Test Report issued under the responsibility of:

TEST REPORT
IEC 60670-24
Boxes and enclosures for electrical accessories for household and similar fixed electrical installations
Part 24: Particular requirements for enclosures for housing protective devices and other power dissipating electrical equipment

Report Number..... :	MI21-0066721-01
Date of issue ..... :	2021-08-05
Total number of pages	40
Name of Testing Laboratory preparing the Report ..... :	IMQ S.p.A – Milano Via Quintiliano, 43 – 20138 Milano – Italy
Applicant's name ..... :	GEROS SRL
Address..... :	Via Sacro Cuore, 54 – 36027 San Pietro di Rosà (VI) – Italy
Test specification:	
Standard ..... :	IEC 60670-24:2011 to be used in conjunction with IEC60670-1: 2002, AMD1:2011
Test procedure..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60670_24D
Test Report Form(s) Originator .... :	IMQ S.p.A.
Master TRF ..... :	Dated 2017-08-29

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

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General disclaimer:

The test results presented in this report relate only to the object tested.
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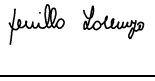
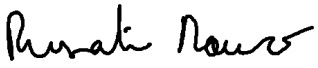
Test item description .....:	Enclosures for fixed installation for devices and dissipating power
Trade Mark .....:	GEROS
Manufacturer.....:	GEROS SRL
Model/Type reference .....:	GR15 Series (see General product information)
Ratings .....:	IP65 – 400V

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	**IMQ S.p.A. Milano**	
Testing location/ address ..... :		20138 Milano – Via Quintiliano,43	
Tested by (name, function, signature) ..... :		Lorenzo Ferrillo [Laboratory Technician]	
Tested by (name, function, signature) ..... :		Mauro Rusnati [Laboratory Technician]	
Approved by (name, function, signature) .. :		Alessandro Primicerio [Laboratory Manager]	
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :		N/A	
Tested by (name, function, signature) ..... :		N/A	
Approved by (name, function, signature) .. :		N/A	
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :		N/A	
Tested by (name + signature) ..... :		N/A	
Approved by (name, function, signature) .. :		N/A	
☐	**Testing procedure: CTF Stage 3:**	N/A	
☐	**Testing procedure: CTF Stage 4:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name, function, signature) ..... :		N/A	
Witnessed by (name, function, signature). :		N/A	
Approved by (name, function, signature) .. :		N/A	
Supervised by (name, function, signature) :		N/A	

List of Attachments:

- Test report base on IEC 60670-24 : 2011:……23 pages
- Attachment “European Differences and National Differences”:……5 pages
- Annex 1: Instructions sheet:……1 page
- Annex 2: Photographic Documentation:……11 pages

Tests performed (name of test and test clause):	**Testing location:**
Complete tests In this test report the requirements concerning the following (clauses and sub-clauses) have been cancelled as not applicable: 11 – 12.4 – 12.5 – 12.6 – 12.7 – 12.8 – 12.10 – 12.11 – 12.12 – 12.13 – 12.14 – 12.15 – 15.1 – 17 and 19	IMQ S.p.A. 20138 Milano – Via Quintiliano,43

Summary of compliance with National Differences (List of countries addressed):

See European Group Differences and National Differences

☒ **The products fulfill the requirements of EN 60670-24:2013 used in conjunction with EN 60670-1:2005**

Copy of marking plate: (as example)

Test item particulars		
7.1	Nature of material	☒ 7.1.1 Insulating ☐ 7.1.2 Metallic ☐ 7.1.3 Composite
7.2	Method of installation	☐ 7.2.1 Flush, semi-flush or embedded in: ☐ 7.2.1.1 No combustible walls, ceilings or floors ☐ 7.2.1.2 Combustible walls, ceilings or floors ☐ 7.2.1.3 Hollow walls, hollow ceilings, hollow floors or furniture ☒ 7.2.2 Surface mounting on: ☒ 7.2.2.1 No combustible walls, ceilings, floors or furniture ☐ 7.2.2.2 Combustible walls, ceilings, floors or furniture ☒ 7.2.3 Placement: ☐ 7.2.3.1 Suitable for installation into concrete during the casting process (see 7.6) ☒ 7.2.3.2 Suitable for all types of installation except into concrete
7.3	Type(s) of inlets (outlets)	☐ 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 are made during installation
7.4	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	Minimum and maximum temperatures during installation	☒ 7.5.1 -5 °C to +60 °C ☐ 7.5.2 -15 °C to +60 °C ☐ 7.5.3 -25 °C to +60 °C
7.6	Maximum temperature during the casting process	☐ 7.6.1 +60 °C ☐ 7.6.2 +90 °C
7.7	Boxes and enclosures for hollow walls and the like according to 7.2.1.3	☐ 7.7.1 Class Ha ☐ 7.7.3 degree of protection of the part mounted in the hollow wall: ☐ 7.7.3.2 >IP2X
7.8	Provision for fixing accessories to boxes	☐ 7.8.1 Boxes supplied with screws ☐ 7.8.2 Boxes intended to receive screws ☐ 7.8.3 Boxes intended to receive claws ☒ 7.8.4 Boxes intended to receive other means
7.101	Empty enclosure	☒ 7.101.1 GP enclosure ☐ 7.101.2 PD enclosure
7.102	Basic enclosure	☒ 7.102.1 GP enclosure ☐ 7.102.2 PD enclosure

Possible test case verdicts:

- test case does not apply to the test object.....**:** N/A

- test object does meet the requirement.....**:** P (Pass)

- test object does not meet the requirement.....**:** F (Fail)

Testing

Date of receipt of test item.....**:** 2021-06-10 BEM (ref. IMQ) no.: 104566
Item(s) sampled and sent by the applicant

Date (s) of performance of tests .....**:** From 2021-07-06 to 2021-07-28

General remarks:

The test results presented in this report relate only to the object tested.

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"(see Enclosure #)" refers to additional information appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

The uncertainties for the test and measurements are those listed in SCAME Operational Instruction EQA0000.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided .....**:** ☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory(ies):

GEROS SRL

Via Sacro Cuore, 54
36027 San Pietro di Rosà (VI) – Italy

General product information:

Description of the enclosures GR15 series:

Type /catalogue reference	Dimensions (W × H × D)	Description	Maximum capability to dissipate power (P_{de})
GR15070	110 × 150 × 98 mm 4 modules	Grey (RAL 7035) enclosure, smoky door	10 W
GR15072	170 × 170 × 98 mm 8 modules	Grey (RAL 7035) enclosure, smoky door	13 W
GR15074	240 × 190 × 98 mm 12 modules	Grey (RAL 7035) enclosure, smoky door	22 W
GR15076	240 × 310 × 100 mm 24 (12 + 12) modules	Grey (RAL 7035) enclosure, smoky door	24 W
GR15060	110 × 150 × 98 mm (4 modules)	White (RAL 9016) enclosure, smoky door	10 W
GR15062	170 × 170 × 98 mm (8 modules)	White (RAL 9016) enclosure, smoky door	13 W
GR15064	240 × 190 × 98 mm (12 modules)	White (RAL 9016) enclosure, smoky door	22 W
GR15066	240 × 310 × 100 mm 24 (12 + 12) modules	White (RAL 9016) enclosure, smoky door	24 W

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
8	**MARKING**		
8.1	Enclosures shall be marked with:		
	a) name, trade mark or identification mark of the manufacturer or the responsible vendor ..... :	GEROS	P
	b) IP > 3X and/or IP > X0..... :	IP65	P
	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.		P
	The visibility of the marking is also allowed after opening the door or the lid if a minimum degree of IP20 is maintained after opening.		N/A
	c) symbol for total insulation, if applicable ..... :		N/A
	d) type designation, reference number or catalogue number ..... :	GR15060 (as example)	P
	e) letter N for terminals intended exclusively for the neutral conductor ..... :		N/A
	f) symbol for earthing terminals for the connection of the protective conductor ..... :		N/A
	Markings of neutral terminals and earthing terminals not placed on screws, or any other easily removable parts		N/A
	g) rated voltage ..... :	Un 400 V	P
	h) rated current (enclosures 7.101.2 and 7.102.2) ... :		N/A
	i) standard reference number ..... :	IEC 60670-24	P
	j) maximum temperature during the building process if 90 °C ..... :		N/A
	k) information concerning the openings that can bemade during installation for enclosures without inlets (7.3.7) ..... :	See instruction sheet	P
	l) maximum capability to dissipate power (*P*de) for GP enclosures (7.101.1 and 7.102.1) ..... :	See “General product information”	P
	m) usability for hollow wall installation (7.7) ..... :		N/A
	n) corresponding dimension sheet ..... :		N/A
	p) for enclosures classified according to:		
	- "GP" (7.101.1 and 7.102.1) ..... :	See instruction sheet	P
	- "PD" (7.101.2 and 7.102.2) ..... :		N/A
8.2	Marking is durable and easily legible		P
	Rubbing test 15 s with water and 15 s with petroleum spirit		N/A

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Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	After the test: marking still legible		N/A
8.101	Required data for instruction sheet and/or documentation		
	provide appropriate instructions regarding the means to be used to obtain the intended degree of protection		N/A
	give information concerning the verification of the electrical continuity of the protective circuit		N/A
	give to the installer the necessary instructions:		—
	- manufacturer includes in the documentation accompanying the enclosure the necessary instructions for installation and how to integrate accessories (7.101.1 and 7.102.1)		P
	- manufacturer includes in the documentation accompanying the enclosure the necessary instructions for installation according to the appropriate mounting environment (7.101.2 and 7.102.2)		N/A
9	**DIMENSIONS**		
	Boxes and enclosures comply with the appropriate standard sheets, if any ..... :		N/A
10	**PROTECTION AGAINST ELECTRIC SHOCK**		
	Boxes and enclosures assembled, equipped and installed as for normal use in accordance with the manufacturer's instructions: live parts are not accessible.		P
	Enclosures, tested with test probe 11 according to IEC 61032 applied for 1 min with a force of 20 N		P
	In addition, enclosures according to 7.1.1 and 7.1.3, tested with test probe 11 according to IEC 61032 applied for 1 min with a force of 75 N to all places except membranes or like, at (35 ± 2) °C.		P
10.101	Enclosures are tested completed with the necessary means and the window opening(s), if any, completely filled up with blank inserts delivered by the manufacturer and/or samples of products as declared by the manufacturer		P
	Enclosures have ≥ IPXXC, when mounted and installed as for normal use		P
	Enclosures with total insulation when mounted and installed as for normal used:		
	a) completely enclose the installed equipment in insulating material, and		P
	b) at no point are pierced by conducting parts		P

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Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	c) do not have conductive parts (plates, cover-plates or frames) connected to the protective circuit		P
	Enclosures, tested with test probe C according to IEC 61032 applied for 1 min with a force of 3 N		P
	Additional test at (35 ± 2) °C with test probe C according to IEC 61032 on enclosures according to 7.1.1 and 7.1.3 with parts of thermoplastic or elastomeric material applied to:		
	- all places except membranes or the like, where yielding of insulating material could impair the safety, with a force of 3 N		P
	- knock-outs with a force of 3 N		N/A

11	**PROVISION FOR EARTHING**		N/A
11.1	Boxes and enclosures with exposed conductive parts:		
	- provided with an earthing means of low resistance		N/A
	- have provision for the fitting of such an earthing means		N/A
	Earthing means or provision for fitting, located so that:		
	- means is readily accessible, and		N/A
	- removal of an accessory, not disturb the continuity of earthing circuit, and		N/A
	- means is not part of removable cover……..:		N/A
	Exposed conductive parts of covers or cover-plates are connected through a low resistance connection to the earthing means		N/A
	Resistance ≤ 0,05 Ω (Ω)..... :		N/A
11.2	Boxes and enclosures of insulating material classified according to 7.7.2 (Class Hb)		N/A
11.3	Boxes and enclosures with removable sides according to 7.1.2		
	Constructed so that the electrical bond between separable parts includes at least one threaded screw connection		N/A
11.4	Earthing terminal threads		
	Threads of earthing terminal are not stripped		N/A
	During the test: no damage such as impairing the further	See appended table 11.4	N/A
11.101	Except for enclosures intended to be used for total insulation, all exposed conductive parts of the enclosure are connected separately or in groups to the protective circuit terminals.		N/A
	Resistance ≤ 0,05 Ω (Ω)..... :		N/A

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Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
12	**CONSTRUCTION**		
	Boxes and enclosures, constructed without sharp edges		P
	The inner and outer surfaces of a box or cover have the following characterictics:		
	- not subject to peeling, scaling or flaking, and		P
	- smooth and free from blisters, crack and other defects		P
12.1	Lids, covers or cover-plates or part of them		
	Lids, covers or cover-plates or parts of them, which are intended to ensure protection against electric shock:		
	- are held in place effectively		P
	- are removable only by the use of a tool and/or a key		P
12.2	Drain holes		
	Surface and semi-flush mounting enclosures having IPX1 to IPX6 allow the opening of a drain hole ≥ 5 mm in diameter (mm Ø) or 20 mm^2 in area (mm^2) with a width or length ≥ 3mm (mm)..... :		P
	Drain holes: effective		P
12.3	Mounting of enclosures		
	Enclosures have provisions for their suitable attachment according to the method of installation (7.2)		P
	Conductive parts of fixing means inside the box or enclosure are surrounded by insulation which projects above the top of the fixing means by an amount of ≥ 10 % of the maximum width of the cavity for the fixing means (mm)..... :	7 mm	P
12.4	Boxes and enclosures with inlets for flexible cables		
	In inlets (outlets) provided in boxes and enclosures classified according to 7.3.2 the flexible cables can be easily introduced, and		N/A
	- no damage the flexible cable where it enter, or		N/A
	- enclosure impairing its further use		N/A
12.5	Boxes and enclosures with inlets for applications other than flexible cables		
	Inlet openings classified according to 7.3 other than 7.3.2, if any, allow the introduction of:		N/A
	- a conduit or a suitable fitting, and/or		N/A
	- the protective covering of the cable		N/A
	Inlet opening for conduit entries:		

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Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	- capable of accepting either conduits of sizes, or a combination of sizes, according to IEC 60423 and/or IEC 60981		N/A
	- same requirement in at least two inlet openings if there are more than one		N/A
12.6	Boxes and enclosures with a cable anchorage(s)		
	In boxes and enclosures classified according to 7.4.2 the connection of the conductors of the flexible cable are relieved from strain		N/A
	Clear how relief from strain and prevention of twisting is intended to be effected		N/A
	Cable anchorages are:		
	- suitable for the different types of flexible cable		N/A
	- at least one part of it is integral with, or permanently fixed to, one of the component parts of the box		N/A
	- of insulating material or provided with an insulating lining fixed to the metal parts		N/A
	Test of effectiveness of the cable anchorage:		N/A
	- external dimensions of flexible cable (mm) ..... :		—
	- clamping screws tightened with a torque equal to 2/3 of that specified in Table 4 (Nm) ..... :		—
	- glands tightened with a torque equal to that specified in Table 5 ..... :		—
	It is not possible to push the flexible cable into the specimen by more than 1 mm with a force specified in Table 3 (N) ..... :		N/A
	Pull force as specified in Table 3 applied 50 times for 1 s (N) ..... :		—
	Torque as specified in Table 3 applied for (15 ± 1) s (Nm) ..... :		—
	After the test: displacement ≤ 2 mm (mm)..... :		N/A
	Cable anchorage: no damage		N/A
12.7	Boxes and enclosures with cable retention means		
	Cable retention means of boxes and enclosures classified according to 7.4.1 retain the cable in place		N/A
	Boxes and enclosures according to 7.5.2 or 7.5.3, tested at (-15 ± 2) °C and (-15 ± 2) °C respectively		N/A
	Test with cables as declared by the manufacturer, fitted according to the manufacturer's instructions and loaded with an axial force of (20 ± 1) N applied for 1 min:		N/A
	Type of cable/maximum nominal cross-sectional area (mm^2) ..... :		—

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Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	After the test: displacement ≤ 3 mm (mm)..... :		N/A
	Type of cable/minimum nominal cross-sectional area (mm^2) ..... :		—
	After the test: displacement ≤ 3 mm (mm)..... :		N/A
12.8	Knock-out inlets (outlets) intended to be removed by mechanical impact		
12.8.1	General		
	It is possible to remove knock-out by mechanical impact without damaging the box		N/A
	Chips or burrs are not accepted in knock-out for cables		N/A
	Chips and burrs are disregarded in knock-out for conduits and/or for use with a grommet or a membrane		N/A
	In order to close an open knock-out in a box or an enclosure according 7.1.2 a blanking-plug used without a locknut:		
	- not become dislodged, and		N/A
	- its effectiveness not be impaired, and		N/A
	- it fulfil all requirements for knock-outs		N/A
12.8.2	Knock-out retention		
	Boxes and enclosures having knock-outs, accessible after installation by means of a 6 mm diameter mandrel with a flat end that:		N/A
	- not provide access to live parts, a force of (30 ± 1) N applied for (15 ± 1)s		N/A
	- provide direct access to live parts, a force of (40 ± 1) N applied for (60 ± 1) s		N/A
	Box with multi-stage knock-outs, the force applied to the smallest		N/A
	During the test: knock-out remains in place		N/A
	Degree of protection unchanged 1 h after the test		N/A
12.8.3	Knock-out removal		
	Removal test of knock-outs with a tool as stated by the manufacturer, without conditioning:		
	During the test: no displacement of a larger stage of multi-stage knock-outs when a smaller stage is removed		N/A
	After the test: no sharp edges, box and enclosure is not damaged		N/A
	Removal test of knock-outs with a tool as stated by the manufacturer, immediately following a conditioning at the minimum temperature specified according to 7.5 for 5 h ± 10 min (boxes and enclosures according to 7.1.1 or 7.1.3)		
	Test temperature (°C) ..... :	-5°C	—

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Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	During the test: no displacement of a larger stage of multi-stage knock-outs when a smaller stage is removed		N/A
	After the test: no sharp edges, box and enclosure is not damaged		N/A
12.8.4	Flat surfaces surrounding knock-outs		
	Knock-outs located in flat surface		N/A
	Projections or identification are prohibited		N/A
12.9	Screw fixings		
	Fixing means effected by screws withstand mechanical stresses		P
	Screw or other fixing means made from insulating material without standardized thread are tested according to the manufacturer's instruction		N/A
	Thread-forming or thread-cutting screws used only if supplied together with one of the pieces in which they are intended to be inserted		P
	Verification of the mechanical strength of screws	See appended table 12.9	P
12.10	Fixing of boxes and enclosures classified according to 7.2.1.1 and 7.2.1.2		
	Fixing means provided for flush type boxes and enclosures other than for hollow walls ..... :		N/A
	Screws not supplied with box or enclosures can be provided according to the manufacturer's instruction		N/A
	Screws, additional mechanical supports or design features, are considered adequate fixing means		N/A
	the block is filled by the following material ..... :		N/A
	auxiliary device described in Figure 23 is mounted on the specimen and the screw are tightened with a torque equal to 2/3 of that specified in table 4 ..... :		N/A
	After the test, according to Figure Z3, displacement of the specimen from the mounting block ≤ 0,5 mm:		N/A
12.11	Boxes and enclosures classified according to 7.7.1 (Class Ha)		
	Enclosures for hollow walls classified according to 7.7.1 provide suitable means for fixing the enclosure to hollow walls.		N/A
12.12	Boxes and enclosures classified according to 7.7.2 (Class Hb)		N/A
12.13	Cable gland entry		
	Torque test: glands provided with a metal rod tightened and loosened 10 times with a torque specified in Table 5 for 1 min ± 5 s		N/A
	- diameter of test rod (mm) ..... :		—
	- type of material (metal / insulating)..... :		—
	- torque (Nm) ..... :		—

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Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	After the test: no damage		N/A
12.14	Boxes and enclosures with inlets (outlets) for conduits or spouts (hubs)		
	Boxes and enclosures classified according to 7.3.4 and conical spouts as in 7.3.6 withstand the tests of 12.14.1, 12.14.2 and 12.14.3		N/A
	Boxes and enclosures classified according to 7.4.3 withstand the tests of 12.14.1 and 12.14.2		N/A
12.14.1	Enclosures with inlet spout for conduits: a minimum size piece of conduit pressed for 1 min ± 5 s with a force of (100 ± 2) N		
	During the test: inlet spout prevents further entry of the conduit into the box		N/A
12.14.2	Pull-out test after the test according to 12.14.1: conduit with the minimum size corresponding to the insert opening loaded for 1 min with a tensile force of (20 ± 2) N		
	During the test: conduit not come loose from the inlet spout of the enclosure		N/A
12.14.3	Resistance to bending strain of an inlet spout: piece of conduit inserted into the inlet spout with a compressible force of (100 ± 2) N and loaded with a bending moment of 3 Nm for 1 min in six different directions with an interval of (60 ± 2) °		
	During the test: inlet spout not come loose or damaged and conduit stays within the inlet spout		N/A
12.15	Internal volume of boxes and enclosures		
	Declared internal volume of the box or enclosure and each partitioned section of a box or enclosure, raised cover and box extension is measured		N/A
	The volume of a side pocket provided to increase the volume of a box or enclosure is calculated using a depth-of-pocket not more than the smallest dimension of the opening into that side pocket		
	Difference in the volume of water in the measuring cylinder measured before and after the filling of the box, enclosure or raised cover indicates the volume of the box ..... :		N/A
12.101	Enclosures for hollow walls have provisions for retention means for cables or means to use a separate retention device or devices		N/A
12.102	Enclosures have enough space to allow mounting and connection of the accessories (fully equipped) as declared by the manufacturer, in safe way		P
13	**RESISTANCE TO AGEING, PROTECTION AGAINST INGRESS OF SOLID OBJECTS AND AGAINST HARMFUL INGRESS OF WATER**		
13.1	Resistance to ageing		
13.1.1	Specimens of insulating and composite boxes and enclosures, glands, grommets and replaceable membranes placed in a heating cabinet at (70 ± 2) °C for (168 + 4) h and than kept at room temperature for (96 + 4) h		

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Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	Glands tightened with a torque equal to 2/3 of the torque applied during the test of 12.13 (Nm) ..... :		—
	Greater torque value stated by the manufacturer, if any (Nm) ..... :		—
	After the test: 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		N/A
	Specimens that have been subjected to the treatment specified in 13.1.1 placed in a heating cabinet at (40 ± 2) °C for 2 h ± 15 min		
	Immediately after this period the tip of test probe 11 of IEC 61032 is applied for (5 ± 1) s with a force of (30 -2) N. During the tests: grommets, blanking-plug and/or membranes not deformed to such an extent that live parts of any included accessory become accessible		N/A
	Grommets, blanking-plug and/or membranes likely to be subjected to an axial pull: axial pull of (30 -2) N applied for (5 ± 1) s. During the tests: grommets, blanking-plug and/or membranes not deformed to such an extent that live parts of any included accessory become accessible		N/A
	Test repeated on same enclosures fitted with grommets, blanking-plug and/or membranes not subjected to any treatment		N/A
	After the test: no harmful deformation, cracks or similar damage		N/A
13.1.3	Grommets and entry membranes in inlet openings of boxes and enclosures classified according to 7.5.2 and 7.5.3: introduction of the cables and conduit permitted when the ambient temperature is low		N/A
	Test on enclosures fitted with grommets, blanking-plug and/or membranes not subjected to any ageing treatment kept for 2 h in a refrigerator		
	Test temperature (°C) ..... :		—
	Immediately after conditioning: it is possible to pierce any blind grommets, blanking-plug and entry membranes and to introduce cables and conduit of the maximum diameter intended		N/A
	After the test: no harmful deformation, cracks or similar damage		N/A
13.2	Protection against the ingress of solid foreign objects		

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	Enclosures provide a degree of protection of at least IP3X against the ingress of solid foreign objects in accordance with their declared IP code with the lid closed, if any.	IP6X	P
	In the case of an enclosure with a door or a lid which can be opened without the use of a tool during normal use, a minimum degree of IP20 is maintained after opening the door or the lid.		N/A
	Enclosures mounted as in normal use with screwed glands or grommets fitted with cables as declared by the manufacturer:		
	- type of cable, smallest cross-sectional area (mm²) ..... :	20 mm	—
	- type of cable, largest cross-sectional area (mm²) ..... :	40 mm	—
	Enclosures mounted as in normal use with screwed glands or grommets fitted with conduits as declared by the manufacturer:		
	- smallest diameter or dimensions (mm)..... :		—
	- largest diameter or dimensions (mm) ..... :		—
	Fixing screws of the cover or cover-plate tightened with a torque equal to 2/3 of the value of Table 4 used for the test of 12.9 (Nm) ..... :	1,2 Nm	—
	Greater torque value stated by the manufacturer, if the relevant information is provided (Nm) ..... :		—
	- IP5X: test performed as specified in IEC 60529 category 2 with the drain holes, if any, not opened		N/A
	- IP≤4X: test probe does not pass through any opening other than drain holes		N/A
	- IP≤4X: test probe applied on drain holes does not		N/A
	- IP5X: dust does not cover the whole inner surface		N/A
	- IP6X: there is no dust inside the box or enclosure		P
13.3	Protection against harmful ingress of water		
13.3.1	Enclosures with IP>X0 provide a degree of protection against harmful ingress of water in accordance with the declared IP code ..... :	IPX5	P
	Enclosure dimensions: reference surface S (m²) / perimeter (m) ..... :		—
	Appropriate test performed on surface, flush or semi-flush enclosures as specified in IEC 60529 under the following conditions:		
	- dimension S ≤ 0,04 m² or perimeter ≤ 0,8 m according to 13.3.2 and 13.3.3		N/A
	- dimension S > 0,04 m² and perimeter > 0,8 m according to 13.3.2 and 13.3.4		P

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	Enclosures with screwed glands or grommets fitted with cables as declared by the manufacturer:		
	- type of cable, smallest cross-sectional area (mm^2)..... :		—
	- type of cable, largest cross-sectional area (mm^2) :		—
	Enclosures with screwed glands or grommets fitted with conduits as declared by the manufacturer:		
	- smallest diameter or dimensions (mm)..... :		—
	- largest diameter or dimensions (mm) ..... :		—
	Fixing screws of the cover or cover-plate tightened with a torque equal to 2/3 of the value of Table 4 used for the test of 12.9 (Nm) ..... :		—
13.3.2	Surface-mounting enclosures mounted as for normal use		P
	Flush type and semi-flush type enclosures fixed in a test wall:		
	- according to the manufacturer's instructions		N/A
	- according to Figure 5		N/A
	Enclosures fitted with cables having conductors of the largest and smallest cross-sectional area as declared by the manufacturer..... :		—
	IPX3 and IPX4 enclosures: use of oscillating tube (Figure 4) or spray nozzle according to IEC 60529 (Figure 5) ..... :		—
13.3.3	Immediately after the test no more than 0,2 ml x S (cm^2) water in the enclosure (ml)..... :	< 0,2 ml x S (cm^2)	P
	Specimens withstand an electric strength test specified in 14.3 started within 5 min of the completion of IP test		P
13.3.4	Immediately after the test: indicator paper still dry		P

14	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		
14.1	Insulation resistance and electric strength of enclosures classified according to 7.1.1 and 7.1.3 is adequate		P
	Specimens placed in a humidity cabinet containing air with relative humidity between 91 % and 95 % and air temperature between 20 °C and 30 °C for:		
	- 2 days (48 h) for enclosures classified IPX0		N/A
	- 7 days (168 h) for enclosures classified IP>X0		P
	After this treatment: no damage		P
14.2	Insulation resistance measured 1 min after application of 500 V d.c.	See appended table 14.2	P
14.3	Electric strength: a.c. test voltage applied for 1 min	See appended table 14.3	P

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
15	**MECHANICAL STRENGTH**		
	Boxes and enclosures have adequate mechanical strength		P
15.1	Impact test at low temperature		
	Non-metallic boxes and enclosures for use in cast concrete according to 7.3.2.1: impact test with a vertical hammer test apparatus (Figure 8) placed together with the specimens for 2 h ± 15 min in a refrigerator at:		
	- (-5 ± 2) °C for boxes and enclosures classified according to 7.5.1		N/A
	- (-15 ± 2) °C for boxes and enclosures classified according to 7.5.2		N/A
	- (-25 ± 2) °C for boxes and enclosures classified according to 7.5.3		N/A
	Specimens subjected to 5 blows with a mass of 1 kg falling from a height of 100 mm: no damage		N/A
15.2	Compression test		
15.2.1	Boxes and enclosures then placed between two flat hardwood plates and loaded with a force of (500 ± 5) N for 1 min ± 5 s		N/A
	After the test: no deformation or damage		N/A
15.2.2	Boxes and enclosures according to 7.7.2: tests are under consideration		—
15.3	Impact test for boxes and enclosures		
	Specimens subjected to blows by means of an impact test apparatus as described in IEC 60068-2-75 (test EHA) with equivalent mass of 250 g	See appended table 15.3	P
	Boxes classified according to 7.5.2 and 7.5.3 performed at the following temperature:		
	- (-15 ± 2) °C for boxes classified according to 7.5.2		N/A
	- (-25 ± 2) °C for boxes classified according to 7.5.3		N/A
	After the test: no damage		N/A
15.101	PD enclosure provide a degree of protection against external mechanical impact in accordance with their declared IK code		N/A

16	**RESISTANCE TO HEAT**		
16.1	Part of insulating material necessary to retain current-carryng parts		
	Parts of insulating material necessary to retain current-carrying parts and/or parts of the earthing circuit in position: ball-pressure test according to IEC 60695-10-2 at (125 ± 2) °C for (60 +5) min	See appended table 16.1-16.2	N/A
16.2	Part of insulating material not necessary to retain current-carryng parts		

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	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 appended table 16.1-16.2	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	See appended table 16.1-16.2	N/A
16.3	Boxes and enclosures of insulating materials classified according to 7.7.2		N/A
17	**CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND**		N/A
18	**RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT AND TO FIRE**		
	Glow-wire test according to Clauses 4 to 10 if IEC 60695-2-11	See appended table 18	P
19	**RESISTANCE TO TRACKING**		N/A
20	**RESISTANCE TO CORROSION**		
	Test made after having removed all grease by immersion in a degreasing agent for (10 ± 1) min, (10 ± 1) min in a 10 % solution of ammonium chloride, (10 ± 1) min in a box containing air saturated with moisture and (10 ± 1) min at (100 ± 5) °C		
	No signs of rust		P
21	**ELECTROMAGNETIC COMPATIBILITY (EMC)**		
	No tests necessary		—
101	**VERIFICATION OF THE MAXIMUM CAPABILITY TO DISSIPATE POWER (P_{de})**		
	Enclosures according to 7.101.1 and 7.102.1 have the capability to dissipate the declared power (*P*de) according to 8.1 l).	See appended table 101	P
102	**VERIFICATION OF TEMPERATURE RISE**		
	Enclosures according to 7.101.2 and 7.102.2 have an acceptable temperature rise when equipped with the most onerous configuration of electrical equipment declared by the manufacturer	See appended table 102	N/A

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**

12.9	**TABLE: Threaded part torque test**				
Threaded part identification	**Diameter of thread (mm)**	**Table 4 Column number (I, II, III or IV)**	**Applied torque Table 4 (Nm)**	**Times (5/10)**	**No damage**
Cover	3,8	/	1,2	10	P
Box (Rail guide)	3,9	/	1,2	10	P
Supplementary information:					

14.2	**TABLE: Insulation resistance**	
Test voltage applied between:	**Measured (MΩ)**	**Required (MΩ)**
internal and external surface	> 10	≥ 5
Supplementary information:		

14.3	**TABLE: Electric strength**	
Test voltage applied between:	**Test voltage (V)**	**Flashover / breakdown (Yes/No)**
internal and external surface	2000	No
Supplementary information:		

15.3	**TABLE: Impact test**		
Part of enclosure per Table 7 (A, B, C, D, E, F, G)	**Total number of blows per part – Figure 10**	**Height of fall per Table 8 (mm)**	**Comments**
A - Box	5	100	P
A – Cover	5	100	P
D or E or F- (*) Deep cover	4	250 or 300 or 400(#)	P
Supplementary information: (*) it depends of the distance of surface			

16.1 - 16.2	**TABLE: Ball pressure test of insulating materials**	
Allowed impression diameter (mm) ..... :	**≤ 2 mm**	—
Part under test	**Test temperature (°C)**	**Diameter of impression (mm) White / Grey**
Box	70	0,9 / 0,9
Cover	70	0,8 / 0,8
Door	70	0,7 / 0,9
Supplementary information:		

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**

18	**TABLE: Glow-Wire test**					
Part under test		**Material designation**	**Test temperature (°C)**	**Visible flame and sustained glowing (Y/N)**	**Flames and glowing extinction time (s)**	**Ignition of the tissue paper (Yes/No)**
Box (white & grey models)		ABS	650	N	0	N
Cover (white & grey models)		ABS	650	N	0	N
Door (white & grey models)		PC	650	N	0	N
Supplementary information:						

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**

101	**TABLE: verification of the maximum capability to dissipate power (Pde)**		
	The maximum capability to dissipate power is performed with an enclosure arranged as follow:		
	- enclosures according to 7.2.1 with the specimen mounted as declared by the manufacturer		P
	- enclosures according to 7.2.2 mounted on a minimum 19 mm thick plywood painted black		N/A
	- enclosures according to 7.2.3.1 with the specimen cast in a concrete wall		N/A
	- for mounting condition other than in concrete (appropriate Pde value and mounting condition declared in the documentation) ..... :		N/A
	Position of the resistor(s) (Figure 103 / 104 / 105) .. :		—

Article	**Number of modules**	**Number of heating resistors used**	**Power dissipated measured (W) (1)**	**Declared power (P_{de}) (W)**	**Power dissipated measured (2) ≥ P_{de} (Y/N)**	**No damage or deformation**
GR15070	4	1	10	10	Y	P
GR15072	8	1	13	13	Y	P
GR15074	12	1	22	22	Y	P
GR15076	24 (2×12)	2	24	24	Y	P
GR15060	4	1	10	10	Y	P
GR15062	8	1	13	13	Y	P
GR15064	12	1	22	22	Y	P
GR15066	24 (2×12)	2	24	24	Y	P

Supplementary information:

(1) corresponding to a temperature rise in a steady state condition on the hottest accessible part ≤ 30 K

(2) value rounded to the next lower integer number

List of test equipment used:

Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Last Calibration date	Calibration due date
Vernier caliper	S04318	10-20	10-21
Probe 11 - IEC 61032	S04727	05-20	05-21
Oven	P02026	-	-
Test equipment ball pressure	P03762	07-20	07-21
Dynamometric screwdriver	S05568	04-21	04-22
Insulation resistance apparatus	S00390	03-21	03-22
Electric strength apparatus	S01317	10-20	10-21
Current clamp	S05576	10-20	10-21
Multimeter	S03403	11-20	11-21
Digital multimeter	S03423	11-20	11-21
Digital thermometer	S04653	11-20	11-21
T type thermocouple	S08084	03-21	03-22
Glow-wire test equipment	P01893	10-20	10-21
Stopwatch	S05646	11-20	11-20
Dust cabinet	P03746	-	-

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**

ATTACHMENT TO TEST REPORT IEC 60670-24
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

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

Part 24: Particular requirements for enclosures for housing protective devices and other power dissipating electrical equipment

Differences according to.....:	EN 60670-24:2013 used in conjunction with EN 60670-1:2005
Attachment Form No.....:	EU_GD_IEC60670_24B
Attachment Originator .....:	IMQ S.p.A.
Master Attachment.....:	2014-01

Clause	Requirement + Test	Result - Remark	Verdict
	CENELEC COMMON MODIFICATIONS (EN)		
2	**NORMATIVE REFERENCES**		
	See Annex ZA		—
3	**DEFINITIONS**		
	Delete “BE” in 3.101		—
7	**CLASSIFICATION**		
	Delete from Table 1 classifications 7.7.1, 7.7.2, 7.7.2.1 and 7.7.2.2		—
	Delete the notes at the end of the addition to Table 1	See Annex ZB	—
8	**MARKING**		
8.101	**Delete**, in bullet 3, from the dashed texts twice the words "accompanying the enclosure"	Provided by the instruction sheet	P
11	**PROVISION FOR EARTHING**		
11.2	**Delete** this subclause		—
12	**CONSTRUCTION**		
12.2	**Replace** in the NOTE "at least 5 mm" by "at least 2 mm"		N/A

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
12.5	**Delete** in the second paragraph "and/or IEC 60981"		—
	Delete NL in NOTE 2	See Annex ZB	—
12.9	**Delete** the NOTE	See Annex ZB	—
12.10	**Replace** the text of this subclause by:		
	Flush type boxes and enclosures other than for hollow walls are provided with obvious fixing means for their suitable attachment to the wall		N/A
	No test prescribed for boxes and enclosures provided with screws, additional mechanical supports and obvious design features, which prevent the displacement of the box or the enclosure		N/A
	Test for boxes and enclosures having an internal volume less than 0,4 dm^3		N/A
	Boxes and parts of enclosures to be embedded in masonry: specimen is mounted into the mounting block shown in Figure Z1		N/A
	Auxiliary device of Figure Z2 mounted on the specimen and screws tightened with a torque equal to 2/3 of that specified in Table 4 (Nm) ..... :		—
	Specimen not displaced by more than 0,5 mm from the mounting block after SW fallen 10 times from a height of 50 mm onto PW according to the test apparatus of Figure Z3 (mm) ..... :		N/A
12.11	**Replace** the title of 12.11 by the following:		
	Enclosures classified according to 7.2.1.3		
	Replace the first paragraph by the following:		
	"Enclosures for hollow walls classified according to 7.2.1.3 are providing suitable means for fixing the enclosure to hollow walls."		N/A
12.12	**Delete** this subclause		—
12.13	**Replace** Table 5 (different torque values for cable glands tested with a test rod having a diameter up to and including 8 mm)		—
12.14	Delete in the second paragraph "or IEC 60981"		—
12.101	**Delete** the NOTE	See Annex ZB	—
13	**RESISTANCE TO AGEING, PROTECTION AGAINST INGRESS OF SOLID FOREIGN OBJECTS AND AGAINST HARMFUL INGRESS OF WATER**		
13.2	**Delete** the NOTE	See Annex ZB	—
15	**MECHANICAL STRENGTH**		
15.1	**Replace** the third paragraph by:		

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	Specimen subjected to an impact test with a vertical hammer test apparatus (Figure 8)		—
15.2	**Delete** the reference 15.2.1		—
	Delete 15.2.2		—
16	**RESISTANCE TO HEAT**		
16.3	**Delete** this subclause		—
17	**CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND**		
	Replace the first paragraph after Table 101 by:		
	"Compliance is checked by inspection and in case of doubt by measurement between the following parts"		—
101	**VERIFICATION OF THE MAXIMUM CAPABILITY TO DISSIPATE POWER (PDE)**		
	Delete NOTE 103		—
	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		
1	**Denmark**		
	This standard can only be used for GP enclosures with the instructions according to Annex AA. For the other types of enclosures the integration of mechanical and electrical devices into an enclosures are verified by compliance with DS EN 60439-3	GP enclosure	P
7	**Denmark, Italy**		
	Only enclosures according to 7.101.1 and 7.102.1 can be used (GP enclosure)	7.101.1	P
	Belgium, Germany, France, Greece		
	Only enclosures according to 7.101.2 and 7.102.2 can be used (PD enclosure)		N/A
9	**Spain**		
	Boxes comply with the standard sheets specified in the Spanish Standard UNE 20451		P
	Screws included in some of these standard sheets because screws are considered as a dimensional requirement		N/A
11.1	**Denmark**		
	Due to the lack of an earthing conductor in many existing old buildings, boxes and enclosures requiring earth connection cannot normally be used		N/A

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
12.5	**Czech Republic, Netherlands, United Kingdom**		
	Inlets according to 7.3.3 in boxes intended to receive switches or socket-outlets have spout(s) with adequate inlet stops		N/A
12.9	**Czech Republic, Netherlands**		
	Flush-type boxes have metal inserts and are provided with metal screws having ISO metric thread		N/A
	United Kingdom		
	Boxes are provided with metal threads so as to ensure safety		N/A
	Thread-forming or thread-cutting screws are not permitted		N/A
12.101	**United Kingdom**		
	The text of this clause does not apply. Cables are retained using fixing means applied during installation by the installer		N/A
13.2	**Denmark**		
	In the case of an enclosure with a door or a lid which can be opened without the use of a tool during normal use, a minimum degree of IP30 are maintained after opening the door or the lid		N/A
	ANNEX ZC A-deviations		
1	**United Kingdom** {Electricity, Safety, Quality and Continuity Regulations; SI '2002 2665'}		
	Add after the second paragraph:		
	This standard cannot be used in installations with a 230 V single-phase supply rated up to 100 A that is under the control of ordinary persons.		N/A
	Integration of mechanical and electrical devices into an enclosure must be verified by compliance with BS EN 60439-3		N/A
9	**Malta** (Electrical Accessories Regulations, 2004)		
	United Kingdom (UK Plug and Socket Safety Regulations, 1994)		
	Boxes intended to accommodate socket-outlets or connection units to BS 1363 have provision for two M3.5 fixing screws at the following fixing centres, in accordance with BS 4662:		N/A
	- at centres of 60,3 mm ± 0,2 mm on the horizontal or vertical centrelines for boxes intended to accommodate 1-gang socket-outlets or connection units (mm) ..... :		N/A

IEC 60670-24			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	- at centres of 120,6 mm ± 0,3 mm on the horizontal or vertical centrelines for boxes intended to accommodate 2-gang socket-outlets or connection units (mm) ..... :		N/A
	- at centres of 180,9 mm ± 0,4 mm on the horizontal or vertical centrelines for boxes intended to accommodate 3-gang socket-outlets or connection units (mm) ..... :		N/A

Annex 1: Instruction sheet

SERIE GR15... IP 65 STANDARD IEC 60670-1:2015IEC 60670-1:2015

SERIES GR15... IP 65 STANDARD IEC 60670-1:2015IEC 60670-1:2015

- TENSIONE D'IMPIEGO 400V
  RATED VOLTAGE 400V

- CLASSIFICATO: GP
  CLASSIFIED: GP

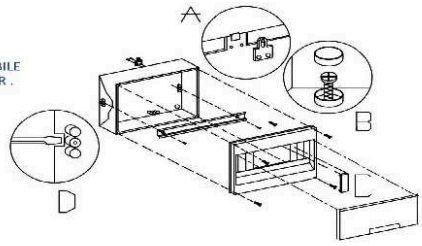
A. ISTRUZIONI PER OTTENERE IL DOPPIO ISOLAMENTO CON STAFFE ESTERNE GR17402. INSTRUCTIONS FOR OBTAINING DOUBLE INSULATION WITH EXTERNAL BRACKETS GR17402

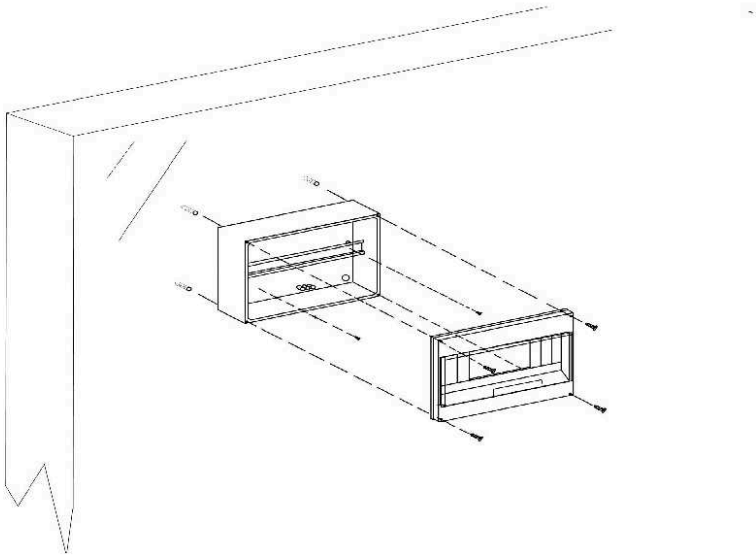
B. TAPPI COPRI VITE.
SCREW COVER PLUGS.

C. ELEMENTI DI CHIUSURA MODULI PER SPAZZI NON USATI
CLOSING ELEMENTS FOR MODULES NOT USED

D. FORI DI DRENAGGIO CONDENSA NEI QUATTRO LATI.
CONDENSATE DRAIN HOLES IN FOUR SIDES.

ARTICOLI ARTICLE	POTENZA DISSIPABILE DISSIPATING POWER .
GR15070	10W
GR15072	13W
GR15074	22W
GR15076	24W
GR15060	10W
GR15062	13W
GR15064	22W
GR15066	24W





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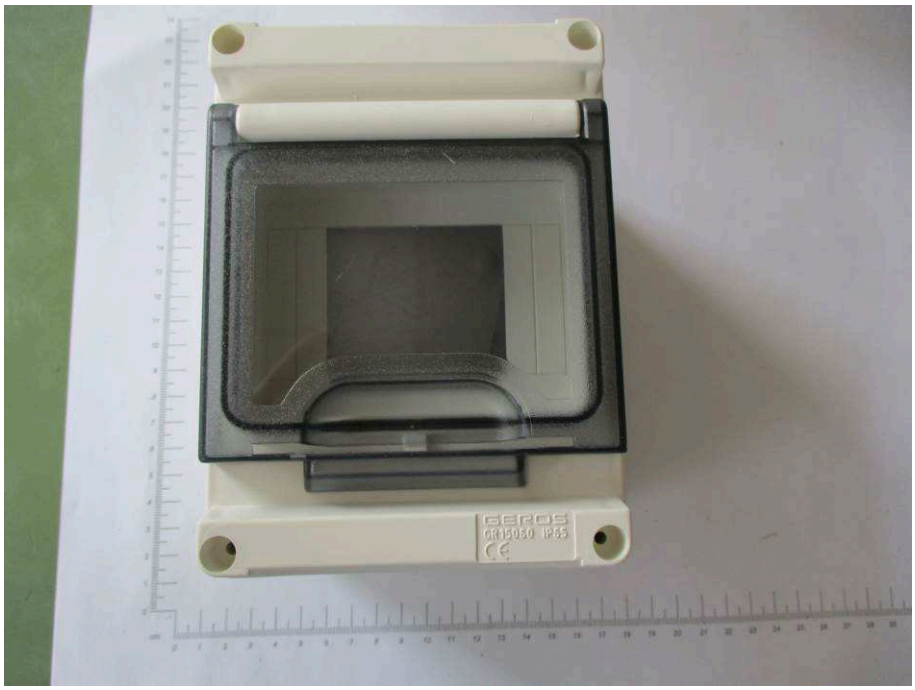

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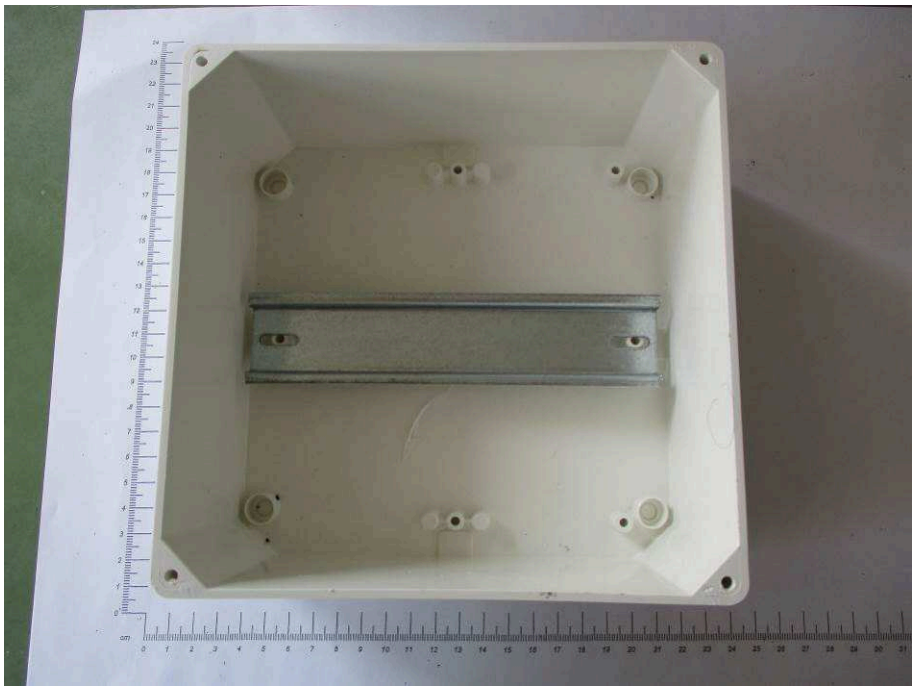

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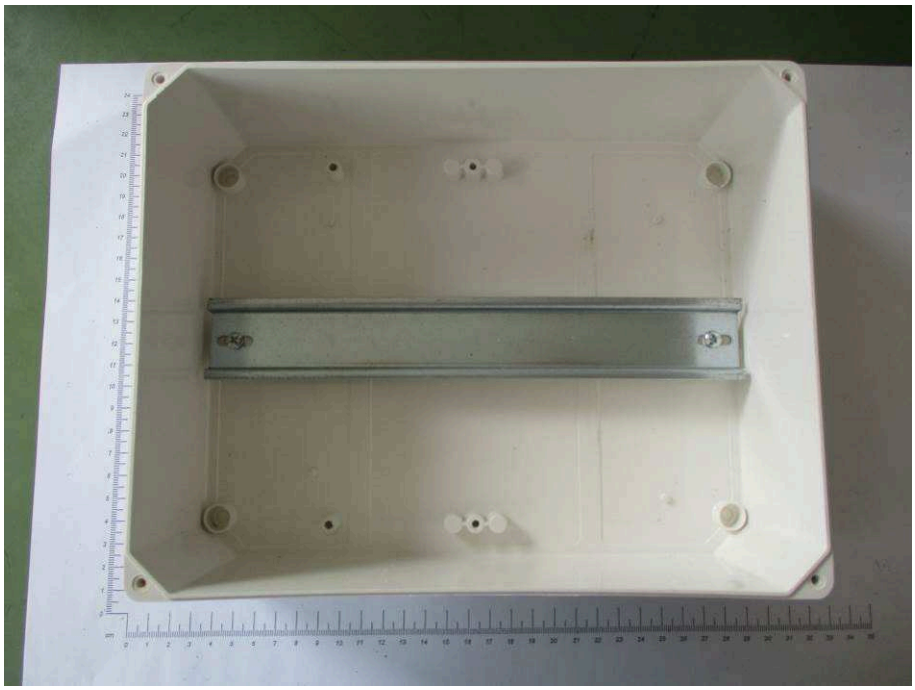

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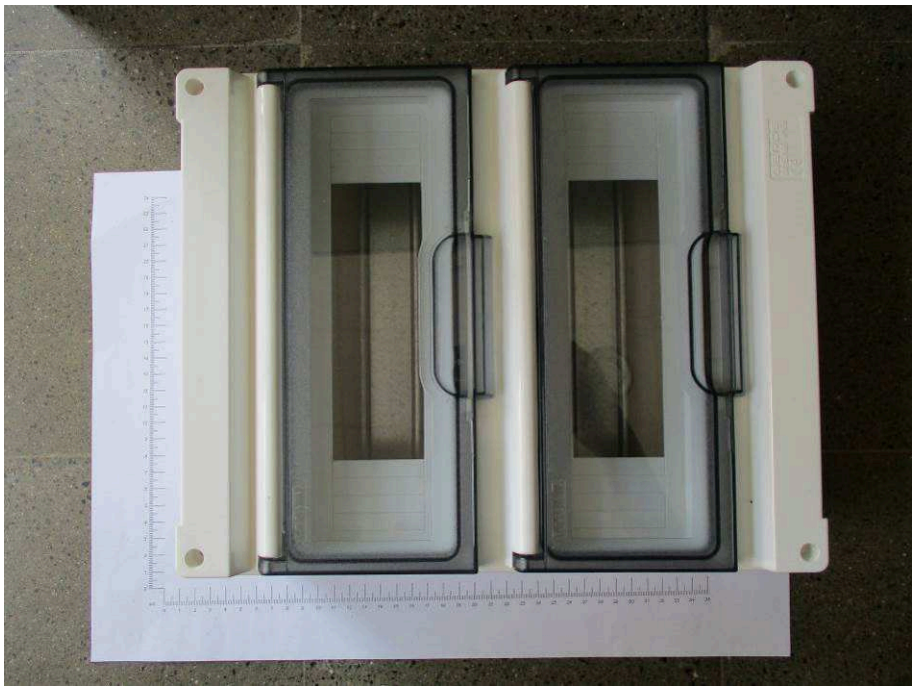

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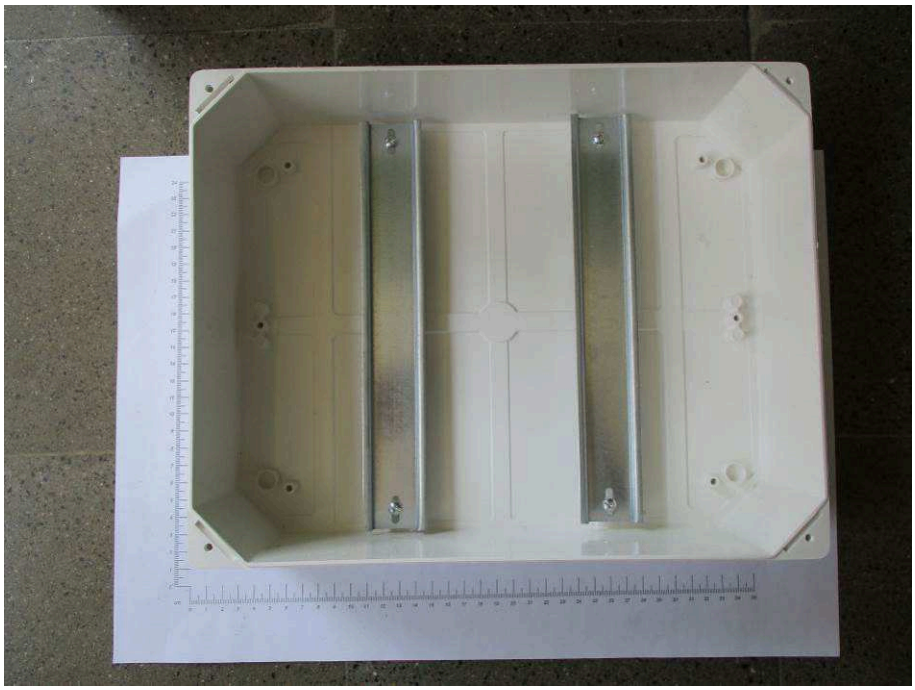

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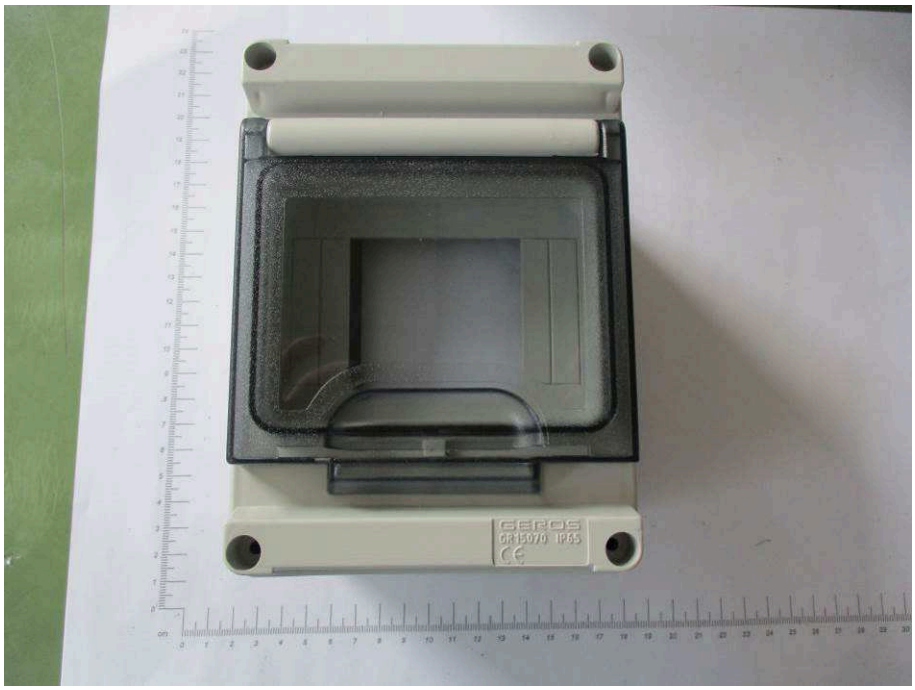

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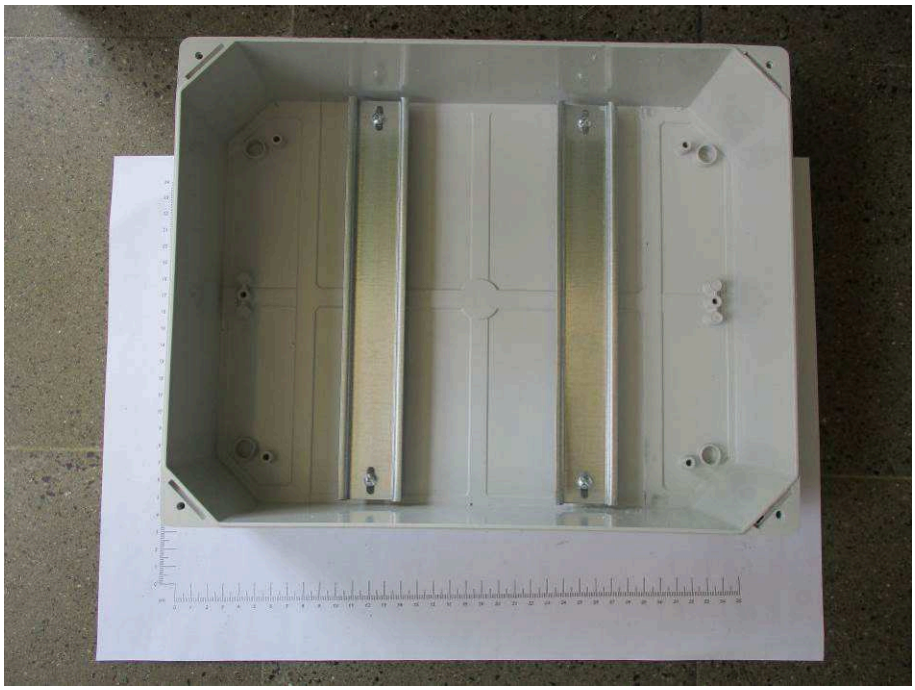

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