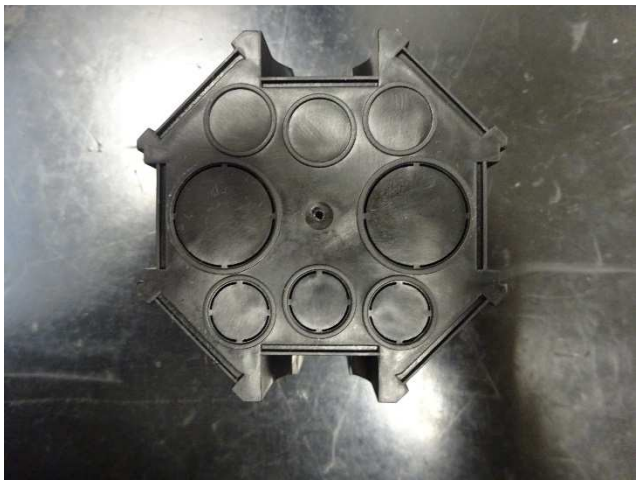
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	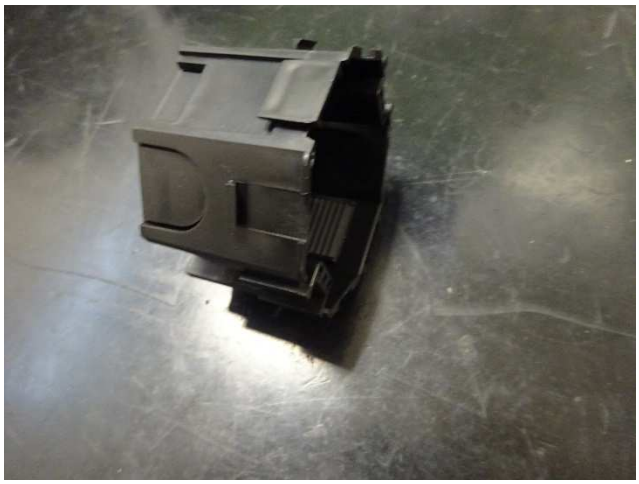
Image 3	Image 4

DABLER
Electrical Equipment

Οδηγίες για ΣΥΝΔΕΟΜΕΝΟ ΚΟΥΤΙ ΔΙΑΚΟΠΤΟΥ ΟΚΤΑΓΩΝΟ 010/40

Τεχνικά Χαρακτηριστικά

Βάθος : 50mm

Διάμετρος : 67mm

- Με 8 εισόδους για σωλήνες & 5 για καλώδια

- Ελάχιστη θερμοκρασία εφαρμογής-εγκατάστασης: -5 °C
- Μέγιστη θερμοκρασία εφαρμογής-εγκατάστασης: +60 °C
- Αποτελείται από μονωτικό αυτοσβενόμενο υλικό
- Ονομαστική τάση μόνωσης: 450V
- Οπές για σωλήνες Φ20 και Φ25 καθώς και οπές για καλώδια

Εγκατάσταση

Τοποθετούμε το κουτί και με κατάλληλο εργαλείο πιέζουμε το κουτί ώστε να στερεωθεί μέσα στον τοίχο. Στη συνέχεια χρησιμοποιούμε κατάλληλες βίδες στις αντίστοιχες θέσεις για τη στερέωση.

Άνοιγμα οπών εισόδου-εξόδου στο κουτί

Με τη χρήση κατσαβιδιού χτυπάμε στα προκαθορισμένα σημεία ώστε να αφαιρεθεί το κάλυμμα και να ανοίξει η οπή, ανάλογα με τη διάμετρο του εξαρτήματος που πρόκειται να συνδεθεί στο κουτί.