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EN ISO/IEC 17025
T-177

TEST REPORT

LVS EN 60335-2-30 (IEC 60335-2-30)

Household and similar electrical appliances – Safety – Part 2-30: Particular requirements for room heaters

Report Reference No	:	2207604707E/45045/TR/22
Tested by (Name + signature)	:	Vadims Suvorovs
Approved by (Name + signature)	:	Aleksandrs Matvejevs
Date of issue	:	16 August 2022
Total number of pages	:	84 pages + annexes (see Page 3)
Testing Laboratory	:	SIA «TUV NORD Baltik», Bureau of laboratory testing and diagnostics, LVD Testing Laboratory
Address	:	Saremas iela 3, Riga, LV-1005, Latvia
Applicant's name	:	ASBISc Enterprises PLC
Address	:	1, Iapetou Street Agios Athanasios, 4101 Limassol, Cyprus

Test specification:

Standard	:	LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 used in conjunction with LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021
Test procedure	:	According to the standard
Non-standard test methods	:	None
Test Report Form No	:	TUV NB 61172-EN60335-2-30-5/20
TRF originator	:	SIA «TUV NORD Baltik»

The present test report form is prepared using IECEE recommendations of the TRF guide OD-2020.

Test item description	:	Infrared room heater
Trademark	:	AENO
Manufacturer	:	Same as applicant
Model/type reference	:	AGH0001S
Ratings	:	220-230 V∿, 50 Hz, 3.0 A, 700 W, Class II, IP44

Summary of testing:

1. The tested appliance is found to be in conformity with the specified standard.

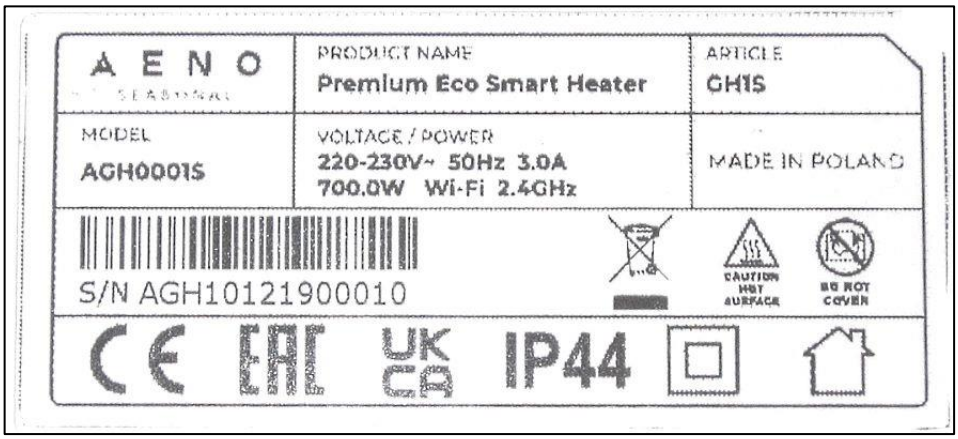
Testing remarks:

1. [Cl. 7.13] The instruction manual shall be given in the official language of a country where the appliance is intended to be sold.

General product information:

1. The appliance is an infrared room heater which can be used as a portable appliance if equipped with feet, or as a fixed appliance if mounted on a wall.
2. The appliance is a Class II appliance. Non-detachable supply cord is used for connection to mains.
3. The heater is made of glass panels with heating element between the panels.
4. Temperature sensors are used to control the room ambient temperature and temperature inside the heater; it is also equipped with an overturn sensor and a Wi-Fi module to allow the heater to be controlled remotely using a smartphone.

Copy of marking plate(s):



Test item particulars:	
Type of the appliance	Infrared room heater
Mode of installation, mobility	☒ Portable appliance ☐ Hand-held appliance ☐ Stationary appliance ☒ Fixed appliance ☐ Built-in appliance
Connection to the mains supply	☐ Battery-operated appliance (other than permanent connection to fixed wiring) ☒ Supply cord with a plug ☐ Appliance inlet ☐ Pins for insertion into a socket-outlet ☐ Detachable power supply part (permanent connection to fixed wiring) ☐ Supply cord without a plug ☐ Set of terminals ☐ Set of supply leads
Operating conditions	☒ Continuous ☐ Intermittent ☐ Short period ☐ Attended ☒ Unattended
Protection class of the appliance	☐ Class I ☒ Class II ☐ Class III
Degree of protection according to IEC 60529	IP44
Environmental ratings	0...+40 °C, RH 75 %; indoor use
Size of the appliance and weigth	1000 × 365 × 65 mm 8.45 kg – fixed mode 1000 × 420 × 165 mm 8.60 kg – portable mode
Accessories and detachable parts	—

Possible test case verdicts:

- test object does meet the requirement ..... : P (Pass)
- test case does not apply to the test object ..... : N/A (Not Applicable)
- test object does not meet the requirement ..... : F (Fail)

Testing:

Date of receipt of test item(s) ..... : 22 June 2022
Date(s) of performance of tests ..... : 4 July 2022 – 15 August 2022
Number of received test items ..... : 1 (one)
Testlab ID number(s) ..... : TNB 22/19

General remarks:

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

This report is not valid as a Test Report unless signed by an approved Testing Laboratory.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

Throughout this report a point is used as the decimal separator.

"(See Annex #)" refers to an annex appended to the report.

"(See Remark #)" refers to a remark appended to the report.

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

Annexes:

1. Photos ..... : 6 p.
2. Instruction manual ..... : 68 p.

Test equipment list:			
Used	Type	Equipment No	Comments
X	Hama EWS-380	00104932	Electronic weather station
X	GW Instek GPT-815	EL833248	HV withstand tester (0.2…5 kV AC/DC)
	Bio-Tek 601 PRO	125255	International safety analyzer
	Fluke 6200	RO1714016	Portable appliance tester
	Fluke 1651	8495063	Multifunction tester
X	GW Instek GDM-8246	CL811476	Digital multimeter
X	GW Instek GDM-396	UL131181	Digital multimeter
	itw DT-266	22117997	Clamp meter / multimeter
X	ETech PM300	2217	Energy meter (0…3000 W, 0…16 A)
X	TDGC$_2$-3000VA	12.2016/01	Variable transformer (0…250 V~, 3000 VA)
	GW Instek PSP-405	EK193100	Programmable power supply (0…40 VDC)
X	Yuanyao YTH-408-70-1P	04.2013/01	Temperature humidity chamber (–70…+180°C, RH 20…98 %)
X	Greisinger GMH 3250	06.2011/01	Digital thermometer (–199.9…+999.9°C), type K thermocoupes
X	Standard ST-882	06100682	Infrared thermometer (–50…+550°C)
X	Leakage/touch current measuring circuit	06.2011/02	According to IEC 60990, Fig.4
X	Glow-wire tester	06.2011/05	According to IEC 60695-2-10
X	Ball-pressure test apparatus	06.2011/04	According to IEC 2740/2000
	Needle flame burner	09.2011/16	(∅0.9 mm)
X	Test hammer	06.2011/03	According to IEC 60068-2-75
X	Impact test-ball	09.2011/15	According to EN 61010-1 (∅50 mm, 500 g)
X	Lutron FG-5020	H.80568	Force gauge (0…110 N)
X	Wera 7440	A10-09-12541	Torque driver (0.3…1.2 Nm)
X	Wera 7441	B10-09-11888	Torque driver (1.2…3.0 Nm)
	Wera 7442	C10-08-7748	Torque driver (3.0…6.0 Nm)
X	Slava SDSpr-1-2	0510802	Chronometer (0…30 min, 0.1 s)
X	Dahongying TCS	11.2014/04	Scales (0…150 kg, 50 g)
X	Stabila BM20	014	Measuring tape (0…5 m, 1 mm)
X	Vernier caliper JOBI	13425	(0…150 mm, 0.1 mm)
X	Thickness meter kit	1973	(0.05...1.00 mm; 20 pcs)
X	Microscope MBS-2	7609679	(× 0.6 / 1 / 2 / 4 / 7)
X	Incline stability testing bench	11.2014/05	(10…15° incline angle)
X	Jointed test-finger	06.2011/06	According to EN 61032 Nr.B
X	Rigid test-finger	06.2011/07	According to EN 61032 Nr.11
	Test probe ∅4 mm	06.2011/08	According to EN 61032 Nr.12
X	Test pin ∅4 mm	08.2011/12	According to EN 61032 Nr.13
X	Test hook	08.2011/11	According to IEC 789/98

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
5	**GENERAL CONDITIONS FOR THE TESTS**		
	Tests are carried out in accordance with Cl. 5 unless otherwise specified		P
5.2	Tests are carried out on a single appliance except Cl. 20, 22, 26, 28, 30 and 31 which may require separate appliances		P
5.3	Tests are carried out in the order of the clauses except for the tests of Cl. 14, 19.14, 21.2, 22.11, 22.24 or other tests if specified otherwise		P
	The appliance used for the tests of Cl. 19 is also used for the test of 22.24		P
5.4	When appliances are supplied by other energies, the influence is taken in account		N/A
5.5	Tests are carried out with the appliance placed in the most unfavorable position		P
5.6	Appliances provided with controls or switches are tested adjusted to the most unfavorable settings, if it can be altered by the user		P
	Thermostats sensitive to the room air temperature are short-circuited		N/A
5.7	Tests are carried out in a draught-free location	T_{amb} = (20 ± 5) °C	P
5.8	Appliances are tested at rated frequency and voltage or more unfavorable frequency/voltage, if marked with ranges or for multiple supplies		P
5.9	When alternative heating elements or accessories are available, the appliance is tested with those which give the most unfavorable result		N/A
5.10	Tests are carried out on the appliance as supplied; appliances are installed in accordance with the instructions provided		P
	Heaters intended to be installed adjacent to each other are installed in accordance with the instructions		N/A
5.11	Appliances are tested with the appropriate flexible cord for connection to fixed wiring		N/A
5.12	For heating and combined appliances multiply factor applies only to non-PTC heating elements		N/A
5.13	Tests for appliances where the heating elements are supplied via a switch mode power supply are carried out at a voltage corresponding to the specified power input		N/A
5.14	Class 0I or class I appliances are checked for compliance as class II construction if accessible not earthed and non-metallic parts are not separated from live parts by earthed metal parts		N/A

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
5.15	Parts of appliances operating at SELV are checked for compliance with the requirements for class III construction		N/A
5.16	The supply is to be free from perturbations from external sources when testing electronic circuits		P
5.17	Appliances powered by rechargeable batteries that are recharged in the appliance are tested in accordance with Annex B		N/A
5.18	If linear and angular dimensions are specified without a tolerance, ISO 2768-1 is applicable		P
5.19	Components having both self-resetting feature and a non-self-resetting feature, the appliance is tested with the non-self-resetting feature rendered inoperative		N/A
5.101	Heaters intended to be used as both portable appliances and fixed appliances are subjected to the tests applicable to both types of appliances		P
5.102	If the heater is a combination of two or more types, it is subjected to the tests relevant for each type, unless such tests cover each other		P
	Heaters for wall-mounting are tested both as heaters for mounting at high level and as for mounting other than at high level, unless the instructions state only high-level mounting		P
6	**CLASSIFICATION**		
6.1	Class of the protection against electric shock	☐ Class I ☒ Class II ☐ Class III	P
6.2	Degree of protection against harmful ingress of water	IP44	P
	Heaters intended for use in greenhouses or building sites, at least IPX4		N/A
7	**MARKING AND INSTRUCTIONS**		
7.1	The appliance is marked with:		
	– the rated voltage or voltage range (V)	220-230 V	P
	– the symbol of nature of supply or the rated frequency (Hz)	~ / 50 Hz	P
	– the rated power input (W) or the rated current (A)	700 W	P
	– the name, trademark or identification mark of the manufacturer or responsible vendor	AENO	P
	– the model or type reference	AGH0001S	P

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
	– the symbol for class II appliances		P
	– the symbol for class III appliances (not necessary for battery-operated appliances)		N/A
	– the IP number according to a degree of protection against ingress of water, if other than IPX0	IP44	P
	– the symbol for class II and III appliances incorporating a functional earth		N/A
	The rated voltage or rated voltage range for appliances intended to be connected to the supply mains covers:		
	– 230 V for single-phase appliances	220-230 V	P
	– 400 V for three-phase appliances		N/A
	Symbol for the enclosure of electrically-operated water valves (at >ELV) in external hose-sets		N/A
	Heaters intended to be filled with liquid by the user, marked with the max and min liquid levels		N/A
	Heaters are marked with symbol IEC 60417-5641 combined with the prohibition sign of ISO 3864-1,		P
	or with the substance	“WARNING: Do not cover.”	N/A
	This marking is not required for:		
	– heaters for mounting at high level		N/A
	– visibly glowing radiant heaters		N/A
	– heaters constructed so that they cannot be covered		N/A
	– heaters also intended to dry clothes and which comply with IEC 60335-2-43		N/A
	– heaters for mounting under benches		N/A
	Heaters having a fireguard that is intended to be removed for transportation or storage are marked to state that the heater must not be operated without this guard in place		N/A
	Maximum rated wattage and type of each lamp, for ceiling mounted heat lamp appliances		N/A
	Marking of cab heaters	“Cab heater”	N/A
7.2	Substance for stationary appliances for multiple supply	“WARNING: Before obtaining access to terminals, all supply circuits must be disconnected”	N/A
	Placed in the vicinity of the terminal cover		N/A

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
7.3	Appliances with a range of rated values and without means of range adjustment are marked with the limits of the range separated by a hyphen	220-230 V	P
	Appliances to be adjusted for use at a particular value are marked with the values separated by an oblique stroke		N/A
7.4	Voltage or frequency setting, if any, is clearly discernible		N/A
7.5	Appliances marked with more than one rated voltage or range, the rated power input or current for each voltage or range is marked		N/A
7.6	Used symbols, of those specified in IEC 60335-1 and IEC 60335-2-30		P
7.7	Appliances to be connected to more than two supply conductors or appliances for multiple supply, the connection diagram is fixed to them, unless correct connection obvious		N/A
7.8	Indication of terminals for the connection to the supply mains (except for type Z attachments):		
	– "N" exclusively for neutral conductor		N/A
	– "⏚" for protective earthing		N/A
	– "⏚" for functional earthing		N/A
	Indications are not placed on removable parts		N/A
7.9	Switches which may give rise of hazard are marked or placed so as to indicate clearly which part of the appliance they control	Power button	P
7.10	Different positions of controls are indicated by figures, letters or other visual means	By colour of illumination	P
	A push-push button switch used for start and stop the operations is not used for other functions		N/A
	The figure "0" is only used for the "off position"		N/A
	The on position is clearly visible when the heater is in its intended position of use		N/A
7.11	Controls to be adjusted are provided with an indication for the direction of adjustment		N/A
7.12	User instructions are provided with the appliance	(See Annex 2)	P
	Any precautions necessary are stated		P
	Statement, children aged from 8 years and above and persons with reduced capabilities	Stricter version on the substance given. Children younger than 12 years are prohibited to use the appliance.	P
	Statement, children aged from 3 to 8 years, and less than 3 years		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Appliances having a part of class III construction supplied from a detachable PSU, statement to use the appliance only with the provided PSU		N/A
	Class III appliances, statement to be supplied only at SELV corresponding to the marking		N/A
	Maximum altitude of use for appliances intended for use at altitudes > 2000 m		N/A
	Statement, appliances with functional earth	"This appliance incorporates an earth…"	N/A
	If the "Do not cover" symbol is marked, its meaning is explained		P
	Substance, for heaters marked with "Do not cover" symbol or statement	"WARNING: In order to avoid overheating, do not cover the heater."	P
	Statement that the heater's parts can become very hot and cause burns	"CAUTION: Some parts can become very hot…"	P
	Statement that the heater must not be located immediately below a socket-outlet		P
	Substance, for heaters with heating elements in direct contact with panels of glass, ceramic or similar material that are accessible parts	"WARNING: The heater must not be used if the … panels are damaged."	P
	Substance, for visibly glowing radiant heaters, other than heaters for mounting at high level	"Do not use this heater with a programmer … or any other device that switches the heater on automatically, since a fire risk exists…"	N/A
	Substances, for visibly glowing radiant heaters having a fireguard that can be partly removed without the aid of a tool		
	– considering access to heating elements	"The fireguard is intended to prevent direct access to heating elements and must be in place…"	N/A
	– considering protection	"The fireguard does not give full protection for young children…"	N/A
	Substances, for portable heaters:		
	– considering use in places where water is present	"Do not use this heater in the immediate surroundings of a bath, a shower…"	P
	– considering use of the dropped heater	"Do not use this heater if it has been dropped."	P
	– considering use of the damaged heater	"Do not use if there are visible signs of damage."	P
	– considering the position of use	"Use this heater on a horizontal and stable surface or fix it to the wall."	P

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Clause	Requirement – Test	Result – Remark	Verdict
	Instructions, for cleaning the reflector of visibly glowing radiant heaters		N/A
	Instructions, for replacing the lamps of fuel-effect heaters		N/A
	Substances, for oil-filled radiators:		
	– considering repair works	"…Repairs requiring opening of the oil container are only to be made by the manufacturer…"	N/A
	– considering utilization	"When scrapping the heater, follow the regulations concerning the disposal of oil"	N/A
	Instructions, for routine cleaning of ceiling mounted heat lamp appliances		N/A
	Substances, for portable heaters:		
	– considering use of the heater in rooms with disabled persons	"WARNING: Do not use this heater in small rooms occupied by persons no capable of leaving the room on their own…	P
	– considering presence of flammable materials near the heater	"WARNING: To reduce the risk of fire, keep textiles, curtains … a min distance 1 m from air outlet."	P
7.12.1	Details for any precautions to be taken during installation of the appliance		P
	Statement that an appliance is intended to be permanently connected to the water mains not by a hose-set		N/A
	Statement of actions to be taken to adjust the appliance for operation at the required rated voltage or frequency		N/A
	Details on the method of fixing, for heaters intended to be fixed by screws or other means		P
	Warning about the possible danger of installation close to curtains and other combustible materials, for stationary visibly glowing radiant heaters and ceiling mounted heat lamp appliances		N/A
	Statement, installation at least 1.8 m above the floor, for heaters for mounting at high level		N/A
	Statement, the heater is to be installed so that switches and other controls cannot be touched by a person in the bath or shower, for fixed heaters likely to be used in a bathroom	IP44	N/A
	Statements, how rollers or feet are to be fixed to the heater, if supplied		P

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Clause	Requirement – Test	Result – Remark	Verdict
	Details for proper installation, for heaters intended to be installed in wardrobes or ceilings		N/A
	Details for proper installation, for ceiling mounted heat lamp appliances that are recessed into a ceiling space or cavity		N/A
	Substances for the heat lamp appliances:		
	– considering covering	"The appliance shall, under no circumstances, be covered with insulating material or similar material."	N/A
	– considering the discharge of air	"National regulations concerning the discharge of air have to be fulfilled."	N/A
	– considering installation	"Joists, beams and rafters shall not be cut or notched to install the appliance."	N/A
	Statements, for heaters for mounting under church benches:		
	– the heater is intended for installation under benches that are fixed in position		N/A
	– the minimum distance between the underside of the heater and the floor		N/A
	– the minimum distances of the relevant surfaces of the heaters to the front and rear edge of the underside of the bench which shall be not less than 50 mm		N/A
	Substances, for heaters intended to be built into the floor and that incorporate a floor level grille		
	– considering drain hole obstructions	"After installation ensure that any drain holes are free from obstruction."	N/A
	– considering mechanical strength	"Ensure that any floor level grille has a mechanical strength consistent with the national building codes"	N/A
	Information for cab heaters:		
	– the shortest permissible distance between the heater outlet and the interior surfaces of the motor vehicle		N/A
	– that the installation shall be in accordance with any instructions issued by the vehicle manufacturer		N/A
7.12.2	Stationary appliances not fitted with a supply cord and a plug or other means of disconnection, statement for disconnection means to be incorporated in the fixed wiring		N/A

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
7.12.3	Statement to protect the fixed wiring insulation if it can come into contact with parts having temperature rise > 50 K		N/A
7.12.4	Information for built-in appliances:		
	– dimensions of the space to be provided for the appliance		N/A
	– dimensions and position of the means for supporting and fixing		N/A
	– minimum distances between the appliance parts and the surroundings		N/A
	– minimum dimension of ventilation openings and their arrangement		N/A
	– connection to the supply mains and interconnections of components		N/A
	– necessity to allow disconnection of the appliance after installation		N/A
7.12.5	Substance regarding the replacement of a damaged supply cord, if provided	☐ Type X attachment ☒ Type Y attachment ☐ Type Z attachment	P
7.12.6	Substance for appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains	“CAUTION: In order to avoid a hazard due to inadvertent resetting…”	N/A
7.12.7	Instructions on how to fix the fixed appliance to its support		P
7.12.8	Instructions for appliances connected to water mains state the maximum and the minimum, if necessary, inlet water pressure		N/A
	Statement to use new hose-sets and not to reuse old hose-sets, for appliances connected by detachable hose-sets		N/A
7.12.9	For each language, the instructions specified in 7.12 and from 7.12.1 to 7.12.8 appear together before any other instructions supplied with the appliance		P
	Instructions are also be available in an alternative format (website, CD, etc.)		P
7.13	Instructions and other text are written in an official language of a country in which the appliance is intended to be sold	(See Remark 1)	P
7.14	Markings are clearly legible and durable; test	water, 15 s; petr. spirit, 15 s	P
	The signal words WARNING, CAUTION, DANGER are in uppercase having a height not less than specified		P

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
	Unless contrasting colours are used, moulded in, engraved, or stamped markings have height or depth ≥ 0.25 mm		N/A
	The height of the “Do not cover” symbol, at least 15 mm	15 mm	P
	The height of the words “Do not cover”, at least 3 mm	≥ 3 mm	N/A
	The height of the words relating to the maximum rated wattage and type of heat lamp, at least 6 mm	≥ 6 mm	N/A
7.15	Markings specified in 7.1 to 7.5 are on a main part of the appliance		P
	Markings are clearly discernible from the outside of the appliance or after removal of a cover		P
	Covers of portable appliances covering markings are removable without the aid of a tool		N/A
	For stationary appliances, at least the name, trademark or identification mark and the model or type reference are visible when the appliance is installed as in normal use		N/A
	For fixed appliances, at least the name, trademark or identification mark and the model or type reference are visible when the appliance is installed according to the instructions provided		P
	Indications for switches and controls are placed on or near these components and not on parts which can be incorrectly repositioned		P
	Functional earth symbol is placed next to the class II or III symbol		N/A
	The indication of the different positions of switches is visible from a distance of 1 m, for heaters for mounting at high level		N/A
	The marking concerning covering is visible after the heater has been installed		P
	It is not placed on the bottom of, or on the back of, portable heaters		P
	The marking concerning removable fireguards is visible before fitting the fireguard		N/A
	For ceiling mounted heat lamp appliances, the marking relating to the maximum rated wattage and type of heat lamp is visible when replacing a lamp in accordance with the instructions		N/A
7.16	Replaceable thermal links or fuse links are marked and clearly identified		N/A

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
8	**PROTECTION AGAINST ACCESS TO LIVE PARTS**		
8.1	Appliances are constructed and enclosed so as to provide adequate protection against accidental contact with live parts		P
	Does not apply to live parts of screw-type or bayonet-type lampholders incorporated in ceiling mounted heat lamp appliances that are accessible only when the heat lamp is extracted		N/A
8.1.1	The requirement applies for all positions of the appliance and after removal of detachable parts		P
	Insertion or removal of lamps located behind a detachable cover, protection against contact with live parts of lamp caps is ensured		N/A
	Detachable fireguards are not removed if their removal requires the use of a tool, provided that:		N/A
	– the instructions state that the plug must be removed from the socket-outlet before cleaning the reflector, or		N/A
	– the heater incorporates a switch having a contact separation in all poles that provides full disconnection under overvoltage category III conditions		N/A
	Test with test probe B and probe 18; no contact with live parts	≤ 1 N; 10 N (probe 18), 20 N (probe B)	P
8.1.2	Test with test probe 13 in class 0, II appliances, class II constructions; no contact with live parts	≤ 1 N	P
	Test with test probe 13 in earthed metal enclosures with non-conductive coating; no contact with live parts	≤ 1 N	N/A
8.1.3	Test with test probe 41 in other than class II appliances; no contact with live parts of visibly glowing heating elements	Not applicable	
	Switching devices provide full disconnection and respective clearances		N/A
8.1.4	Accessible part is not considered live if:		
	– the part is supplied at SELV, $U_{a.c.peak}$ ≤ 42.4 V		N/A
	– the part is supplied at SELV, $U_{d.c.}$ ≤ 42.4 V		N/A
	– or the part is separated from live parts by a protective impedance		N/A
	If protective impedance is used, the current between the part and the supply source is ≤ 2 mA for d.c. or its peak value is ≤ 0.7 mA for a.c. and:		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	– for voltages 42.4 V < U_{peak} ≤ 450 V, the capacitance is ≤ 0.1 µF		N/A
	– for voltages 450 V < U_{peak} ≤ 15 kV, the discharge is ≤ 45 µF		N/A
	– for voltages U_{peak} > 15 kV, the discharge energy is ≤ 350 mJ		N/A
8.1.5	Live parts of built-in, fixed appliances and appliances delivered in separate units, protected at least by BI before installation or assembly		P
8.2	Class II appliances and constructions are constructed and enclosed to ensure adequate protection against accidental contact with BI and metal parts separated from live parts by BI only		P
	During user maintenance and after the removal of detachable parts during replacement of heat lamps, the BI of internal wiring may be touched if it is electrically equivalent to the insulation of cords complying with IEC 60227 or IEC 60245		N/A
	Only possible to touch parts which are separated from live parts by DI or RI		P
	Test with test probes applied in accordance with 8.1.1		P
	Test probe B and probe 18 applied to built-in and fixed appliances only after installation		P
9	**STARTING OF MOTOR-OPERATED APPLIANCES**		
	Not applicable		
10	**POWER INPUT AND CURRENT**		
10.1	Power input at normal operating temperature does not deviate from the rated power input by more than the specified deviation	(See appended table)	P
10.2	Current at normal operating temperature does not deviate from the rated current by more than the specified deviation	(See appended table)	N/A
	Compliance is checked when the power input has stabilized with:		
	– all circuits which can operate simultaneously in operation		P
	– the appliance supplied at rated voltage		P
	– the appliance operated under normal operation		P
	The test is carried out at both the upper and the lower limits of the range for appliances marked with the rated voltage range(s)		P

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Clause	Requirement – Test	Result – Remark	Verdict
11	**HEATING**		
11.1	Appliances and their surroundings do not attain excessive temperatures in normal use		P
11.2	Appliances are placed or installed as specified and in accordance with the instructions in the test corner		P
	The test corner or shelf are made of dull black-painted ~20 mm thick plywood		P
	The ceiling of the test corner is covered with insulating material having a coefficient of thermal insulation of approximately 3.2 m^2K/W		P
	Fixed heaters are mounted in front of a socket-outlet with the heater plug inserted, unless the distance between the heater and the wall is < 30 mm, or it is prohibited in the instructions		N/A
	If a fixed heater has an opening at floor level, a felt pad 20 mm thick is placed on the floor and pushed flat into the opening as far as possible		N/A
	Heaters having an air-outlet grille intended to be recessed in a floor, a window-sill or similar location are also tested as specified in 19.103		N/A
	Appliances provided with an automatic cord reel, 1/3 of the total length of the cord is unreeled		N/A
	Cord storage devices, other than automatic cord reels, 50 cm of the cord is unwound		N/A
	The temperature rise of the cord sheath is determined as specified		P
	Cab heaters are placed in the test box as specified in Figure 103 in the most unfavourable position according to the instructions		N/A
11.3	Temperature rises other than of windings are determined by means of thermocouples		P
	The temperature rise of the felt pad is determined by thermocouples attached to small blackened disks of copper or brass, ∅15 mm × 1 mm, placed on the surface of the pad		P
	Temperature rises of windings are determined by the resistance method, if possible		N/A
11.4	Heating appliances are operated under normal operation and at $1.15 \cdot P_{rated}$	$1.15 \cdot P_{rated}$ (805 W)	P
	If the temperature rise limits are exceeded in appliances incorporating motors, transformers or electronic circuits, the test is repeated with the appliance supplied at $1.06 \cdot U_{rated}$		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
11.5	Motor-operated appliances are operated under normal operation and supplied with the most unfavorable voltage of 0.94…1.06·U_{rated}		N/A
11.6	Combined appliances are operated as heating appliances		N/A
11.7	Appliances are operated until steady conditions are established		P
11.8	Temperature rises are monitored continuously and do not exceed the specified values	(See appended table)	P
	If temperature rise of the motor winding exceeds the specified values or doubts regarding the insulation temperature classification exist, the tests of Annex C are carried out		N/A
	Stationary heaters are considered liable to be operated continuously for long periods		P
	The temperature rise limits of transformers, motors and electronic circuit components may be exceeded when operated at 1.15·P_{rated}		N/A
	Liquid-filled radiators, the temperature rise of parts in contact with oil is not measured		N/A
	Unvented liquid-filled radiators, the temperature rise of the outer surface of the liquid container is at least 50 K less than the liquid boiling point		N/A
	The temperature rise of surfaces of heaters does not exceed the values shown in Table 101		P
	Heaters intended to be mounted under church benches only, the temperature rise of surfaces accessible to the test rod is ≤ 70 K		N/A
	Heaters to be mounted under other benches, the temperature rise of surfaces accessible to the test rod does not exceed the limits specified in Table 3 for parts held for short periods only		N/A
	The temperature rise of the plug does not exceed 45 K, for fixed heaters mounted in front of a socket-outlet		N/A
	The temperature rise of the walls of the cab heater test box and the test corner does not exceed 65 K		N/A
	Protective devices do not operate		P
	Sealing compound does not flow out		P
	Components in protective electronic circuits allowed to operate provided they are tested for the number of cycles of operation of 24.1.4		N/A
12	**VOID**		

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Clause	Requirement – Test	Result – Remark	Verdict
13	**LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE**		
13.1	At operating temperature, the leakage current is not excessive, the electric strength is adequate		P
	Heating appliances are operated at $1.15 \cdot P_{rated}$	$1.15 \cdot P_{rated}$ (805 W)	P
	Motor-operated and combined appliances are supplied at $1.06 \cdot U_{rated}$		N/A
	Protective impedance and radio interference filters are disconnected		N/A
13.2	Leakage current is measured by means of an appropriate circuit	(See appended table)	P
13.3	Electric strength test at 50/60 Hz voltage, 1 min	(See appended table)	P
	No breakdowns occur		P
14	**TRANSIENT VOLTAGES**		
	Appliances withstand the transient overvoltages to which they may be subjected		N/A
	Clearances having values less than specified are subjected to an impulse voltage test	(See appended table)	N/A
	No flashover occurs during the test, unless of FI		N/A
	Flashover of FI is allowed if the appliance complies with Cl. 19 when the clearance is short-circuited		N/A
15	**MOISTURE RESISTANCE**		
15.1	The enclosure provides a degree of protection against moisture in accordance with the classification of the appliance	IP44	P
	The tests of 15.1.1 and 15.1.2, compliance		P
	After the tests, the electric strength test of 16.3		P
	After the tests, inspection of clearances and creepage distances of Cl. 29		P
15.1.1	Appliances other than IPX0 are subjected to the tests of IEC 60529	Subclause 14.2.4a	P
	Water valves containing live parts and that are incorporated in external hoses for connection to the water mains are subjected to the IPX7 test		N/A
15.1.2	Positioning/installation of the appliance as specified in the standard	☐ Hand-held ☐ Built-in ☒ Used on a floor or table ☒ Wall-mounted ☐ With pins for sockets ☐ Ceiling-mounted	P

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Clause	Requirement – Test	Result – Remark	Verdict
	Appliances with an automatic cord reel are tested with the cord in the most unfavorable position when the reeling of the wet cord may affect electrical insulation during operation		N/A
	The cord is not dried before reeling		N/A
	Appliances with type X attachment, except having a specially prepared cord, are fitted with the lightest permissible type of flexible cord		N/A
	Detachable parts are removed and subjected, if necessary, to the relevant treatment with the appliance, if a tool is not needed		N/A
15.2	Appliances subject to spillage of liquid in normal use are constructed so that spillage does not affect their electrical insulation		N/A
	Appliances with type X attachment, except having a specially prepared cord, are fitted with the lightest permissible type of flexible cord		N/A
	Appliances incorporating an appliance inlet are tested with or without an appropriate connector, whichever is most unfavorable		N/A
	Detachable parts are removed		N/A
	Test, liquid container completely filled and further liquid is poured in steadily over the specified period of time	1 % NaCl liquid; 15 % of the container capacity or 0.25 l, whichever is greater; 1 min	N/A
	After the test, the electric strength test of 16.3		N/A
	After the test, inspection of clearances and creepage distances of Cl. 29		N/A
	Heaters intended to be built into the floor and having a grille or opening at or near to the floor level are constructed so that such spillage does not affect their electrical insulation		N/A
	Test, water is poured steadily over the grille at the most unfavorable place over a period of 10 s	10 l of water, 1 % NaCl and 0.6 % of rinsing agent, 10 s	N/A
	After the test, the electric strength test of 16.3		N/A
	After the test, inspection of clearances and creepage distances of Cl. 29		N/A
15.3	Appliances are proof against humid conditions that may occur in normal use		P
	Test preconditioning; cable entries are left open, detachable parts are removed	24 h in normal ambient conditions	P
	Humidity test	RH (93 ± 3) %, (20…30 ± 2) °C, 48 h	P
	Tests of Cl. 16		P

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Clause	Requirement – Test	Result – Remark	Verdict
16	**LEAKAGE CURRENT AND ELECTRIC STRENGTH**		
16.1	At room temperature, the leakage current is not excessive, the electric strength is adequate		P
	Protective impedance is disconnected from live parts before carrying out the tests		N/A
16.2	Leakage test voltage, single-phase appliances	$1.06 \cdot U_{rated}$ (244 V)	P
	Leakage test voltage, three-phase appliances		N/A
	Leakage current measurements, within 5 s	(See appended table)	P
16.3	Electric strength test at 50/60 Hz voltage, 1 min	(See appended table)	P
	No breakdowns occur		P
17	**OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS**		
	In the event of short-circuit likely to occur in normal use, no excessive temperatures in transformer or associated circuits occur		N/A
	Appliance supplied with more unfavorable voltage, the most unfavorable short-circuit or overload likely to occur in normal use is applied		N/A
	Temperature rise of the insulation of SELV conductors does not exceed the relevant specified values by more than 15 K		N/A
	Temperature of windings does not exceed the specified values; temperature limits do not apply to fail-safe transformers complying with 15.5 of IEC 61558-1		N/A
18	**ENDURANCE**		
	Not applicable		
19	**ABNORMAL OPERATION**		
19.1	Appliances are constructed so that as a result of abnormal or careless operation the risks of fire, mechanical damage impairing safety or electric shock is obviated as far as practicable		P
	Electronic circuits are so designed and applied that a fault condition will not render the appliance unsafe		P
	If the control performs more than one function, only that aspect of the control under consideration is rendered inoperative		N/A
	Instead of the tests specified, appliances are subjected to the tests of 19.5, 19.6, 19.11, 19.12 and 19.101 to 19.115, as applicable		P

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Clause	Requirement – Test	Result – Remark	Verdict
	Tests are continued until a non-self-resetting thermal cut-out operates or until steady conditions are established		P
19.2	Appliances with heating elements are tested as specified in Cl. 11 but with restricted heat dissipation	Not applicable	
19.3	The test of 19.2 is repeated at a different power	Not applicable	
19.4	Appliances are tested as specified in Cl. 11, any temperature limiting control is short-circuited	Not applicable	
	Appliances incorporating more than one control, controls are short-circuited in turn		
19.5	Class 0I and class I appliances incorporating tubular sheathed or embedded heating elements are tested as specified in Cl. 11, one end of the element is connected to the sheath		N/A
	The test is repeated with the polarity of the supply reversed and with the other end of the element connected to the sheath		N/A
	The test is not carried out on appliances intended to be permanently connected to the fixed wiring		N/A
	Appliances with a neutral are tested with the neutral connected to the sheath		N/A
19.6	Appliances with PTC heating elements are supplied at the rated voltage until steady conditions are established		N/A
	Working voltage of the PTC elements is increased in 5 % steps up to $1.5 \cdot U_{rated}$ or until the PTC element ruptures, whichever is first, re-establishing steady conditions between steps		N/A
19.7	Appliances are operated under stalled conditions:	Not applicable	
	– locking the rotor, if locked rotor torque < full load torque		
	– locking moving parts in other cases		
	Appliances incorporating several motors, each motor is locked separately		
	Appliances with motors and capacitors in auxiliary windings are operated with the rotor locked and:		
	– capacitors open-circuited, one at a time		
	– capacitors short-circuited, one at a time		
	Operation of appliances provided with a timer or programmer		
	Operation duration during the tests:		

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Clause	Requirement – Test	Result – Remark	Verdict
	– maximum period allowed by a timer or programmer		
	– 30 s, for hand-held, continuously loaded by hand or kept by hand or foot		
	– 5 min, for appliances that are operated while attended		
	– until steady conditions are established, for other appliances		
	The temperature of the windings does not exceed the relevant specified values		
19.8	Appliance with multi-phase motors, one phase is disconnected, the appliance is operated under normal operation at the rated voltage for the time specified in 19.7	Not applicable	
19.9	Running overload test on appliances with motors intended to be automatically controlled or liable to operate continuously	Not applicable	
	Appliance is operated under normal conditions at the rated voltage, the load is increased in steps (10 % of motor winding current) until protective device operates or the motor stalls		
	During the test, the temperature of the windings does not exceed the specified values		
19.10	Appliances with series motors are operated with the lowest possible load at $1.3 \cdot U_{rated}$ for 1 min	Not applicable	
	During the test, parts are not ejected from the appliance		
19.11	Electronic circuits are checked by evaluation of the fault conditions specified in 19.11.2, unless they comply with 19.11.1		P
19.11.1	Fault conditions of 19.11.2 a) to g) are not applied if both conditions are met:		
	– the electronic circuit is a low-power circuit (≤ 15 W at low-power points)		N/A
	– the protection against hazards, electric shock or dangerous malfunction in other parts does not rely on the correct functioning of the electronic circuit		N/A
19.11.2	The following fault conditions are considered and applied, if necessary, one at a time:		
	a) short circuit of FI if clearances or creepage distances are less than the specified values		P
	b) open circuit at terminals of any component		P

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Clause	Requirement – Test	Result – Remark	Verdict
	c) short circuit of capacitors, unless they comply with IEC 60384-14		P
	d) short circuit of any two terminals of an electronic component, other than integrated circuit		P
	e) failure of triacs in the diode mode		P
	f) failure of microprocessors and integrated circuits except thyristors, triacs and the like		P
	g) failure of an electronic power switching device		P
	Fault tests are applied when the appliance is operated under the conditions of Cl.11 supplied at the rated voltage		P
	The duration of the tests as specified		P
	In each case, the tests are ended if a non-self-resetting interruption of the supply occurs		P
19.11.3	Appliances incorporating a protective electronic circuit operating to ensure compliance with Cl. 19, the relevant test is repeated with a single fault simulated as indicated in 19.11.2 a) to g)		P
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or		P
	a device that can be placed in the stand-by mode,		P
	are subjected to the tests of 19.11.4.1 to 19.11.4.7; the tests are carried out at the rated voltage, the device being set in the off position or stand-by mode		P
	Appliances incorporating a protective electronic circuit,		P
	are subjected to the tests of 19.11.4.1 to 19.11.4.7 after the protective electronic circuit has operated during the tests of Cl. 19 except 19.2, 19.6, 19.11.3		P
19.11.4.1	Appliances are subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4		P
19.11.4.2	Appliances are subjected to radiated fields in accordance with IEC 61000-4-3, frequency ranges as specified		P
19.11.4.3	Appliances are subjected to fast transient bursts in accordance with IEC 61000-4-4, test level 3 or 4 as specified		P

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Clause	Requirement – Test	Result – Remark	Verdict
19.11.4.4	The power supply terminals of the appliance are subjected to voltage surges in accordance with IEC 61000-4-5, voltages as specified		P
	Earthed heating elements in class I appliances are disconnected		N/A
19.11.4.5	Appliances are subjected to injected currents in accordance with IEC 61000-4-6, test level 3		P
19.11.4.6	Appliances are subjected to the class III voltage dips and interruptions in accordance with IEC 61000-4-11		P
19.11.4.7	Appliances are subjected to mains signals in accordance with IEC 61000-4-13, test level class 2		P
19.11.4.8	Appliances are supplied at the rated voltage under normal operation. After 60 s, the supply voltage reduced to a level at which the appliance ceases to respond to user inputs or parts cease to operate. This voltage value is recorded.	At voltage approx. 40 V~ the control circuit's relay disconnects the heating and the circuit ceases to respond; when the voltage is restored, the relay does not switch on automatically, although the LED lights green (heating mode), restart of the heating requires manual action.	P
	Appliances are supplied at the rated voltage under normal operation. The voltage is then reduced to a value ~10 % less than the recorded value. After 60 s the voltage is increased to the rated voltage. Appliances continue to operate.		P
19.12	If safety depends upon the operation of a fuse-link, the test of 19.11.2 is repeated with the link replaced by an ammeter, the current is measured and is as specified		P
19.13	During the tests, no emission of flames, molten metal, poisonous or ignitable gases occurs		P
	Temperatures do not exceed the specified values	(See appended table)	P
	After the appliance has cooled down, compliance with Cl. 8 is not impaired		P
	Appliance complies with 20.2 if can still operate		P
	Cooled down insulation of other than class III appliances withstands the electric strength test of 16.3, the test voltage is of 13.3		P
	Appliances for immersion or filling with liquids in normal use are immersed or filled with water for 24 h prior to the electric strength test		N/A
	After the operation or interruption of a control, clearances and creepage distance across FI withstand the electric strength test of 16.3		P
	Appliances do not undergo a dangerous malfunction, no failure of protective electronic circuits occurs		P

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Clause	Requirement – Test	Result – Remark	Verdict
	Appliances with an electronic switch do not become operational or operation does not result in dangerous malfunction		P
	Doors and lids controlled by interlocks may be releases provided that:		N/A
	– the lid or door does not move automatically to an open position if released, and		N/A
	– the appliance does not restart after the cycle in which an interlock was released		N/A
	During the test of 19.106, the temperature of the motor windings do not exceed the values specified in Table 8		N/A
19.14	Appliances are operated as specified in Cl. 11, any relay or contactor that operated under Cl. 11 is short-circuited	Fault causing constant heating	P
	Relays/contactors with several contacts, the contacts are short-circuited in turn		N/A
	Any relay/contactor which operates only to ensure that the appliance is energized for normal use is not short-circuited		N/A
	If several relays/contactors operate in Cl.11, each such component is short-circuited in turn		N/A
19.15	Appliances with mains voltage selection switch, the switch is set to the lowest rated voltage position, the highest rated voltage is applied		N/A
19.101	Appliances are operated as specified in Cl. 11, but the power input is $1.24 \cdot P_{rated}$; all thermal controls that operate during the test of Cl. 11 are short-circuited simultaneously	$1.24 \cdot P_{rated}$ (870 W) The control circuit detects overvoltage and disconnects heating	P
19.102	Circular and similar portable heaters that emit heat in several directions are placed as close as possible to one of the walls of the test corner and operated at $1.24 \cdot P_{rated}$	$1.24 \cdot P_{rated}$ (870 W) The control circuit detects overvoltage and disconnects heating	P
19.103	Heaters are operated as specified in Cl. 11 but with the appliance covered	No hazards; temperature sensors prevent overheating	P
	The test does not apply to:		
	– heaters for mounting at high level, except for wardrobe heaters		N/A
	– visibly glowing radiant heaters		N/A
	– portable fan heaters		N/A
	The covering is made with felt strips as specified		P
	Thermocouples are attached as specified		P
	The strips are applied to each half of the heater in turn and then to the complete heater		P

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Clause	Requirement – Test	Result – Remark	Verdict
	The temperature rise of the strips does not exceed 150 K (an over-shoot of 25 K is allowed during the first hour)		P
	Heaters intended to be installed in wardrobes comply with the test with any self-resetting thermal cut-out short-circuited		N/A
19.104	Built-in heaters having air outlets in the floor, window-still or similar locations are operated as specified in Cl. 11 with the grilles covered; thermal controls that operate during the test of Cl. 11 are short-circuited		N/A
	The temperature rise of the strips does not exceed 150 K (an over-shoot of 25 K is allowed during the first hour)		N/A
19.105	Heaters having a liquid container that is intended to be filled by the user are operated as specified in Cl. 11 but with the container empty		N/A
19.106	Fan heaters and heaters incorporating motors are operated as specified in Cl. 11; the heater is supplied at $1.0 \cdot U_{rated}$ with the motor rotor locked		N/A
19.107	Fan heaters are operated at its working voltage as specified in 11.4, the motor is supplied separately at its working voltage; thermal controls that operate during the test of Cl. 11 are short-circuited		N/A
	When steady conditions are established, the voltage applied to the motor is reduced as specified, the voltage applied to the heating elements being maintained as specified above		N/A
	Under these conditions, the heater is again operated until steady conditions are established or for 1 h, whichever is longer		N/A
	After this period, the airflow is further restricted to verify that a thermal cut-out operates		N/A
19.108	Portable fan heaters are operated as specified in Cl. 11		N/A
	A rectangular sheet of paper is held against air inlets, without additional pressure for 4 h		N/A
	If the enclosure has more than one surface with air inlets, these surfaces are covered in turn		N/A
19.109	Cab heaters and portable fan heaters are operated as specified in Cl. 11, but placed as near to the wall of the test corner as possible with the airflow directed against the wall; thermal controls that operate during the test of Cl. 11 are short-circuited		N/A
	The temperature rise of the wall does not exceed 150 K		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
19.110	Portable visibly glowing radiant heaters are operated as specified in Cl. 11, but placed so that the radiation is directed against one of the walls of the test corner with the distance to the wall changed as specified		N/A
	The temperature rise of the wall does not exceed 70 K		N/A
19.111	Visibly glowing radiant heaters, other than heaters for mounting at high level, are operated as specified in Cl. 11 but at $1.0 \cdot P_{rated}$		N/A
	When steady conditions are established, a piece of dry bleached cotton flannelette as specified is held taut against the central part of the fireguard		N/A
	The flannelette does not smolder or ignite within 10 s		N/A
19.112	Portable heaters are operated as specified in Cl. 11, but placed on a soft-wood surface covered with felt as specified; the heater is then pushed so that it overturns in the most unfavorable position	No hazards; the heater is equipped with an overturn sensor which disconnects heating	P
	The felt or the wood surface does not smolder or ignite; the felt temperature does not exceed 150 K		P
	The temperature of the surface of oil-filled radiators is at least 40 K lower than the oil boiling point; no deformation of the container, leakage of oil or emission of flames occurs		N/A
	Fuel effect heaters intended to be placed in a fireplace are not subjected to this test		N/A
19.113	Fan heaters are operated as specified in Cl. 11, except that all self-resetting thermal cut-outs and controls that operate during the test of Cl. 11 are short-circuited and the fan motor is stalled		N/A
	The time from energizing the heating elements to the time that the non-self-resetting protective device (if used) operates is recorded		N/A
19.114	A quantity of oil is drained from the container of oil-filled radiators until the oil level is ~10 mm above the heating element; the container is then resealed and the appliance operated as specified in Cl. 11 but at $1.0 \cdot P_{rated}$		N/A
	The temperature of the surface of the container is at least 40 K lower than the oil boiling point		N/A
19.115	Ceiling mounted heat lamp appliances are operated as specified in Cl. 11 but with the highest rated wattage heat lamps fitted as allowed by the construction and at $1.06 \cdot U_{rated}$		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
19.116	Cab heaters are placed so that the distance between the test wall and the air outlet grille is 10 cm; the cab heater is supplied at $1.15 \cdot P_{rated}$ and operated until steady conditions are reached; all thermal controls that operate during the test of Cl. 11 are short-circuited		N/A
	The temperature rise of the wall does not exceed 65 K		N/A
19.117	Fan heaters are operated as specified in Cl. 11 with all thermal cut-outs and controls short-circuited and the fan motor stalled; the fan heater is energized for the longest time recorded during the test of 19.113 plus 5 s		N/A
	The fan heater does not emit flames; during the test, 19.13 is not applicable		N/A
20	**STABILITY AND MECHANICAL HAZARDS**		
20.1	Heaters, except fixed heaters, have adequate stability		P
	Incline test, the appliance is placed on an inclined plane; no overturn	15° angle	P
	Force test, force is applied horizontally to the top of appliances having a mass > 5 kg; no overturn	(5 ± 0.1) N	P
20.2	Moving parts are positioned or enclosed to provide adequate protection against injuries		N/A
	Not applicable to parts that necessarily have to be exposed to perform the working functions		N/A
	Appliances having dangerous moving parts due to their function, full protection is not possible for performing their intended use		N/A
	Protective enclosures, guards, etc. are not detachable		P
	Protective enclosures, guards, etc. have adequate mechanical strength		P
	Unexpected closure of self-resetting thermal cut-outs and overcurrent protective devices does not cause hazard		N/A
	Test of 21.1, test probe as specified; not possible to touch dangerous movable parts	≤ 5 N	N/A
21	**MECHANICAL STRENGTH**		
21.1	Appliances have adequate mechanical strength and are constructed to withstand rough handling		P
	The requirement is not applicable to the glass envelopes of heat lamps incorporated in ceiling mounted heat lamp appliances		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Test with three blows; no damages	3 × 0.5 J	P
	For appliances with heating elements in direct contact with panels of glass, ceramic or similar material that are accessible parts, the impact energy of the blows applied to the panel is 2.0 J	2.0 J; cracks of the tempered glass; in the end the pieces of broken glass fall out of its place	P
	For cab heaters, the impact energy is increased; the test is performed at –25 °C	3 × 1.0 J	N/A
	In case of doubt, SI and RI are subjected to the electric strength test of 16.3	No breakdown of the cracked glass; no break-down of the insulation of the heating element	P
	Small dents, chips, etc. are ignored if not impairing safety; cracks not visible to naked eye are ignored		P
21.2	Accessible parts of solid insulation have sufficient strength to prevent penetration by sharp implements		P
	If SI < 1 mm or RI < 2 mm, scratch test at raised temperature is applied as specified	$T_{Cl.11}$, (10 ± 5) N, 20 mm/s; 10 N; (30 ± 0.5) N	N/A
	After the test the insulation withstands the electric test of 16.3 with the pin applied as electrode		N/A
21.101	Visibly glowing radiant heaters, other than for mounting at high level, are placed so that the central part of the fireguard is horizontal; a mass of 5 kg having a ∅100 mm flat base is placed for 1 min on the central part of the fireguard	5 kg, ∅100 mm flat base, 1 min	N/A
	The test is also applied to the air inlet and outlet grilles of cab heaters		N/A
	After the test, the fireguard shows no significant permanent deformation		N/A
21.102	Fixed appliances having a hinged part, the movement of which is restricted by chains or similar means, are fixed and the hinged part is allowed to drop under its own weight	5 times	N/A
	The heater shows no damage that could impair compliance with this standard; compliance with 8.1 and Cl. 29 is not impaired		N/A
21.103	The suspension means of panel heaters for ceiling mounting have adequate strength		N/A
	Load test and torque test for rigid suspension heaters; no significant deformation of the suspension means		N/A
21.104	Portable fan heaters are placed in a sling and dropped on a hardwood board from a height 500 mm; all self-resetting thermal cut-outs and control that operate during the test of Cl. 11 are short-circuited		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	The fan motor is stalled, and the portable fan heater is operated as specified in Cl. 11; the fan heater does not emit flames and the requirements of 8.1 and 16.3 are met		N/A
21.105	Cab heaters withstand vibrations liable to occur in normal use		N/A
	Vibration test of IEC 60068-2-6; after the test the appliance shows no hazardous damages, screws and connections did not change position or work loose		N/A
21.106	Cab heaters other than intended to be permanently mounted withstand the effects of being dropped		N/A
	Free fall test of Procedure 1 of IEC 60068-2-31		N/A
21.107	Floor level grilles of heaters intended to be built into the floor have adequate mechanical strength		N/A
	100 kg mass placement test; the maximum deflection of the grille is ≤ 3 mm		N/A
22	**CONSTRUCTION**		
22.1	Appliances marked with the first numeral of the IP-code, the requirements of IEC 60529 fulfilled	IP44	P
22.2	Stationary appliances are provided with means to ensure all-pole disconnection	☒ Supply cord with a plug ☐ Switch complying 24.3 ☐ Statement in instructions ☐ Appliance inlet	P
	Single-pole switches and protective devices that disconnect heating elements in single-phase permanently connected class 0I and class I appliances are connected to the phase conductor		N/A
	Fixed heaters that may be installed in front of a socket-outlet incorporate a switch complying with 24.3 or have a statement in the instructions that the disconnecting device in the fixed wiring must be provided		N/A
22.3	Appliances with pins provide no undue strain on socket-outlets		N/A
	Torque test	≤ 0.25 Nm, 1 min	N/A
	Pull force test after heating; pins displacement when cooled ≤ 1 mm	(70 ± 2) °C, 1 h; 50 N, 1 min	N/A
	Torque test on pins; no rotation of pins	0.4 Nm, 1 min	N/A
22.4	Appliances for heating liquids or causing undue vibration are not provided with pins for inserting into socket-outlets		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
22.5	Appliances with a plug, no risk of electric shock from charged capacitors when pins are touched		P
	Electromagnetic phenomena tests, if compliance relies on the operation of an electronic circuit		P
	Test, voltage between pins	1 s, ≤ 34 V	P
22.6	Electrical insulation is not affected by liquids that could condense or leak		N/A
	Test with liquid drops in case of doubt		N/A
22.7	Appliances containing liquid are constructed to withstand the pressure likely to occur during use		N/A
	Pressure test; no leakage of liquid		N/A
22.8	Compartments to which access is gained without a tool and that are likely to be cleaned, electrical connections are not subjected to pulling during cleaning		N/A
22.9	Insulation, internal wiring, windings, slip rings or commutators are not exposed to oil, grease, etc.		N/A
22.10	Non-self-resetting thermal cut-outs are not resettable by the operation of automatic switching devices		N/A
	Reset buttons of non-self-resetting controls are located or protected from accidental resetting		N/A
22.11	Non-detachable parts that protect against access to live parts, moving parts or moisture are fixed reliably and withstand mechanical stresses		P
	Snap-in devices have obvious locked position		N/A
	Parts likely to be removed during servicing or installation are reassembled 10 times		N/A
	Push force test	50 N, 10 s	P
	Pull force test	50 N, 10 s	P
	Torque test for parts likely to be twisted		N/A
22.12	Handles, knobs, grips, levers, etc. are fixed in a reliable manner		N/A
	Other parts that are intended to be detached during use, maintenance or cleaning are not considered as parts providing similar function as handles, knobs, grips, levers		N/A
	It is not possible to remove or fix incorrectly such parts if they are used to indicate the position of switches or similar components		N/A
	Pull test:		
	– axial pull is unlikely to be applied	15 N, 1 min	N/A
	– axial pull is likely to be applied	30 N, 1 min	P

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Clause	Requirement – Test	Result – Remark	Verdict
22.13	Handles gripped in normal use, no contact with parts with excessive temperatures		N/A
22.14	No ragged or sharp edges, other than necessary for functioning		P
	Pointed ends of self-tapping screws, etc. are unlikely to be touched		P
22.15	Storage hooks and similar devices for flexible cords are smooth and well-rounded		N/A
22.16	Automatic cord reels do not cause:		
	– undue abrasion or damage to the sheath of the flexible cord		N/A
	– breakage of conductor strands		N/A
	– undue wear of contacts		N/A
	Test of cord reels as specified	6000 times, 30 min^{-1}	N/A
	After the test, the cord and its reel are inspected; in case of doubt the electric strength test of 16.3	1000 V	N/A
22.17	Spacers to prevent overheating of walls are not removable by hand, screwdriver or spanner		N/A
	This is not applicable to built-in appliances		N/A
	The requirement does not apply to rollers or feet that prevent the appliance from overheating walls or the floor if the appliance complies with Cl. 19 without these parts in place		N/A
22.18	Current-carrying parts and other metal parts are resistant to corrosion		P
22.19	Driving belts are not used as electrical insulation		N/A
22.20	Direct contact between live parts and thermal insulation is prevented, unless used material is non-corrosive, non-hygroscopic, non-combustive		N/A
	Appropriate tests, if necessary		N/A
22.21	Wood, cotton, silk, paper, etc. are not used as insulation, unless impregnated		P
22.22	Appliances do not contain asbestos		P
22.23	Oils containing PCB are not used		P
22.24	Bare heating elements are supported to prevent excessive displacement occurring during normal use, the rupture of a heating element do not give rise to a hazard		N/A
	Test, the heating element is cut; no contact with accessible metal parts or fall out of the appliance		N/A
	Force test on springs supporting coiled heating elements; no break of a string	5 N	N/A

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Clause	Requirement – Test	Result – Remark	Verdict
22.25	Sagging heating conductors cannot come into contact with accessible metal parts		N/A
22.26	Insulation between SELV and live parts complies with the requirements for DI or RI		N/A
22.27	Parts connected by protective impedance are separated by DI or RI		N/A
22.28	Class II appliances connected to gas or water mains, metal parts in contact with gas or water are separated from live parts by DI or RI		N/A
22.29	Class II appliances intended for permanent connection to the fixed wiring, required degree of access to live parts is maintained after installation		N/A
22.30	Parts of class II construction serving as SI or RI and which can be omitted during reassembly:		
	– fixed so that they cannot be removed without being seriously damaged, or		P
	– cannot be replaced in an incorrect position, or if omitted, the appliance is rendered inoperable		P
22.31	Clearances or creepage distances over SI and RI are not reduced below the specified values as a result of wear		P
	If screws, nuts, etc. become loose, clearances or creepage distances between live parts and accessible parts are not reduced below the specified values, except as specified		P
22.32	SI and RI are constructed or protected against deposition of pollution resulting from wear of parts within the appliance		P
	SI of natural or synthetic rubber is resistant to ageing or located and dimensioned as specified		N/A
	Ceramic material which is not tightly sintered is not used as SI		P
	Oxygen bomb test; no cracks visible to the naked eye	97 % O_2, (2.1 ± 0.07) MPa, (70 ± 1) °C, 96 h; 16 h, T_{room}	N/A
	Test of the ceramic material; no trace of dye visible to the naked eye	solution 1 g + 100 g, 15 MPa, 7 h	N/A
22.33	Conductive liquids that are or may become accessible are not in direct contact with live parts or unearthed metal parts separated from live parts by BI only		N/A
	Electrodes are not used for heating liquids		N/A
	Class II construction, conductive liquids that are or may become accessible are not in direct contact with BI or RI, unless RI has at least 3 layers		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Class II construction, conductive liquids in contact with live parts are not in direct contact with RI, unless RI has at least 3 layers		N/A
	Air layer is not used as BI or RI in a DI system if it is likely to be bridged by leaking liquid		N/A
22.34	Shafts of operating knobs, handles, levers, etc. are not live unless the shaft is inaccessible when the part is removed		N/A
22.35	Handles, levers and knobs that are held or actuated in normal use do not become live in the event of a failure of BI		N/A
	Handles, levers and knobs of metal and their shafts likely to become live in the event of a failure of BI, are adequately covered by an insulating material or accessible parts are separated from shafts or fixings by SI		N/A
	The requirement above does not apply to such components of stationary and cordless appliances if they are reliably connected to an earthing terminal or separated from live parts by an earthed metal		N/A
22.36	Handles continuously held in hand, designed so that when gripped in normal use, the operator's hand is not likely to touch metal parts, unless they are separated from live parts by DI or SI		N/A
22.37	Class II appliances, capacitors are not connected to accessible metal parts; their casings of metal is separated from accessible metal parts by SI		P
	The requirement does not apply to capacitors complying with the requirements for protective impedance specified in 22.42		N/A
22.38	Capacitors are not connected between the contacts of a thermal cut-out		P
22.39	Lampholders are only used for the connection of lamps		N/A
	The insulating parts of lampholders used for the connection of replaceable heat lamps in ceiling mounted heat lamp appliances are ceramic		N/A
22.40	Motor-operated and combined appliances intended to be moved while in operation or have accessible moving parts are fitted with an easily visible and accessible switch to control the motor		N/A
	Unless giving rise to a hazard, appliances for remote control are fitted with an easily visible and accessible switch for stopping the operation		P
22.41	Other than lamps, no components containing mercury are incorporated in the appliance		P

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Clause	Requirement – Test	Result – Remark	Verdict
22.42	Protective impedance consists of at least two separate components		N/A
	If any one of the components is short- or open-circuited, the values of 8.1.4 are not exceeded		N/A
	Component impedances are unlikely to change significantly during the lifetime of the appliance		N/A
22.43	Appliances adjustable for different voltages are constructed so that accidental changing of the setting is unlikely to occur		N/A
22.44	An appliance is child-appealing if one of the following criteria is present:		
	– appliance decorated using faces, cartoon like characters, or similar images		N/A
	– appliance using shapes representing animals, characters, persons or scale models		N/A
	An appliance is child-appealing if more than one of the following criteria are present:		
	– using non-functional light		N/A
	– using non-functional sound (e.g. music)		N/A
	– using non-functional movement		N/A
	If the appliance is child-appealing, is < 4 kg or is mounted or normally used at a height < 850 mm, the following conditions shall be met:		
	– no accessible surfaces at a height < 850 mm exceed the temperature rise limits as stated		N/A
	– hazardous moving parts are not accessible		N/A
	– live parts are not accessible		N/A
	– accessible liquid in the appliance does not exceed 38 °C		N/A
	– the requirement 22.12 is applicable for all accessible parts of the appliance		N/A
	The requirement is not applicable to appliances where there is a toy shaped like the appliance		N/A
22.45	When air is used as RI, the appliance is so constructed that clearances cannot be reduced below the specified values		N/A
22.46	Programmable protective electronic circuits, the software contains measures to control the fault/error conditions		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
22.47	Appliances intended to be connected to water mains, withstand the water pressure expected in normal use		N/A
	Water pressure test; no leakages from any part		N/A
22.48	Appliances intended to be connected to water mains are constructed to prevent backsiphonage of non-potable water into the water mains		N/A
22.49	Duration of remote operation is settable before the appliance can be started, unless it switches off automatically at the of the cycle or is not giving hazards during continuous operation		N/A
22.50	Controls incorporated in the appliance have priority over controls actuated by remote control		P
22.51	Control of the appliance is manually adjustable to the setting of the remote operation before the appliance can operate in this mode		N/A
	Visual indication on the appliance shows that it is adjusted for remote control		N/A
	Manual setting and visual indication are not required if, without giving rise to a hazard, appliances can:		
	– operate continuously, or		P
	– operate automatically, or		P
	– be operated remotely		P
22.52	Socket-outlets on appliances accessible to the user are of the system used in a country in which the appliance is intended to be sold		N/A
22.53	Class II and III appliances that incorporate functionally earthed parts have at least DI or RI between live parts and functionally earthed parts		N/A
22.54	Button cells and R1 batteries are not accessible without the aid of a tool or compartment cover can be opened only with at least two movements		N/A
22.55	Devices to stop the function of the appliance are distinguished from other devices by shape, etc.		P
22.56	Detachable power supply part is provided with the part of class III construction of the appliance		N/A
22.57	The properties of non-metallic materials do not degrade from exposure to UV-C radiation		P
22.101	Heaters, other than heaters for mounting at high level, are guarded in order to prevent contact with heating elements	By a glass panel	P
	Test, test probe 41 of IEC 61032 is applied to the guard; no contact of heating elements	5 N	P

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Clause	Requirement – Test	Result – Remark	Verdict
	The openings in fireguards are measured and do not exceed:		
	– a major dimension of 126 mm and a minor dimension of 12 mm, or		N/A
	– a major dimension of 53 mm and a minor dimension of 20 mm		N/A
	Any apertures having a minor dimension of less than 5 mm are ignored		N/A
22.102	Fireguards have a total open area not less than 50 % of the surface area of the fireguard		N/A
22.103	Fireguards are securely attached to the heater so that it is not possible to detach them completely without the use of a tool		N/A
22.104	Appliances for wall mounting are constructed so that they can be securely fixed to a wall		P
22.105	Panels made of glass, ceramic etc. that are accessible parts and that are in direct contact with heating elements withstand thermal shock	No cracks, etc.	P
	Test, water is directed onto the central part of the heated appliance; the panel is not damaged	1.15·P_{rated} (805 W); 1 l, (15 ± 5) °C, 10 ml/s, tube ∅5 mm	P
22.106	Portable appliances do not have openings on the underside that would allow small items to penetrate and touch live parts		P
	The distance between the supporting surface and live parts through openings is measured; at least ≥ 6 mm (if with legs: ≥ 10 mm, if stands on a table, ≥ 20 mm if stands on a floor)		N/A
22.107	Visibly glowing radiant heaters fixed to a wall or ceiling are constructed so that the direction of radiation cannot be significantly changed without the use of a tool after the heater has been fixed		N/A
22.108	Visibly glowing radiant heaters, other than heaters for mounting at high level, do not incorporate thermostats, timers or similar means which switch on heating elements automatically		N/A
22.109	The disconnection of the supply by a switch in the off position do not rely on electronic components		N/A
	If the heater has a stand-by mode, it is considered to be on		P
22.110	Heaters intended to be mounted under church benches, metal surfaces accessible to the ∅75 mm test rod have a non-metallic coating with a thickness of at least 50 microns		N/A
22.111	Normally open switches relying on contact with the floor to keep them in the closed position have moving contacts as specified		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
22.112	Cab heaters do not contain bare heating elements		N/A
23	**INTERNAL WIRING**		
23.1	Wireways are smooth and free from sharp edges and points		P
	Wires are protected against contact with burrs, cooling fins or similar edges		P
	Holes in metal through which insulated wires pass have smooth well-rounded surfaces or provided with bushings		N/A
	Wiring is effectively prevented from contacting moving parts		N/A
23.2	Beads and similar ceramic insulators on live wires are fixed or located so that they cannot change their position or rest on sharp edges		N/A
	Beads inside flexible metal conduits are contained within an insulating sleeve, unless the conduit cannot move in normal use		N/A
23.3	Parts movable in normal use or during user maintenance do not cause undue stress to electrical connections and internal conductors		N/A
	Flexible metallic tubes do not cause damage to the insulation of the conductors contained within		N/A
	Open-coil springs are not used to protect the wiring		P
	Adequate insulating lining is provided for coil spring with turns touching each other		N/A
	Flexing test, the appliance is supplied at U_{rated} and operated in normal operation; no damages	10000 flexings, 30 min^{-1}	N/A
	After the test, the electric strength test of 16.3	1000 V	N/A
23.4	Bare internal wiring is sufficiently rigid and fixed, clearances and creepage distances cannot be reduced below the specified values		N/A
23.5	Insulation of internal wiring subjected to the supply mains voltage withstands the electrical stresses likely to occur in normal use		P
	Electric strength test between the conductor and metal foil wrapped around the insulation	2000 V, 15 min	P
23.6	Sleeving used as SI on internal wiring is retained in position by positive means		N/A
23.7	Conductors colored green/yellow are only used for earthing conductors		N/A
23.8	Aluminum wires are not used for internal wiring		P

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Clause	Requirement – Test	Result – Remark	Verdict
23.9	Stranded conductors are not consolidated by soldering if subjected to contact pressure		P
	Soldering is allowed if contact pressure is provided by spring terminals		N/A
23.10	Insulation and sheath of internal wiring, incorporated in external hoses for connection to water mains, is at least equivalent to PVC		N/A
24	**COMPONENTS**		
24.1	Components comply with the safety requirements of the relevant standards		P
	Unless otherwise specified, the requirements of Cl. 29 apply between live parts of components and accessible parts of the appliance		P
	Unless otherwise specified, the requirements of 30.2 apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections inside components		P
	Components that have not been previously tested or do not comply with the relevant standard are tested as specified in 30.2		P
	Components that have been previously tested and shown to comply with the resistance to fire requirements need not retested provided that:		
	– the severity specified in the component standard not less that the severity specified in 30.2, and		P
	– unless the preselection alternative used, the test report for the component states if it complied with the standard		P
	If the above two conditions are not satisfied, the component is tested as a part of the appliance		P
	Plugs, socket-outlets and other connecting devices of interconnection cords are not interchangeable with such components listed as specified if it could give rise to a hazard		N/A
	List of critical components	(See appended table)	P
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression comply with IEC 60384-14		N/A
	Tests in accordance with Annex F		N/A
24.1.2	Safety isolating transformers comply with IEC 61558-2-6		N/A
	Tests in accordance with Annex G		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
24.1.3	Switches comply with IEC 61058-1	10000 cycles	N/A
	Switches operating during the test of 19.112	300 cycles	N/A
	Tests in accordance with Annex H		N/A
	If the switch operates a relay or contactor, the complete switching system subjected to the test		N/A
	If the switch only operates a motor starting relay complying with IEC 60730-2-10, the complete switching system is not tested		N/A
24.1.4	Automatic controls comply with IEC 60730-1 together with the relevant part 2		P
	– thermostats	10000 cycles	N/A
	– thermostats of liquid-filled radiators that operate during the test of Cl. 11	100000 cycles	N/A
	– thermostats of cab heaters	100000 cycles	N/A
	– temperature limiters	100 cycles	N/A
	– self-resetting thermal cut-outs	10000 cycles	P
	– self-resetting thermal motor protectors for motors in cab heaters	10000 cycles	N/A
	– voltage maintained non-self-resetting thermal cut-outs	1000 cycles	N/A
	– non-self-resetting thermal cut-outs operating during the test of 19.112	300 cycles	N/A
	– other non-self-resetting thermal cut-outs	1000 cycles	N/A
	– timers	3000 cycles	N/A
	– energy regulators	10000 cycles	N/A
	Thermal motor protectors are tested in combination with their motor under the conditions specified in Annex D		N/A
	Water valves containing live parts and incorporated in external hoses for connection to water mains, the degree of protection of enclosure is IPX7		N/A
24.1.5	Appliance couplers with the degree of protection IPX0 comply with IEC 60320-1		N/A
	Appliance couplers with the degree of protection higher than IPX0 comply with IEC 60320-2-3		N/A
	Interconnection couplers comply with IEC 60320-2-2		N/A
24.1.6	Small lampholders comply with IEC 60238, the requirements for E10 lampholders applicable		N/A
24.1.7	Remote operation via a telecommunication network complies with EN 41003		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Compliance with Cl. 8 is not impaired by connecting the appliance to a device covered by EN 41003		N/A
24.1.8	Thermal links comply with IEC 60691		N/A
	Thermal links not complying with IEC 60691 considered to be an intentionally weak part for Cl. 19 purposes		N/A
24.1.9	Contactors and relays, other than motor starting relays, are tested as a part of the appliance		P
	Contactors and relays are tested in accordance with Cl. 17 of IEC 60730-1		P
24.2	Appliances are not fitted with:		
	– switches, automatic controls, power supplies and the like in flexible cords		P
	– devices that cause the protective device in the fixed wiring to operate in the event of a fault in the appliance		P
	– thermal cut-outs that can be reset by a soldering operation, unless the solder melting point is at least 230 °C		P
24.3	Switches intended to ensure all-pole disconnection of stationary appliances are directly connected to the supply terminals and have contact separation in all poles		N/A
24.4	Plugs and socket-outlets for ELV circuits or used as terminal devices for heating elements are not interchangeable with plugs, socket-outlets, connectors, inlets specified		N/A
24.5	Capacitors in auxiliary windings of motors are marked with their rated voltage and capacitance and used in accordance with these markings		N/A
	Voltage across the capacitor connected in series with a motor winding does not exceed $1.1 \cdot U_{rated}$ when supplied at $1.1 \cdot U_{rated}$		N/A
24.6	Working voltage of motors directly connected to the supply mains and having inadequate BI for the rated voltage of the appliance is ≤ 42 V		N/A
	Such motors comply with tests of Annex I		N/A
24.7	Detachable hose-sets for connection to the water mains comply with IEC 61770		N/A
	Such hose-sets are supplied with the appliance		N/A
	Appliances permanently connected to the water mains, not connected by a detachable hose-set		N/A
24.8	Motor running capacitors permanently connected in series with a motor winding does not cause a hazard in the event of a capacitor failure		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	The requirement is met by one or more of the following conditions:		
	– the capacitors are of safety class S2 or S3 (IEC 60252-1)		N/A
	– the capacitors are housed within a metallic or ceramic enclosure		N/A
	– the distance of separation of the outer surface of the capacitor to adjacent non-metallic parts is > 50 mm		N/A
	– adjacent non-metallic parts within 50 mm of the outer surface of the capacitor withstand the needle-flame test of Annex E		N/A
	– adjacent non-metallic parts within 50 mm of the outer surface of the capacitor are classified as at least V-1 (IEC 60695-11-10)		N/A
24.101	Devices incorporated in oil-filled radiators in order to comply with 19.114 are self-resetting		N/A
	Protective devices incorporated in cab heaters in order to comply with Cl. 19, are not self-resetting		N/A
	Non-self-resetting thermal cut-outs, incorporated in cab heaters, that are reset by disconnection of the supply mains are considered to be self-resetting		N/A
24.102	Protective devices incorporated in cab heaters in order to comply with Cl. 19, do not close automatically when subjected to low temperatures		N/A
	Test on protective devices at –35 °C, 18 h; none of the samples change its position		N/A
24.Z1	Motor running capacitors with a metallic enclosure having an overpressure fuse, the flame testing of internal plastic parts supporting current-carrying connections is not necessary		N/A
25	**SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS**		
25.1	Appliances not intended to be permanently connected to the fixed wiring are provided with means for connection to the supply mains:		
	– supply cord fitted with a plug		P
	– an appliance inlet having at least the same IP-degree as the appliance		N/A
	– pins for insertion into socket-outlets		N/A
	Plugs and pins for insertion into socket outlets follow the relevant standards sheets in Annex ZH	Type F plug; Types G, J and L may also be used	P

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Clause	Requirement – Test	Result – Remark	Verdict
25.2	Appliances, other that stationary appliances for multiple supply, are not provided with more than one means for connection to the supply mains		P
	Stationary appliances for multiple supply, relevant circuits are insulated from each other		N/A
	Electric strength test between each means of connection to the supply mains	1250 V, 50/60 Hz, 1 min	N/A
25.3	Appliances intended for permanent connection to the fixed wiring are provided with one of the following means of connection:		
	– a set of terminals for a flexible cord		N/A
	– a fitted supply cord		N/A
	– a set of supply leads accommodated in a suitable compartment		N/A
	– a set of terminals for cables of fixed wiring		N/A
	– a set of terminals and cable entries, conduit entries, glands, which allow the connection of the appropriate types of cable or conduit		N/A
	Such appliances provided with terminals for the fixed wiring or terminals and cable entries, conduit entries, etc., for cables allow the connection of the supply conductors after the appliance has been fixed to its support		N/A
	Fixed appliances with removable parts allow the connection to the fixed wiring after a part of the appliance has been fixed to its support		N/A
25.4	Appliances intended for permanent connection to the fixed wiring and having I_{rated} ≤ 16 A, cable and conduit entries are suitable for maximum sizes as specified		N/A
	Cable and conduit entries are constructed or located so that the introduction of the conduit or cable does not reduce clearances or creepage distances below the specified values		N/A
25.5	Method of the supply cord assembly to the appliance	☐ Type X attachment ☒ Type Y attachment ☐ Type Z attachment	P
	Type X attachments are not used for flat twin tinsel cord, unless specially prepared		N/A
	Multi-phase appliances for permanent connection to the fixed wiring and supplied with a supply cord, the supply cord assembled to the appliance by a type Y attachments		N/A
25.6	Plugs are not fitted with more than one flexible cord		P

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Clause	Requirement – Test	Result – Remark	Verdict
25.7	Type of supply cords for other that class III appliances:		
	– Rubber sheathed		N/A
	– Polychloroprene sheathed		N/A
	– Polyvinyl chloride sheathed		P
	– Heat resistant polyvinyl chloride sheathed		N/A
	– Halogen-free, low-smoke, thermoplastic insulated and sheathed		N/A
	Supply cords for class III appliances are adequately insulated		N/A
	Electric strength test between the conductor and metal foil wrapped around the insulation	500 V, 2 min	N/A
	Supply cords of portable heaters intended to be used in greenhouses and for cab heaters are polychloroprene sheathed flexible cords		N/A
	Supply cords of heaters to be used on building sites are not lighter than heavy polychloroprene sheathed flexible cord (code 60245 IEC 66)		N/A
	Portable oil-filled radiators fitted with PVC-sheathed cords (60227 IEC 52 or 53), metal parts likely to touch the supply cord in normal use include those parts that are inaccessible to the ∅75 mm test rod specified in Table 101		N/A
25.8	Conductors of a supply cord have a nominal cross-section area not less than specified	2 × 1.5 mm^2	P
25.9	Supply cords are not in contact with sharp points or edges		P
25.10	Green/yellow core of the supply cord of class I appliances is connected to the earthing terminal of the appliance and earthing contact of the plug		N/A
	In multi-phase appliances, the colour of the neutral conductor of the supply cord is blue		N/A
	Requirements for additional neutral conductors provided in the supply cord		N/A
25.11	Conductors of supply cords are not consolidated by soldering if subjected to contact pressure		P
	Soldering is allowed if contact pressure is provided by spring terminals		N/A
25.12	Insulation of the supply cord is not damaged by molding to part of the enclosure		N/A
25.13	Inlet opening for supply cords are constructed to allow introduction of the sheath of the supply cord without risk of damage		P

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Clause	Requirement – Test	Result – Remark	Verdict
	Non-detachable lining or bushing is provided, unless the inlet opening is of insulating material	Cord guard moulded on the supply cord	P
	Additional bushing or lining is provided for the unsheathed supply cord, unless class 0 or class III appliance		N/A
25.14	Appliances provided with a supply cord and that are moved in operation are constructed so that the supply cord is adequately protected against excessive flexing where it enters the appliance		N/A
	Flexing test, conductors are supplied at U_{rated} and loaded with I_{rated}		N/A
	The test is not resulting in:		
	– a short circuit between the conductors		N/A
	– a breakage of more than 10 % of strands of any conductor		N/A
	– separation of the conductor from its terminal		N/A
	– loosening of any cord guard		N/A
	– damage to the cord or cord guard which would impair compliance with this standard		N/A
	– broken strands piercing the insulation and becoming accessible		N/A
25.15	Appliances provided with a supply cord or intended to be permanently connected to fixed wiring by a flexible cord have a cord anchorage		P
	Cord anchorage relieves conductors from strain and twisting at the terminals and protects the insulation of the conductors from abrasion		P
	Cord cannot be pushed into the appliance to an extent that the cord or internal parts of the appliance could be damaged		P
	Pull and torque test; the cord is not damaged, displacement ≤ 2 mm	100 N, 1 s, 25 times; 0.35 Nm, 1 min; 0.3 mm	P
25.16	Construction and location of cord anchorages for type X attachments:		
	– replacement of the cord is easily possible		N/A
	– it is clear how the relief from strain and the prevention of twisting are obtained		N/A
	– anchorages are suitable for the different type of supply cords, unless specially prepared		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	– the cord cannot touch the accessible clamping screws of the anchorage, unless separated from accessible metal parts by SI		N/A
	– the cord is not clamped by a metal screw which bears directly on the cord		N/A
	– at least one part of the cord anchorage is securely fixed to the appliance, unless it is a part of a specially prepared cord		N/A
	– screws to be operated when replacing the cord do not fix other components		N/A
	– if labyrinths can be bypassed, the test of 25.15 is nevertheless withstood		N/A
	– for class 0, class 0I and class I appliances, anchorages are of insulating material or are provided with an insulating lining		N/A
	– for class II appliances, anchorages are of insulating material or, if of metal, they are insulated from accessible metal parts by SI		N/A
25.17	Type Y and type Z attachments, cord anchorages are adequate	Cord guard fixed in the wiring compartment cover	P
25.18	Cord anchorages are arranged so that they are only accessible with the aid of a tool or that the cord can only be fitted with the aid of a tool		P
25.19	Type X attachments, in portable appliances glands are not used as cord anchorages		N/A
	Tying the cord into a knot or tying the cord with string is not allowed		P
25.20	Conductors of the supply cord for type Y and type Z attachments are insulated from accessible metal parts by BI for class 0, class 0I and class I appliances, and by SI for class II appliances		P
25.21	Construction of the space for the connection of supply cords having type X attachment, or for the connection of fixed wiring:		
	– it is possible to check that the supply conductors are correctly positioned and connected before fitting any cover		N/A
	– any cover can be fitted without risk of damage to the conductors or their insulation		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	– for portable appliances, the uninsulated end of a conductor cannot come into contact with accessible metal parts, if escapes from terminals		N/A
	Force test for portable appliances not fitted with pillar terminals; no contact with accessible metal parts	2 N	N/A
25.22	Appliance inlets are:		
	– located or enclosed so that live parts are not accessible during insertion or removal of the connector (not applicable to inlets complying with IEC 60320-1)		N/A
	– located so that the connector can be inserted without difficulty		N/A
	– located so that, after insertion of the connector, the appliance is not supported by the connector when it is placed in any position in normal use		N/A
	– not an appliance inlet for cold conditions if the temperature rise of external metal parts exceeds 75 K during the test of Cl. 11, unless the supply cord is unlikely to touch such metal parts		N/A
25.23	Interconnection cords comply with the requirements for the supply cords		N/A
	Exceptions:		
	– the cross-sectional area of the conductors is determined on the basis of the maximum current carried during the test of Cl. 11, not by the rated current		N/A
	– the thickness of the insulation of the conductor may be reduced if the voltage is less than the rated voltage		N/A
	– the cross sectional areas of the conductors need not comply with 25.8, for class III construction, interconnection cords of a class I or II appliance		N/A
	Electric strength test of 16.3, if necessary		N/A
25.24	Interconnection cords are not detachable without the aid of a tool if compliance with this standard is impaired when they are disconnected		N/A
25.25	Dimensions of pins of appliances that are inserted into socket-outlets are compatible with the dimensions of the relevant socket-outlet		N/A
	Dimensions of the pins and engagement face of plugs are in accordance with the dimensions of the relevant plug standard	Type F plug; Types G, J and L may also be used	P

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Clause	Requirement – Test	Result – Remark	Verdict
26	**TERMINALS FOR EXTERNAL CONDUCTORS**		
26.1	Appliances are provided with terminals or equally effective devices for the connection of external conductors	Screw terminals on the control circuit board	P
	Terminals, other than in class III appliances, are only accessible after removal of a non-detachable cover		P
	Earthing terminals may be accessible if a tool is required to make the connections and the wire is clamped independently from its connection		N/A
26.2	Appliances with type X attachment, except having a specially prepared cord, and appliances for the connection to fixed wiring are provided with terminals with screws, nuts or similar devices, unless the connections are soldered	Type Y attachment; not for connection to the fixed wiring	N/A
	Screws and nuts are not used to fix any other components		N/A
	Screws and nuts may be used to clamp internal conductors if they are unlikely to be displaced when fitting the supply conductors		N/A
	Soldered connections, the conductor is so position or fixed that reliance is not placed upon the soldering alone to maintain it in position		N/A
	Soldering alone may be used if barriers are provided so that clearances or creepage distances cannot be reduced below the specified values for SI if the conductor becomes free		N/A
26.3	Terminals for type X attachment and for the connection to fixed wiring clamp the conductor between metal surfaces with sufficient contact pressure without causing damage		N/A
	Terminals are fixed so that when the clamping means are tightened or loosened:		
	– the terminal does not become loose		N/A
	– internal wiring is not subjected to stress		N/A
	– clearances or creepage distances are not reduced below the specified values		N/A
	Torque test of 9.6 of EC 60999-1; no deep or sharp indentations of the conductors		N/A
26.4	Terminals for type X attachment, except having a specially prepared cord, and terminals for the connection to fixed wiring do not require special preparation of the conductor		N/A
	Terminals are constructed or placed so that the conductor cannot slip out when clamping means are tightened		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
26.5	Terminals for type X attachment are located or shielded so that if a wire of a stranded conductor escapes there is no risk of accidental connection to other parts which would result in a hazard		N/A
	Stranded conductor test with 8 mm of insulation removed; no contact between live parts and accessible metal parts		N/A
26.6	Terminals for type X attachment and for the connection to fixed wiring allow the connection of conductors having nominal cross-section area as specified		N/A
	Terminals for specially prepared cord are only suitable for this cord		N/A
26.7	Terminals for type X attachment, other than in class III appliances, are accessible after removal of a cover or part of the enclosure		N/A
26.8	Terminals for the connection of fixed wiring, including earthing terminal, are located close to each other		N/A
26.9	Terminals of pillar type are constructed or located so that the end of a conductor introduced is visible or can pass beyond the threaded hole for the specified distance		N/A
26.10	Terminals with screw clamping and screwless terminals are not used for the connection of flat twin tinsel cords, unless the ends are fitted with suitable means for use with screw terminals		N/A
	Pull test; no damage to the connection	5 N	N/A
26.11	Appliances having type Y of type Z attachment, soldered, welded, crimped or similar connections may be used	Screw terminals	P
	Conductors connected by soldering are not considered to be positioned or fixed so that reliance is not placed on the soldering alone, unless they are held independently of the solder		N/A
	Class II appliances, reliance is not placed upon the soldering, crimping or welding alone to maintain the conductor in position		N/A
	These methods alone may be used if barriers are provided so that clearances or creepage distances cannot be reduced below the specified values for SI if the conductor becomes free		N/A
27	**PROVISION FOR EARTHING**		
27.1	Accessible metal parts of class 0I and class I appliances that may become live in the event of BI failure are permanently and reliably connected to an earthing terminal	No earthing; Class II appliance	N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Earthing terminals and contacts are not connected to the neutral terminal		N/A
	Class 0, class II and class III appliances have no provision for earthing		P
	Class II and class III appliances may incorporate an earth for functional purposes		N/A
	SELV circuits are not earthed, unless they are protective SELV circuits		N/A
27.2	Clamping means of earthing terminals are adequately secured against accidental loosening		N/A
	Terminals for the connection of external equipotential bonding conductors allow nominal cross-section areas of 2.5…6 mm^2		N/A
	Such terminals are not used to provide earthing continuity between different parts of the appliance		N/A
	Not possible to loosen the conductors without the aid of a tool		N/A
27.3	Detachable parts with connections, the earthing connection is made before current-carrying connections, separated after such connections		N/A
	Appliances with supply cords, arrangement is such that the current-carrying conductors become taut before the earthing conductor, if the cord slips out of the cord anchorage		N/A
27.4	Parts of the earthing terminal, no risk of corrosion resulting from contact of the terminal metal and the conductor copper		N/A
	Parts providing earthing continuity are of a metal adequately resistant to corrosion, unless they are parts of metal frame, enclosure or of copper or its alloys		N/A
	Parts of steel providing earthing continuity are provided with an electroplated coating ≥ 5 µm		N/A
	Parts of coated or uncoated steel that only provide or transmit contact pressure are adequately protected against rusting		N/A
	Parts of a frame or enclosure of aluminum or its alloys, precautions are taken to avoid the risk of corrosion resulting from contact between copper and aluminum or its alloys		N/A
27.5	Connection between the earthing terminal or contact and earthed metal parts has low resistance		N/A
	Not applicable if the clearances of BI in a protective SELV circuit are based on the rated voltage		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Resistance measurement; ≤ 0.1 Ω		N/A
27.6	Printed conductors of PCBs are not used to provide earthing continuity in hand-held appliances		N/A
	Printed conductors may be used in other appliances if at least two tracks are used		N/A
28	**SCREWS AND CONNECTIONS**		
28.1	Fixings, electrical connections, earthing continuity connections withstand the mechanical stresses occurring in normal use		P
	Screws are not of soft metal or liable to creep		P
	Screws of insulating material, ∅ ≥ 3 mm		N/A
	Screws of insulating material are not used for electrical or earthing continuity connections		P
	Screws used for electrical or earthing continuity connections screw into metal		P
	Screws are not of insulating material if their replacement with a metal screw impair SI or RI		N/A
	Screws removable during replacement of a supply cord or user maintenance are not of insulating material if their replacement by a metal screw impair BI		N/A
	Test of screws and nuts; no damage impairing further use of the fixings occur	(See appended table)	P
28.2	Electrical and earthing continuity connections, contact pressure is not transmitted through non-ceramic insulating material liable to shrink or distort, unless it is compensated by metal parts		P
	The requirement does not apply to electrical connections in circuits carrying ≤ 0.2 A and for which 30.2.2 is applicable or ≤ 0.5 A and for which 30.2.3 is applicable		N/A
28.3	Space-threaded (sheet metal) screws are only used for electrical connections if they clamp the parts together		N/A
	Thread-cutting (self-tapping) screws are only used for electrical connections if they generate a full form machine screw thread	Only for mechanical connections (wiring com-partment cover fixation)	N/A
	Thread-cutting (self-tapping) screws are not used if likely to be operated by the user or installer		N/A
	Thread-cutting and space-threaded screws may be used for earthing continuity connections if it is not necessary to disturb the connection		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	At least two screws are used for earthing continuity connection, unless a thread length is at least half the diameter of the screw		N/A
28.4	Screws and nuts making mechanical connections are secured against loosening if they also make electrical or earthing continuity connections		N/A
	Rivets used for electrical or earthing continuity connections are secured against loosing if such connections are subject to torsion in normal use		N/A
29	**CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION**		
	Clearances, creepage distances and SolIns are adequate to withstand the electrical stresses		P
	If coatings are used on PCBs, Annex J applies		P
29.1	Clearances are not less than the values specified taking into account the rated impulse voltage	(See appended table)	P
	Clearances for appliances for altitudes > 2000 m		N/A
	Clearances for BI and FI comply with the impulse voltage test of Cl. 14		P
	If distances could be affected by wear, distortion, movement of parts, the clearances for rated impulse voltage 1500 V are increased	+ 0.5 mm	N/A
	Application of a force by means of test probe B; measurements	☐ 2 N, for bare conductors ☒ 30 N, for accessible surfaces	P
29.1.1	Clearances of BI are sufficient to withstand the overvoltages likely to occur during use	(See appended table)	P
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1.0 mm if the pollution degree is 1		N/A
	Lacquered conductors of windings are considered to be bare conductors		N/A
29.1.2	Clearances of SI are not less than those specified for BI	(See appended table)	P
29.1.3	Clearances of RI are not less than those specified for BI using the next higher step for rated impulse voltage	(See appended table)	N/A
29.1.4	Clearances for FI are determined as specified	(See appended table)	N/A
	Clearances are not specified if the appliance complies with Cl. 19 with the FI short-circuited		N/A
	Lacquered conductors of windings are considered to be bare conductors; clearances at crossover point are not measured		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Clearance between surfaces of PTC heating elements may be reduced to 1 mm		N/A
29.1.5	Appliances having higher working voltages than rated voltage, the clearances for BI are determined as specified		N/A
	If secondary winding of a step-down transformer is earthed or an earthed screen between the primary and secondary windings exists, clearance of BI on the secondary side is not less than specified using the next lower step		N/A
	Circuits supplied with a voltage lower than rated voltage, clearances of FI are based on the working voltage		N/A
29.2	Creepage distances are not less than the values specified taking into account the material group and the working voltage	(See appended table)	P
	For fan heaters and cab heaters, microenviron-ment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use		N/A
	Application of a force by means of test probe B; measurements	☐ 2 N, for bare conductors ☒ 30 N, for accessible surfaces	P
	In a DI system, the working voltage for both the BI and SI is taken as the working voltage across the complete DI system		P
29.2.1	Creepage distances of BI are not less than the values specified	(See appended table)	P
	If working voltage is periodic and f > 30 kHz, the creepage distances are determined as specified		N/A
29.2.2	Creepage distances of SI are not less than those specified for BI	(See appended table)	P
29.2.3	Creepage distances of RI are not less than double those specified for BI	(See appended table)	N/A
29.2.4	Creepage distances of FI are not less than those specified	(See appended table)	N/A
	If working voltage is periodic and f > 30 kHz, the creepage distances are determined as specified		N/A
	Creepage distances may be reduced if the appliance complies with Cl. 19 with the FI short-circuited		N/A
29.3	SI and RI have adequate thickness, or a sufficient number of layers, to withstand the electrical stresses expected during the use	(See appended table)	P
	Compliance is checked by one of the following subclauses from 29.3.1 to 29.3.4:		

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Clause	Requirement – Test	Result – Remark	Verdict
29.3.1	Thickness of SI is at least 1 mm	≥ 1 mm	P
	Thickness of RI is at least 2 mm		N/A
29.3.2	Each layer of material of SI withstands the electric strength test of 16.3		N/A
	SI consists of at least 2 layers of material		N/A
	RI consists of at least 3 layers of material		N/A
29.3.3	Dry heat test Bb of IEC 60068-2-2 for the insulation	T_{max} + 50 K, 48 h	N/A
	Electric strength test of 16.3 at the conditioning temperature		N/A
	Electric strength test of 16.3 after cooling down to room temperature		N/A
	The test is not carried out if the temperature rise of the insulation during the tests of Cl. 19 does not exceed specified values		N/A
29.3.4	Thickness of the accessible parts of RI consisting of a single layer is not less than specified		N/A
29.3.Z1	Appliances constructed so that if there is a possibility of damaging the insulation during installation, the insulation withstands the scratch and penetration test of 21.2		N/A
30	**RESISTANCE TO HEAT AND FIRE**		
30.1	Parts are sufficiently resistant to heat:		
	– external parts of non-metallic material		P
	– part of insulating material supporting live parts		N/A
	– parts of thermoplastic material providing SI or RI		P
	For fan heaters, other than cab heaters, the temperature rises determined during the tests of Cl. 19 are only taken into account for non-metallic parts supporting or being in direct contact with non-self-resetting thermal cut-outs and heating elements		N/A
	Ball pressure test; immersion diameter ≤ 2 mm	(See appended table)	P
30.2	Parts of non-metallic material are resistant to ignition and spread of fire		P
30.2.1	Glow-wire test of IEC 60695-2-11 at 650 °C on parts of non-metallic material	(See appended table)	P
	The test is not carried out on parts having GWFI at least 650 °C according to IEC 60695-2-12		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	The test is not carried out on parts classified at least HB40 according to IEC 60695-11-10		N/A
	Parts on which the glow-wire test cannot be carried out meet the requirements of ISO 9772 for material classified HBF		N/A
30.2.2	Glow-wire test of IEC 60695-2-11 for appliances operated while attended on parts of non-metallic material supporting current-carrying connections	Not applicable	
	– 750 °C, for connections carrying a current > 0.5 A during normal operation	(See appended table)	
	– 650 °C, for other connections	(See appended table)	
	Non-metallic material within 3 mm but shielded by a different material, the tip of the glow-wire is applied to the interposed shielding material		
	The test is not carried out on parts having GWFI according to IEC 60695-2-12 of at least 750 °C or 650 °C as appropriate		
	The test is not carried out on small parts providing these parts:		
	– comprise material having GWFI of at least 750 °C of 650 °C as appropriate, or		
	– comply with the needle-flame test of Annex E, or		
	– comprise material classified as V-0 or V-1 according to IEC 60695-11-10		
	The glow-wire test of IEC 60695-2-11 is not applicable to:		
	– hand-held appliances		
	– appliances to be kept switched on by hand or foot		
	– appliances continuously loaded by hand		
	– parts supporting welded connections		
	– parts supporting connections in low-power circuits specified in 19.11.1		
	– soldered connections on PCBs		
	– connections on small PCB components		
30.2.3	Appliances operated while unattended are tested as specified in 30.2.3.1 and 30.2.3.2		
	The tests are not applicable to:		
	– parts supporting welded connections		N/A
	– parts supporting connections in low-power circuits specified in 19.11.1		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	– soldered connections on PCBs		P
	– connections on small PCB components		P
30.2.3.1	Glow-wire test of IEC 60695-2-11 at 850 °C on parts of non-metallic material supporting connections carrying a current > 0.2 A	(See appended table)	N/A
	The test is not carried out on parts having GWFI at least 850 °C according to IEC 60695-2-12		N/A
30.2.3.2	Glow-wire test of IEC 60695-2-11 on parts of non-metallic material supporting connections		
	– 750 °C, for connections carrying a current > 0.2 A during normal operation	(See appended table)	N/A
	– 650 °C, for other connections	(See appended table)	N/A
	Non-metallic material within 3 mm but shielded by a different material, the tip of the glow-wire is applied to the interposed shielding material		N/A
	The test is not carried out on parts having both, GWIT according to IEC 60695-2-13 of at least 775 °C or 675 °C as appropriate and GWFI according to IEC 60695-2-12 of at least 750 °C or 650 °C as appropriate		N/A
	The test is not carried out on small parts providing these parts:		N/A
	– comprise material having GWIT of at least 775 °C of 675 °C as appropriate, or		N/A
	– comprise material having GWFI of at least 750 °C of 650 °C as appropriate, or		N/A
	– comply with the needle-flame test of Annex E, or		N/A
	– comprise material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
	Consequential needle-flame test in accordance with Annex E on non-metallic parts within the envelope of a ∅20 × h50 vertical cylinder above the center of the connection zone if these parts:		
	– withstood the glow-wire test at 750 °C or 650 °C as appropriate, but produce a flame that persists > 2 s, or	(See appended table)	N/A
	– comprise material having GWFI of at least 750 °C of 650 °C as appropriate, or		N/A
	– small parts comprising material having GWFI of at least 750 °C of 650 °C as appropriate, or		N/A
	– small parts for which the needle-flame test of Annex E was applied, or		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	– small parts for which a material classification of V-0 or V-1 was applied		N/A
	The test is not carried out on non-metallic parts, including small parts, within the cylinder that are:		
	– parts having GWIT of at least 750 °C or 650 °C as appropriate, or		N/A
	– parts comprising material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
	– parts shielded by a flame barrier that meets the needle-flame test of Annex E or that comprises material classified of V-0 or V-1 was applied		N/A
30.2.4	Needle-flame test of Annex E on the base material of PCBs	(See appended table)	N/A
	The test is not carried out on:		
	– PCBs of low-power circuits specified in 19.11.1		N/A
	– PCBs in a metal enclosure that confines flames or burning droplets		N/A
	– PCBs in hand-held appliances		N/A
	– PCBs in appliances to be kept switched on by hand or foot		N/A
	– PCBs in appliances continuously loaded by hand		N/A
	– a base material classified as V-0 according to IEC 60695-11-10 or VTM-0 according to ISO 9773		P
30.101	Fan heaters are resistant to fire		N/A
	Needle-flame test of Annex E		N/A
	The needle-flame test is not carried out on material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
	This test is not carried out on fan heaters that are also intended to be operated at maximum heat output with the fan switched off		N/A
31	**RESISTANCE TO RUSTING**		
	Ferrous parts, the rusting of which might cause the appliance to fail to comply, are adequately protected against rusting		P
32	**RADIATION, TOXICITY AND SIMILAR HAZARDS**		
	The appliance does not emit harmful radiation, present toxic or similar hazard		P

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Clause	Requirement – Test	Result – Remark	Verdict
A	**ANNEX A (INFORMATIVE) ROUTINE TESTS**		
	Description of routine tests to be carried out by the manufacturer	According to Manufacturer Quality System	P
A.1	Earth continuity test		N/A
A.2	Electric strength test		P
A.3	Functional test		P

B	**ANNEX B (NORMATIVE) APPLIANCES POWERED BY RECHARGEABLE BATTERIES THAT ARE RECHARGED IN THE APPLIANCES**		
	The following modifications are applicable for appliances powered by batteries that are recharged in the appliance		
3.19	Normal operation:		
	– the appliance, supplied by its fully charged battery, is operated as specified in relevant part 2		N/A
	– the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		N/A
	– if possible, the appliance is supplied from the supply mains through its battery charger, the battery being initially discharged to such an extent that the appliance cannot operate; the appliance is operated as specified in relevant part 2		N/A
	If the appliance incorporates inductive coupling between two parts that are detachable from each other, the appliance is supplied from the supply mains with the detachable part removed		N/A
5.B.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		N/A
7.1	Battery compartment for batteries intended to be replaced by the user is marked with battery voltage and polarity of the terminals		N/A
	Symbol for appliances to be supplied from a detachable supply unit, and statement		N/A
7.12	The instructions for appliances incorporating batteries intended to be replaced by the user include the following:		
	– type reference of the battery		N/A
	– the orientation of the battery with regard to polarity		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	– the method of replacing batteries		N/A
	– details regarding safe disposal of used batteries		N/A
	– warning against using non-rechargeable batteries		N/A
	– how to deal with leaking batteries		N/A
	Substance for appliances containing non-user-replaceable batteries	“This appliance contains batteries that are…”	N/A
	Substance for appliances containing non-replaceable batteries	“This appliance contains batteries that are non-replaceable”	N/A
	Type of the detachable supply unit used for recharging batteries; warning statement	“WARNING: For the purposes of recharging the battery, only use…”	N/A
7.15	Markings are placed on the part of the appliance connected to the supply mains		N/A
	Type reference of the detachable supply unit		N/A
8.2	Appliances having batteries that according to the instruction may be replaced by the user need only have BI between live parts and their surface of the battery compartment; if the appliance can operate without batteries, DI or RI is required		N/A
11.7	The battery is charged for the period stated in the instructions or for 24 h		N/A
19.1	Appliances subjected to tests of 19.101, 19.102 and 19.103		N/A
19.3	The battery does not rupture or ignite		N/A
19.B.101	Appliances are supplied at rated voltage for 168 h, the battery being continually charged during this period		N/A
19.B.102	For appliances having batteries that can be removed without the aid of a tool, short-circuiting of the terminals of the battery, the battery being fully charged		N/A
19.B.103	Appliances having batteries that are replaceable by the user supplied at rated voltage and operated under normal operation but with the battery removed or in any position allowed by the construction		N/A
21.B.101	Appliances having pins for insertion into socket outlets have adequate mechanical strength. Free fall test, procedure 2, of IEC 60068-2-32:		N/A
	– 100 falls, if ≤ 250 g		N/A
	– 50 falls, if > 250 g		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
25.13	An additional lining or bushing is not required for interconnection cords operating at safety extra-low voltage		N/A
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies; for other parts, 30.2.2 applies		N/A
C	**ANNEX C (NORMATIVE) AGEING TEST ON MOTORS**		
	This annex is applicable when there is doubt with regard to the temperature classification of the insulation of a motor winding		N/A
D	**ANNEX D (NORMATIVE) ALTERNATIVE REQUIREMENTS FOR PROTECTED MOTORS**		
	This annex is applicable to appliances having motors that incorporate thermal motor protectors		N/A
	Temperatures do not exceed those specified in 19.7 and the appliance complies with 19.13		N/A
E	**ANNEX E (NORMATIVE) NEEDLE FLAME TEST**		
	Needle-flame test is carried out in accordance with IEC 60695-2-2, with the following modifications:		
5	The duration of application of the test flame is (30 ± 1) s		N/A
8.2	The specimen is so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1		N/A
8.4	The first paragraph does not apply		N/A
	If possible, the flame is applied at least 10 mm from a corner		N/A
8.5	The test is carried out on one specimen; if the specimen does not withstand the test, the test may be repeated on two further specimens, both withstanding the test		N/A
10	The duration of burning is not exceeding 30 s		N/A
	For printed circuit boards, the duration of burning is not exceeding 15 s		N/A
F	**ANNEX F (NORMATIVE) CAPACITORS**		
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, as modified below:		

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Clause	Requirement – Test	Result – Remark	Verdict
1.5.3	Class X capacitors are tested according to subclass X2		N/A
1.5.4	This subclause is applicable		N/A
1.6	Items a) and b) are applicable		N/A
3.4.3.2	Table II is applicable as specified		N/A
4.1	This subclause is applicable		N/A
4.2.1	This subclause is applicable		N/A
4.2.5	This subclause is applicable		N/A
4.2.5.2	Only table IX is applicable. Values for test A apply; however, for capacitors in heating appliances the values for test B or test C apply		N/A
4.12	This subclause is applicable		N/A
4.13	This subclause is applicable		N/A
4.14	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 applicable		N/A
4.17	This subclause is applicable		N/A
4.18	This subclause is applicable		N/A
G	**ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS**		
	The following modifications are applicable for safety isolating transformers:		
7.1	Transformers for specific use are marked with:		
	– name, trademark or identification mark of the manufacturer or responsible vendor		N/A
	– model or type reference		N/A
17	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1 (the test is carried out on three transformers)		N/A
22	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		N/A
29.1, 29.2, 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply (the values stated for pollution degree 2 are applicable)		N/A
H	**ANNEX H (NORMATIVE) SWITCHES**		
	Switches comply with the following clauses of IEC 61058-1, as modified below:		
	The tests of IEC 61058-1 are carried out under the conditions occurring in the appliance		N/A
	Before being tested, switches are operated 20 times without load		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
8	Switches are not required to be marked		N/A
	Switches that can be tested separately from the appliance are marked with the manufacturer's name or trade mark and the type reference		N/A
15.1	Not applicable		N/A
15.2	Not applicable		N/A
15.3	Applicable for full disconnection and micro disconnection		N/A
17	Compliance is checked on three separate appliances or switches		N/A
	For 17.2.4.4, the number of cycles of actuation declared according to 7.1.4 is 10 000 unless otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335		N/A
	Switches intended for operation under no load and which can be operated only by a tool and switches operated by hand that are interlocked so that they cannot be operated under load, are not subjected to the tests		N/A
	Switches without this interlock are subjected to the test of 17.2.4.4 for 100 cycles of operation		N/A
	Subclauses 17.2.2 and 17.2.5.2 are not applicable		N/A
	At the end of the tests, temperature rise of the terminals is not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1		N/A
20	This clause is applicable to clearances across full disconnection and micro-disconnection; it is also applicable to creepage distances for FI, as stated in table 24		N/A
I	**ANNEX I (NORMATIVE) MOTORS HAVING BASIC INSULATION THAT IS INADEQUATE FOR THE RATED VOLTAGE OF THE APPLIANCE**		
	The following modifications are applicable for motors having basic insulation that is inadequate for the rated voltage of the appliance:		
11.3	Temperature rise of the body of the motor is determined instead of the temperature rise of the windings		N/A
11.8	Temperature rise of the body of the motor, where in contact with insulating material, is not exceeding values in table 3 for the relevant insulating material		N/A
16.3	Insulation between live parts of the motor and its other metal parts is not subjected to the test		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
19.1	The tests of 19.7 to 19.9 are not carried out		N/A
19.I.101	The appliance is supplied at the rated voltage and operated under normal operation with each of the following fault conditions:		
	– short circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit		N/A
	– short circuit of each diode of the rectifier		N/A
	– open circuit of the supply to the motor		N/A
	– open circuit of any parallel resistor, the motor being in operation		N/A
	Only one fault is simulated at a time, the tests are carried out consecutively		N/A
	When any of the fault conditions are simulated, the duration of the test is as specified in 19.7		N/A
22.I.101	For class I appliances incorporating a motor supplied by a rectifier circuit, the d.c. circuit being insulated from accessible parts of the appliance by DI or RI		N/A
J	**ANNEX J (NORMATIVE) COATED PRINTED CIRCUITS BOARDS**		
	Testing of protective coatings of printed circuit boards is carried out in accordance with IEC 60664-3 with the following modifications:		
6.6	When production samples are used, three samples of the printed circuit board are tested		P
6.6.1	The test is carried out at –25 °C		P
6.6.3	Severity 1 is specified		P
6.8.6	Type A coatings are not subjected to a partial discharge test		P
6.9	This subclause is not applicable		P
K	**ANNEX K (NORMATIVE) OVERVOLTAGE CATEGORIES**		
	The information on overvoltage categories is extracted from IEC 60664-1		P
	Overvoltage category is a numeral defining a transient overvoltage condition		P
	Equipment of overvoltage category IV is for use at the origin of the installation		N/A
	Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements		N/A

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation		P
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies		N/A
	Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriate low level		N/A
L	**ANNEX L (INFORMATIVE) GUIDANCE FOR THE MEASUREMENT OF CLEARANCE AND CREEPAGE DISTANCES**		
L.1	Sequence for the determination of clearances		P
L.2	Sequence for the determination of creepage distances		P
M	**ANNEX M (NORMATIVE) POLLUTION DEGREE**		
	The information on pollution degrees is extracted from IEC 60664-1:		
	The microenvironment determines the effect of pollution on the insulation, taking into account the microenvironment		P
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar		P
	Minimum clearances specified where pollution may be present in the microenvironment		P
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		
	– pollution degree 1: no pollution or only dry, non-conductive pollution occurs; the pollution has no influence		N/A
	– pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected		P
	– pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected;		N/A
	– pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
N	**ANNEX N (NORMATIVE) PROOF TRACKING TEST**		
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		
7.3	Test solution A is used		N/A
10.1	Voltage is 100 V, 175 V, 400 V or 600 V, as appropriate		N/A
	The test is carried out on five specimens		N/A
	In case of doubt, additional test with voltage reduced by 25 V, the number of drops is increased to 100		N/A
10.2	The report stating if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V		N/A
O	**ANNEX O (INFORMATIVE) SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30**		
	Description of tests for determination of resistance to heat and fire		
P	**ANNEX P (INFORMATIVE) GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN TROPICAL CLIMATES**		
	The following modifications are applicable for Class 0 and Class 0I appliances having a rated voltage exceeding 150 V, that are intended to be used in countries having a tropical climate and that are marked WDaE:		
	They may also be applied to Class I if they are liable to be connected to a supply mains that excludes the protective earthing conductor due to deficiencies in the fixed wiring system		
5.7	The ambient temperature for the tests of Clauses 11 and 13 is (40 +3/-0) °C		N/A
7.1	The appliance is marked with the symbol		N/A
7.12	The instructions state that the appliance is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA		N/A
	The instructions state the following substance: “This appliance is considered to be suitable for use in countries having a tropical climate. It may also be used in other countries.”		N/A
	The meaning of the symbol explained		N/A
11.8	The values of Table 3 are reduced by 15 K		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
13.2	The leakage current for class I appliances does not exceed 0.5 mA		N/A
15.3	The value of t is 37 °C		N/A
16.2	The leakage current for class I appliances does not exceed 0.5 mA		N/A
19.13	The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3		N/A
Q	**ANNEX Q (INFORMATIVE) SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS**		
	Description of tests for appliances incorporating electronic circuits		
R	**ANNEX R (NORMATIVE) SOFTWARE EVALUATION**		
R.1	Programmable electronic circuits using software		N/A
R.2	Requirements for the architecture		N/A
R.2.1	General		N/A
R.2.2	Measurements to control faults/errors		N/A
R.3	Measurements to avoid errors		N/A
R.3.1	General		N/A
R.3.2	Specification		N/A
R.3.2.1	Software safety requirements		N/A
R.3.2.2	Software architecture		N/A
R.3.2.3	Module design and coding		N/A
R.3.3.3	Software validation		N/A
S	**ANNEX S (NORMATIVE) BATTERY-OPERATED APPLIANCES POWERED BY BATTERIES THAT ARE NON-RECHARGABLE OR NOT RECHARGED IN THE APPLIANCE**		
	The following modifications are applicable for battery-operated appliances where batteries are either non-rechargeable or they are not recharged in the appliance		
5.8.1	More unfavourable polarity applied, if the polarity is not indicated		N/A
5.S.101	Battery-operated appliances are tested with the supplied battery box		N/A
5.S.102	Battery-operated appliances are tested as motor-operated appliances		N/A
7.1	Battery voltage and polarity of the terminals are marked		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Markings for battery-operated appliances:		
	– name, trade mark or identification mark of the manufacturer or vendor		N/A
	– model or type reference		N/A
	– IP number according to degree of protection against ingress of water, other than IPX0		N/A
	– type reference of battery or batteries		N/A
	Markings of positive and negative terminals	+ / –	N/A
7.12	Information to be provided in the instruction manual:		
	– the types of batteries that may be used		N/A
	– how to remove and insert the batteries		N/A
	– non-rechargeable batteries are not to be recharged		N/A
	– rechargeable batteries are to be removed from the appliance before being charged		N/A
	– different types of batteries or new and used batteries are not to be mixed		N/A
	– batteries are to be inserted with the correct polarity		N/A
	– exhausted batteries are to be removed from the appliance and safely disposed		N/A
	– if the appliance is to be stored unused for a long period, the batteries should be removed		N/A
	– the supply terminals are not to be short-circuited		N/A
11.5	Battery-operated appliances are supplied by means of an external power supply with the most unfavourable supply voltage		N/A
19.1	For battery-operated appliances, the tests are carried out with the battery fully charged		N/A
19.13	The battery does not rupture or ignite		N/A
19.S.101	Battery-operated appliances are supplied with the voltage specified in 11.5		N/A
	The supply terminals having an indication of polarity are connected to the opposite polarity		N/A
19.S.102	For appliances with provision for multiple batteries, one or more of the batteries is reversed and the appliance is operated		N/A

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
25.5	Flexible leads or flexible cord used to connect an external battery or battery box in battery-operated appliances is connected to the appliance by a type X attachment		N/A
25.13	This requirement is not applicable to the flexible leads or flexible cord connecting external batteries or a battery box with an appliance		N/A
25.S.101	Battery-operated appliances have suitable means for connection of the battery		N/A
26.5	No risk of accidental connection between supply terminals for flexible leads or cord		N/A
30.2.3.2	Addition as specified		N/A
T	**ANNEX T (NORMATIVE) UV-C RADIATION EFFECT ON NON-METALLIC MATERIALS**		
5.1.6	The UV-C emitter shall be a low pressure mercury lamp		N/A
5.2.5	The black-panel temperature shall be 63 ± 3 °C		N/A
5.3.1	Humidification of the chamber air is specified in part 2 when necessary		N/A
9	Test report		
	This clause is not applicable		
7.1	General specification of the exposure procedure		N/A
7.2	Mounting of the test specimens		N/A
7.3	Exposure test		N/A
7.4	Measurement of radiant exposure		N/A
7.5	Determination of changes in properties after exposure		N/A
8	Exposure report		
	This clause is not applicable		

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict

ZA	**ANNEX ZA (NORMATIVE) SPECIAL NATIONAL CONDITIONS**		
19.5	The test is also applicable to appliances intended to be permanently connected to the fixed wiring	Norway	
22.2	The second paragraph of this subclause is not applicable due to the supply system	Norway	
25.6, 25.25	Information concerning National plug and socket-outlets is available from the CENELEC website		
25.8	In the table, replace the line for 10 A and 16 A by: > 10 and ≤ 13 1.25 (1.0)[b] > 13 and ≤ 16 1.5 (1.0)[b]	Ireland and United Kingdom	

ZB	**ANNEX ZB (INFORMATIVE) A-DEVIATIONS**		
25.6	These regulations apply to all plugs for domestic use at a voltage not less than 200 V and in general allow only plugs complying with I.S. 401:1997, or equivalent, to be fitted to domestic appliances	Ireland	
25.6	These regulations apply to all plugs for domestic use at a voltage not less than 200 V and in general allow only plugs to BS 1363 to be fitted to domestic appliances. It also allows plugs to BS 4573 an EN 50075 to be fitted to shavers and toothbrushes	United Kingdom	

ZE	**ANNEX ZE (INFORMATIVE) SPECIFIC ADDITIONAL REQUIREMENTS FOR APPLIANCES AND MACHINES INTENDED FOR COMMERCIAL USE**		
7.1	Replacement of the fourth and fifth items, addition of a new item		
	– business name and full address of the manufacturer and, where applicable, his authorized representative		N/A
	– model or type reference, serial number, if any, and production year		N/A
	– designation of the appliance		N/A
7.12	Instructions contain at least the following information:		
	– the business name and full address of the manufacturer and, where applicable, his authorized representative		N/A
	– model or type reference as marked on the appliance, except for serial number		N/A

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
	– the designation of the appliance together with its explanation in case it is given by a combination of letters and/or numbers		N/A
	– the general description of the appliance, when needed due to its complexity		N/A
	– specific precautions if required during installation, operation, adjusting, user maintenance, cleaning, repairing, etc.		N/A
	– drawings, diagrams, descriptions and explanations necessary for the safe use and user maintenance of the appliance		N/A
	– the possible reasonably foreseeable misuse and a warning against the effects it may have on the safe use of the appliance		N/A
	Words “Original instructions” appear on the language version(s) verified by the manufacturer or by the authorized representative		N/A
	Translation of the original instructions, the meaning of the sentence “Translation of the original instructions” appear in the relevant instructions delivered with the appliance		N/A
	Instructions for maintenance/service to be done by specialized personnel, mandated by the manufacturer or the authorized representative, supplied in only one Community language which the specialized personnel understand		N/A
	Instructions indicate the type and frequency of inspections, maintenance and preventive measures required for safe operation		N/A
7.12.ZE1	Information for specific appliances:		
	– on use, transportation, assembly, dismantling, testing of foreseeable breakdowns		N/A
	– on how to maintain adequate mechanical stability when in use, during transportation, assembly, dismantling		N/A
	– on protective measures to be taken by the user, personal protective equipment		N/A
	– on operating method to be followed in the event of accident or breakdown, methods to safely unblock the appliance		N/A
	– on specification of the spare parts, when these affect the health and safety of the operator		N/A
	– on airborne noise emissions		N/A

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
7.12.ZE2	Instructions include a warning that the appliance shall be disconnected from its power source during service and when replacing parts		N/A
	If disconnection is not possible, a disconnection with a locking system in the isolated position is provided		N/A
19.11.4.8	Replacement as specified		N/A
20.1	Appliances and their components and fittings have adequate mechanical stability during transportation, assembly, dismantling and any other action involving the appliance		N/A
20.2	Replacement of the full subclause		
	Dangerous moving transmission parts safeguarded either by design or guards		N/A
	Guards used are fixed guards, interlocking movable guards or protective devices		N/A
	Moving parts as a function of the appliance which cannot be made completely inaccessible are fitted with:		
	– fixed guards or interlocking movable guards, if parts are not used in work		N/A
	– adjustable guards restricting access to sections where access is necessary		N/A
	Interlocking movable guards are used where frequent access is required		N/A
21.1	Replacement of the requirement		
	Appliances and their components and fittings have adequate mechanical strength and constructed to withstand such rough handling, that may be expected in normal use, during transportation, assembly, dismantling, etc.		N/A
22.ZE.1	Appliances provided with a seat, the seat gives adequate stability		N/A
	Distance between the seat and the control devices is adaptable to the operator		N/A
22.ZE.2	Appliances with separate devices for the start and the stop functions, the stop function is unambiguously identifiable		N/A
	Appliances with one device performing the start and the stop functions, the stop function is unambiguously identifiable		N/A
	The stop function always override the start function		N/A

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
22.ZE.3	Appliances are designed in such a way that incorrect mounting is avoided, if this can lead to an unsafe situation		N/A
	Information on the correct mounting is given directly on the part/enclosure		N/A
22.ZE.4	If weight, size or shape prevents appliances from being moved manually, appliances are:		
	– fitted with attachments for lifting gear, or		N/A
	– designed so that they can be fitted with attachments for lifting gear, or		N/A
	– shaped in such a way that standard lifting gear can easily be used		N/A
	Appliances to be moved manually are constructed or equipped so that they can be moved easily and safely		N/A
22.ZE.5	Fixing systems or fixed guards which prevent access to dangerous moving transmission parts are only removable with the use of tools		N/A
	If such guards are removable for cleaning and maintenance, fixing systems remain attached to the fixed guards or to the machine after removal		N/A
	Guards are incapable of remaining in place without their fixings		N/A
	The above requirement is not applicable if the appliance becomes inoperative if the component is incorrectly repositioned or absent		N/A
	Movable guards are interlocked		N/A
	Interlocking devices prevent the start of the hazardous appliance functions until the guards are fixed in their position		N/A
	Interlocking devices give a stop command whenever they are no longer closed		N/A
	If an operator is possible to reach the danger zone before the risk has ceased, movable guards are associated with a guard locking device in addition to an interlocking device that:		N/A
	– prevents the start of hazardous appliance functions until the guard is closed and locked, and		N/A
	– keeps the guard closed and locked until the risk of injury has ceased		N/A
	Interlocking movable guards remain attached to the appliance when open		N/A
	Interlocking movable guards can be adjusted only by means of an intentional action		N/A

LVS EN 60335-2-30:2010 + A11:2012 + A1:2020 (LVS EN 60335-1:2012 + A11:2014 + A13:2018 + A14:2019 + A1:2019 + A2:2019 + A15:2021)			
Clause	Requirement – Test	Result – Remark	Verdict
22.ZE.6	Interlocking movable guards are designed to prevent the start or stop of the hazardous appliance functions in case of absence or failure		N/A
	Interlock system test; fit for further use		N/A
22.ZE.7	Adjustable guards restricting access to areas of the moving parts strictly necessary for the work are:		N/A
	– adjustable manually or automatically, depending on type of work involved, and		N/A
	– readily adjustable without the use of tools		N/A
22.ZE.8	In case of the power supply interruption the appliance does not restart after re-establishment of the power supply		N/A
	Automatic restarting is allowed if the appliance continues to operate without causing any hazard to the user		N/A
22.ZE.9	Appliances are fitted with means to isolate them from all energy sources		N/A
	Such isolators are clearly identified		N/A
	Such isolators are capable of being locked if reconnection could endanger persons		N/A
	Disconnection of the energy source, dissipation of remaining or store energy is possible without risk to persons		N/A
ZG	**ANNEX ZG (NORMATIVE) UV APPLIANCES**		
7.12.ZG	Instructions for appliances incorporating UVC emitters include the substance	“WARNING – This appliance contains a UV emitter. Do not stare at the light source.”	N/A
32	Appliances incorporating UV emitters, the manufacturer delivers a declaration providing evidence that the plastic material exposed to the radiation is UV resistant		N/A

10.1	TABLE: POWER INPUT DEVIATION				P
Input deviation of/at:	P rated (W)	P measured (W)	ΔP	Required ΔP	Remark
198 V, 50 Hz	–	548	–	–	
210 V, 50 Hz	–	615	–	–	
220 V, 50 Hz	**700**	**673**	**-27**	**-70…+35 (630…735 W)**	
230 V, 50 Hz		**731**	**+31**		
240 V, 50 Hz	–	797	–	–	
253 V, 50 Hz	–	–	–	–	The control circuit board detects overvoltage and disconnects power
General comments: Heating appliance (permitted deviation: -10…+5 %)					

10.2	TABLE: CURRENT DEVIATION				N/A
Current deviation of/at:	I rated (A)	I measured (A)	ΔI	Required ΔI	Remark
General comments: –					

11.8	TABLE: HEATING TEST, THERMOCOUPLES		P
	Test voltage :	243 V, 50 Hz	—
	Ambient, T_1 (°C) :	22	—
	Ambient, T_2 (°C) :	24	—

Thermocouple locations:	ΔT (K)	Max. ΔT (K)
Accessible heated surfaces (glass)	93	100
Accessible surfaces of the wiring compartment (policarbonate)	32	105
Control button (accessible surface; plastic)	16	105
Mounting brackets / feet (aluminium)	34	85
Power relay ambient	27	T85 – 25
Control circuit board material (fiberglass)	42	–
Insulation of the supply cord (PVC)	25	50
Mounting surface (wall; plywood)	39	60
General comments: Tested in a fixed position on a wall (most unfavourable mode).		

11.8	TABLE: HEATING TEST, RESISTANCE METHOD		N/A
	Test voltage :		—
	Ambient, T_1 (°C) :		—
	Ambient, T_2 (°C) :		—

Temperature of winding:	R_1 (Ω)	R_2 (Ω)	ΔT (K)	Max. ΔT (K)	Insulation class
General comments: –					

13.2	TABLE: LEAKAGE CURRENT		P
	Heating appliances: $1.15 \cdot P_{rated}$:	805 W	—
	Motor-operated and combined appliances: $1.06 \cdot U_{rated}$:	–	—

Leakage current between:	I (mA)	Max allowed I (mA)
Switch position a (accessible metallic parts)	0.014	0.35
Switch position b (accessible metallic parts)	0.002	0.35
Switch position a (accessible non-metallic surfaces)	0.027	0.35
Switch position b (accessible non-metallic surfaces)	0.018	0.35

General comments: Class II appliance with accessible metallic parts

13.3	TABLE: ELECTRIC STRENGTH		P

Test voltage applied between:	Voltage (V)	Breakdown (Yes/No)
Line/neutral and accessible metallic parts	2750	No
Line/neutral and accessible non-metallic surfaces	2750	No

General comments: Class II appliance with accessible metallic parts

14	TABLE: TRANSIENT VOLTAGES				N/A

Clearance between:	Cl (mm)	Required Cl (mm)	Rated impulse voltage (V)	Impulse test voltage (V)	Flashover (Yes/No)

General comments: –

16.2	TABLE: LEAKAGE CURRENT		P
	Single-phase appliances: 1.06·U_{rated}.....:	244 V, 50 Hz	—
	Three-phase appliances: 1.06·$U_{rated}/\sqrt{3}$....:	–	—

Leakage current between:	I (mA)	Max allowed I (mA)
Switch position a (accessible metallic parts)	0.017	0.35
Switch position b (accessible metallic parts)	0.002	0.35
Switch position a (accessible non-metallic surfaces)	0.031	0.35
Switch position b (accessible non-metallic surfaces)	0.019	0.35
General comments: Class II appliance with accessible metallic parts		

16.3	TABLE: ELECTRIC STRENGTH		P

Test voltage applied between:	Voltage (V)	Breakdown (Yes/No)
Line/neutral and accessible metallic parts	3000	No
Line/neutral and accessible non-metallic surfaces	3000	No
General comments: Class II appliance with accessible metallic parts		

19.13	TABLE: ABNORMAL OPERATION		P
	T_1 / T_2 (°C) ..... :	22 / 24	—

Cl. 19.11 – Electronic circuit faults (constant heating)		
Temperature T of part / at:	ΔT (K)	Max. ΔT (K)
Insulation of the supply cord (PVC)	22	150
Wooden supports, walls, etc.	43	150
Observations/comments: Faults in electronic circuit can either cause a disruption of some of the circuit components or the protective fuse, making the circuit and the whole heater non-operational, or the fault can cause constant operation of the heater. While faults causing the heater non-operational do not present any ignition or other hazards, the values given in the table represent the condition when the heater operates until an internal thermal cut-out periodically interrupts operation. Open-circuit of the temperature sensors makes the heater non-operational (indicator is blinking in red indication an error); short-circuit of the sensors does not interrupt operation and the heater operates until an internal thermal cut-out periodically interrupts operation.		

Cl. 19.14 – Relay contact short circuit (constant heating)		
Temperature T of part / at:	ΔT (K)	Max. ΔT (K)
Insulation of the supply cord (PVC)	22	150
Wooden supports, walls, etc.	43	150
Observations/comments: No hazards. The heater is equipped with an internal thermal cut-out which operates if the heater reaches high temperatures (~130 °C). After cooling down the heater continues operation until it is overheated again.		

Cl. 19.101 – Operation at 1.24·P_{rated}, thermal controls short-circuited Cl. 19.102 – Operation at 1.24·P_{rated}, portable heater placed near a wall		
Temperature T of part / at:	ΔT (K)	Max. ΔT (K)
Insulation of the supply cord (PVC)	–	150
Wooden supports, walls, etc.	–	150
Observations/comments: After a brief period of operation the heater control circuit board detects overvoltage and disconnects power supply to the heating element; indication LED is flashing in red; restarting requires reconnection to the power supply or may be possible if the supply voltage drops.		

Cl. 19.103 – Operation as specified in Cl.11 with the heater covered		
Temperature T of part / at:	ΔT (K)	Max. ΔT (K)
Felt strips (material covering the heater)	103	150
Insulation of the supply cord (PVC)	21	150
Wooden supports, walls, etc.	–	150
Observations/comments: The heater temperature sensor turns of the heating like in normal operation. Following cycles of heating are only initiated by the control circuit after temperature inside the heater drops. No overheating.		

Cl. 19.112 – Operation as specified in Cl.11 with the heater then overturned		
Temperature T of part / at:	ΔT (K)	Max. ΔT (K)
Insulation of the supply cord (PVC)	25	150
Wooden supports, walls, etc.	–	150
Observations/comments: The heater is equipped with an overturn sensor which disconnects power supply to the heating element. No ignition or smouldering of the cotton gauze. The heater is overturned after operating some time in normal position.		
General comments: –		

24.1	TABLE: LIST OF CRITICAL COMPONENTS				P
Object / part No.	Manufacturer / trademark	Type / model	Technical data	Standard	Mark(s) of conformity
Glass	–	–	tempered, 3.5 mm	EN 60335-2-30	Tested
Control circuit board	–	P11-013-111	fiberglass, 1.6 mm, V-0	UL94	Tested
Wi-Fi module	–	WBR3	fiberglass, 1.6 mm, V-0	UL94	CE
Power relay	Hongfa	HF7520	16 A, 250 A; 30 V_{DC}	EN 60255-1	UL
Self-resetting thermal cut-out	–	–	130 °C	EN 60730-1	–
Main fuse (FU1)	LB	T6.3AL250V	250 V, 6.3 A	EN 60269-1	VDE, UL, CCC
Control circuit fuse (F1)	JET	T1A250V	250 V, T 1 A	EN 60269-1	VDE, UL, CCC, PSE
RI filter capacitor	MFlex	WXPC-104M X2	0.1 µF, 275 V, X2	EN60384-14	VDE
Terminals	–	–	PCB screw terminals; 300 V, up to 4.0 mm^2	EN 60998-2-1	CE
Supply cord with a plug	–	H05VV-F	2 × 1.5 mm^2, PVC-sheathed; Type F plug	EN 50525	VDE
General comments: –					

28.1	TABLE: THREADED PART TORQUE TEST		P
Threaded part identification:	Diameter of thread (mm)	Column number (I, II or III)	Applied torque (Nm)
Wiring compartment cover fixation screws	3.0	II	0.6
Feet/mounting bracket fixation screws*	8.0	II	2.5
General comments: * Thread for these screws is not rigidly fixed in the heater and starts to rotate after the screw is fully inserted.			

29.1	TABLE: CLEARANCES					P
	Overvoltage category.....:	II				—
		Type of insulation:				
Rated impulse voltage (V)	Min. cl (mm)	Basic	Functional	Supplementary	Reinforced	Verdict / Remark
330	0.5	—	—	—	—	N/A
500	0.5	—	—	—	—	N/A
800	0.5	—	—	—	—	N/A
1 500	0.5	—	—	—	—	N/A
2 500	1.5	X	—	X	—	P
4 000	3.0	—	—	—	—	N/A
6 000	5.5	—	—	—	—	N/A
8 000	8.0	—	—	—	—	N/A
10 000	11.0	—	—	—	—	N/A
General comments: –						

29.2	TABLE: CREEPAGE DISTANCES, BASIC, SUPPLEMENTARY AND REINFORCED INSULATION										P
	Creepage distance (mm) Pollution degree										
Working voltage (V)	1	2			3			Type of insulation			Verdict
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb	BI*	SI*	RI*	
≤50	0.2	0.6	0.9	1.2	1.5	1.7	1.9		—	—	N/A
≤50	0.2	0.6	0.9	1.2	1.5	1.7	1.9	—		—	N/A
≤50	0.4	1.2	1.8	2.4	3.0	3.4	3.8	—	—		N/A
>50 and ≤125	0.3	0.8	1.1	1.5	1.9	2.1	2.4		—	—	N/A
>50 and ≤125	0.3	0.8	1.1	1.5	1.9	2.1	2.4	—		—	N/A
>50 and ≤125	0.6	1.6	2.2	3.0	3.8	4.2	4.8	—	—		N/A
>125 and ≤250	0.6	1.3	1.8	**2.5**	3.2	3.6	4.0	**X**	—	—	P
>125 and ≤250	0.6	1.3	1.8	**2.5**	3.2	3.6	4.0	—	**X**	—	P
>125 and ≤250	1.2	2.6	3.6	5.0	6.4	7.2	8.0	—	—		N/A
>250 and ≤400	1.0	2.0	2.8	4.0	5.0	5.6	6.3		—	—	N/A
>250 and ≤400	1.0	2.0	2.8	4.0	5.0	5.6	6.3	—		—	N/A
>250 and ≤400	2.0	4.0	5.6	8.0	10.0	11.2	12.6	—	—		N/A
>400 and ≤500	1.3	2.5	3.6	5.0	6.3	7.1	8.0		—	—	N/A
>400 and ≤500	1.3	2.5	3.6	5.0	6.3	7.1	8.0	—		—	N/A
>400 and ≤500	2.6	5.0	7.2	10.0	12.6	14.2	16.0	—	—		N/A
>500 and ≤800	1.8	3.2	4.5	6.3	8.0	9.0	10.0		—	—	N/A
>500 and ≤800	1.8	3.2	4.5	6.3	8.0	9.0	10.0	—		—	N/A
>500 and ≤800	3.6	6.4	9.0	12.6	16.0	18.0	20.0	—	—		N/A
>800 and ≤1000	2.4	4.0	5.6	8.0	10.0	11.0	12.5		—	—	N/A
>800 and ≤1000	2.4	4.0	5.6	8.0	10.0	11.0	12.5	—		—	N/A
>800 and ≤1000	4.8	8.0	11.2	16.0	20.0	22.0	25.0	—	—		N/A
>1000 and ≤1250	3.2	5.0	7.1	10.0	12.5	14.0	16.0		—	—	N/A
>1000 and ≤1250	3.2	5.0	7.1	10.0	12.5	14.0	16.0	—		—	N/A
>1000 and ≤1250	6.4	10.0	14.2	20.0	25.0	28.0	32.0	—	—		N/A
>1250 and ≤1600	4.2	6.3	9.0	12.5	16.0	18.0	20.0		—	—	N/A
>1250 and ≤1600	4.2	6.3	9.0	12.5	16.0	18.0	20.0	—		—	N/A
>1250 and ≤1600	8.4	12.6	18.0	25.0	32.0	36.0	40.0	—	—		N/A
* BI = Basic Insulation, SI = Supplementary Insulation, RI = Reinforced Insulation General comments: –											

29.2	TABLE: CREEPAGE DISTANCES, BASIC, SUPPLEMENTARY AND REINFORCED INSULATION										P
	Creepage distance (mm) Pollution degree										
Working voltage (V)	1	2			3			Type of insulation			Verdict
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb	BI*	SI*	RI*	
>1600 and ≤2000	5.6	8.0	11.0	16.0	20.0	22.0	25.0		—	—	N/A
>1600 and ≤2000	5.6	8.0	11.0	16.0	20.0	22.0	25.0	—		—	N/A
>1600 and ≤2000	11.2	16.0	22.0	32.0	40.0	44.0	50.0	—	—		N/A
>2000 and ≤2500	7.5	10.0	14.0	20.0	25.0	28.0	32.0		—	—	N/A
>2000 and ≤2500	7.5	10.0	14.0	20.0	25.0	28.0	32.0	—		—	N/A
>2000 and ≤2500	15.0	20.0	28.0	40.0	50.0	56.0	64.0	—	—		N/A
>2500 and ≤3200	10.0	12.5	18.0	25.0	32.0	36.0	40.0		—	—	N/A
>2500 and ≤3200	10.0	12.5	18.0	25.0	32.0	36.0	40.0	—		—	N/A
>2500 and ≤3200	20.0	25.0	36.0	50.0	64.0	72.0	80.0	—	—		N/A
>3200 and ≤4000	12.5	16.0	22.0	32.0	40.0	45.0	50.0		—	—	N/A
>3200 and ≤4000	12.5	16.0	22.0	32.0	40.0	45.0	50.0	—		—	N/A
>3200 and ≤4000	25.0	32.0	44.0	64.0	80.0	90.0	100.0	—	—		N/A
>4000 and ≤5000	16.0	20.0	28.0	40.0	50.0	56.0	63.0		—	—	N/A
>4000 and ≤5000	16.0	20.0	28.0	40.0	50.0	56.0	63.0	—		—	N/A
>4000 and ≤5000	32.0	40.0	56.0	80.0	100.0	112.0	126.0	—	—		N/A
>5000 and ≤6300	20.0	25.0	36.0	50.0	63.0	71.0	80.0		—	—	N/A
>5000 and ≤6300	20.0	25.0	36.0	50.0	63.0	71.0	80.0	—		—	N/A
>5000 and ≤6300	40.0	50.0	72.0	100.0	126.0	142.0	160.0	—	—		N/A
>6300 and ≤8000	25.0	32.0	45.0	63.0	80.0	90.0	100.0		—	—	N/A
>6300 and ≤8000	25.0	32.0	45.0	63.0	80.0	90.0	100.0	—		—	N/A
>6300 and ≤8000	50.0	64.0	90.0	126.0	160.0	180.0	200.0	—	—		N/A
>8000 and ≤10000	32.0	40.0	56.0	80.0	100.0	110.0	125.0		—	—	N/A
>8000 and ≤10000	32.0	40.0	56.0	80.0	100.0	110.0	125.0	—		—	N/A
>8000 and ≤10000	64.0	80.0	112.0	160.0	200.0	220.0	250.0	—	—		N/A
>10000 and ≤12500	40.0	50.0	71.0	100.0	125.0	140.0	160.0		—	—	N/A
>10000 and ≤12500	40.0	50.0	71.0	100.0	125.0	140.0	160.0	—		—	N/A
>10000 and ≤12500	80.0	100.0	142.0	200.0	250.0	280.0	320.0	—	—		N/A
* BI = Basic Insulation, SI = Supplementary Insulation, RI = Reinforced Insulation General comments: –											

29.2	TABLE: CREEPAGE DISTANCES, FUNCTIONAL INSULATION							N/A
	Creepage distance (mm) Pollution degree							
Working voltage (V)	1	2			3			
		Material group			Material group			
		I	II	IIIa/IIIb	I	II	IIIa/IIIb	Verdict
≤50	0.2	0.6	0.8	1.1	1.4	1.6	1.8	N/A
>50 and ≤125	0.3	0.7	1.0	1.4	1.8	2.0	2.2	N/A
>125 and ≤250	0.4	1.0	1.4	2.0	2.5	2.8	3.2	N/A
>250 and ≤400	0.8	1.6	2.2	3.2	4.0	4.5	5.0	N/A
>400 and ≤500	1.0	2.0	2.8	4.0	5.0	5.6	6.3	N/A
>500 and ≤800	1.8	3.2	4.5	6.3	8.0	9.0	10.0	N/A
>800 and ≤1000	2.4	4.0	5.6	8.0	10.0	11.0	12.5	N/A
>1000 and ≤1250	3.2	5.0	7.1	10.0	12.5	14.0	16.0	N/A
>1250 and ≤1600	4.2	6.3	9.0	12.5	16.0	18.0	20.0	N/A
>1600 and ≤2000	5.6	8.0	11.0	16.0	20.0	22.0	25.0	N/A
>2000 and ≤2500	7.5	10.0	14.0	20.0	25.0	28.0	32.0	N/A
>2500 and ≤3200	10.0	12.5	18.0	25.0	32.0	36.0	40.0	N/A
>3200 and ≤4000	12.5	16.0	22.0	32.0	40.0	45.0	50.0	N/A
>4000 and ≤5000	16.0	20.0	28.0	40.0	50.0	56.0	63.0	N/A
>5000 and ≤6300	20.0	25.0	36.0	50.0	63.0	71.0	80.0	N/A
>6300 and ≤8000	25.0	32.0	45.0	63.0	80.0	90.0	100.0	N/A
>8000 and ≤10000	32.0	40.0	56.0	80.0	100.0	110.0	125.0	N/A
>10000 and ≤12500	40.0	50.0	71.0	100.0	125.0	140.0	160.0	N/A
General comments: –								

30	TABLE: RESISTANCE TO HEAT AND FIRE	P

Cl. 30.1 – Ball-pressure test

Part tested:	Test temperature (°C)	Measured ∅ of immersion (mm)	Immersion ∅ limit (mm)
Wiring compartment enclosure (polycarbonate)	125	0.7	2.0

Cl. 30.2.1, 30.2.2, 30.2.3 – Glow-wire test

Part tested:	Glow-wire temperature (°C)	Burning time (s)	Burning drops (Yes/No)	Tissue paper ignition (Yes/No)
Wiring compartment enclosure (polycarbonate)	650	No ignition	–	–

Cl. 30.2.4 – Needle-flame test

Part tested:	Burning time (s)	Burning drops (Yes/No)	Tissue paper ignition (Yes/No)
Control circuit board	7	No	No

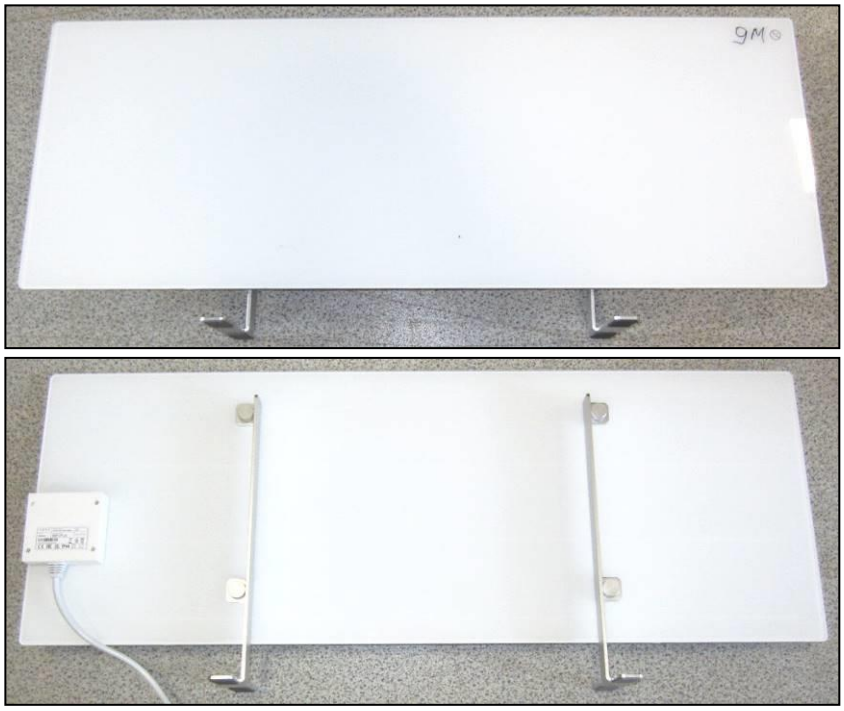
General comments: –

Annex 1
PHOTOS

PHOTOS OF THE TESTED OBJECT

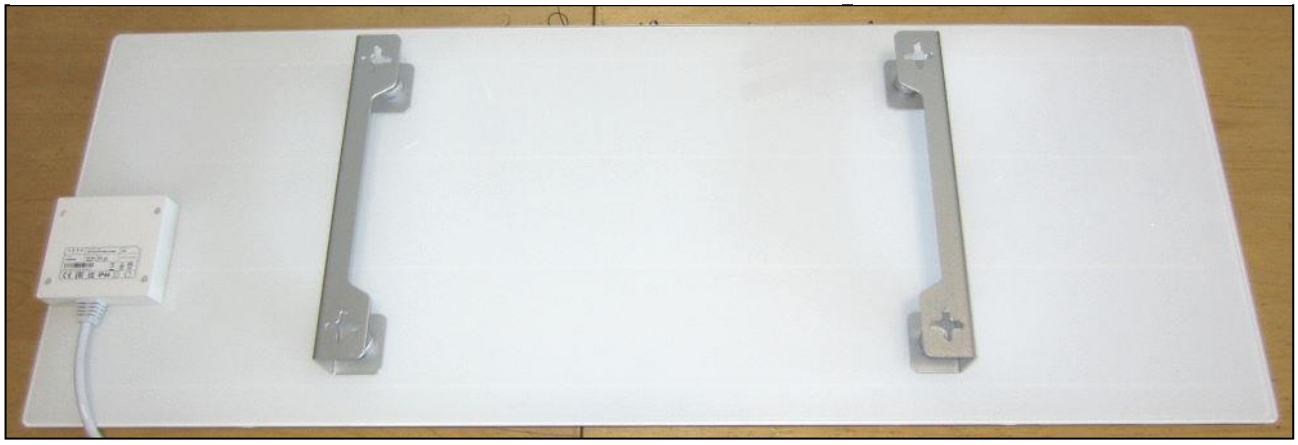
General views of the heater in portable mode

PHOTOS OF THE TESTED OBJECT



Views of the heater in portable mode

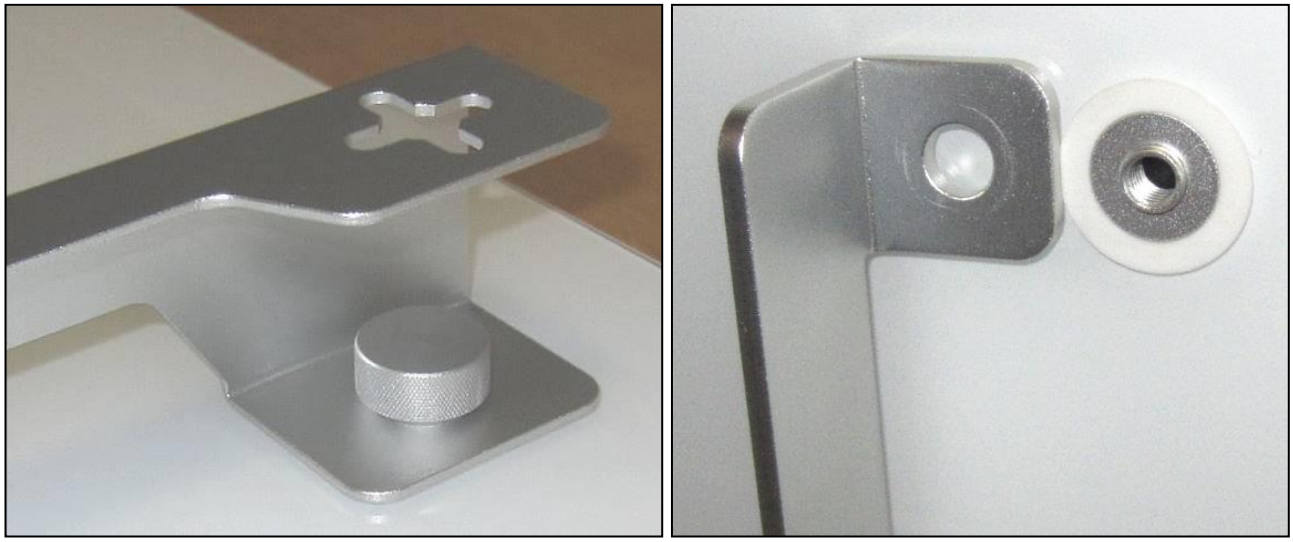
Control circuit compartment



View of the rear panel with brackets for wall mounting

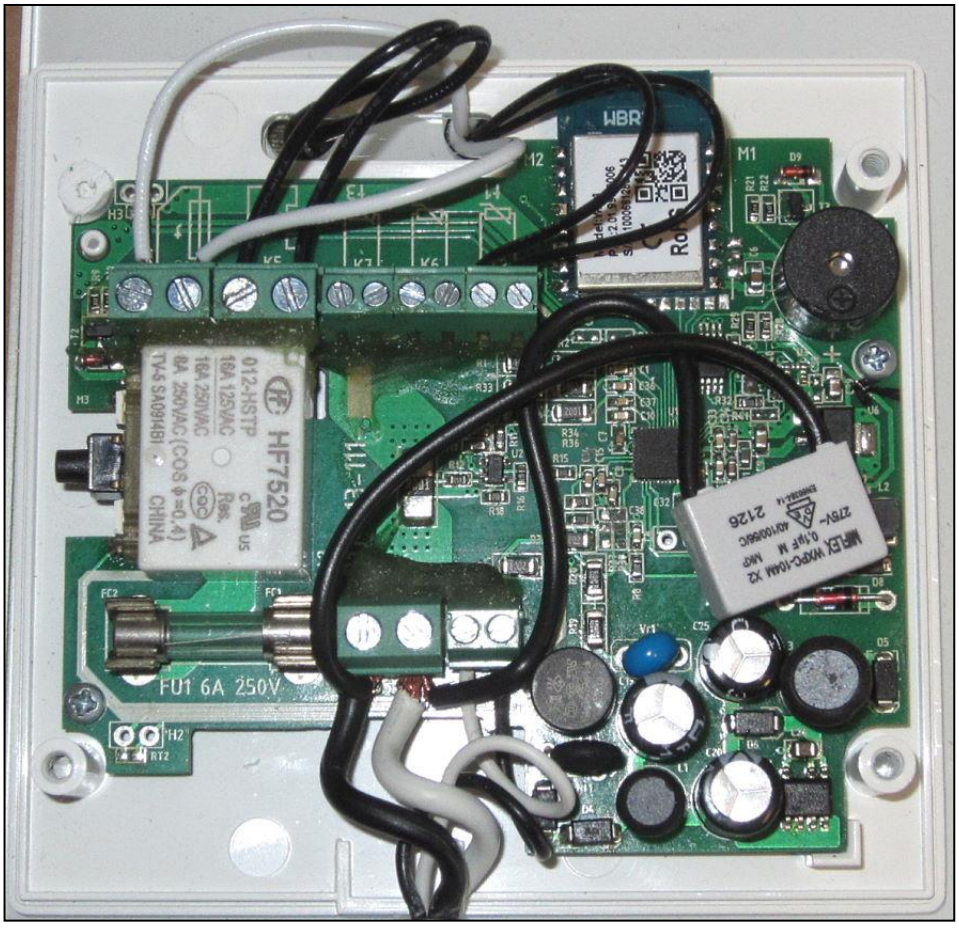
PHOTOS OF THE TESTED OBJECT

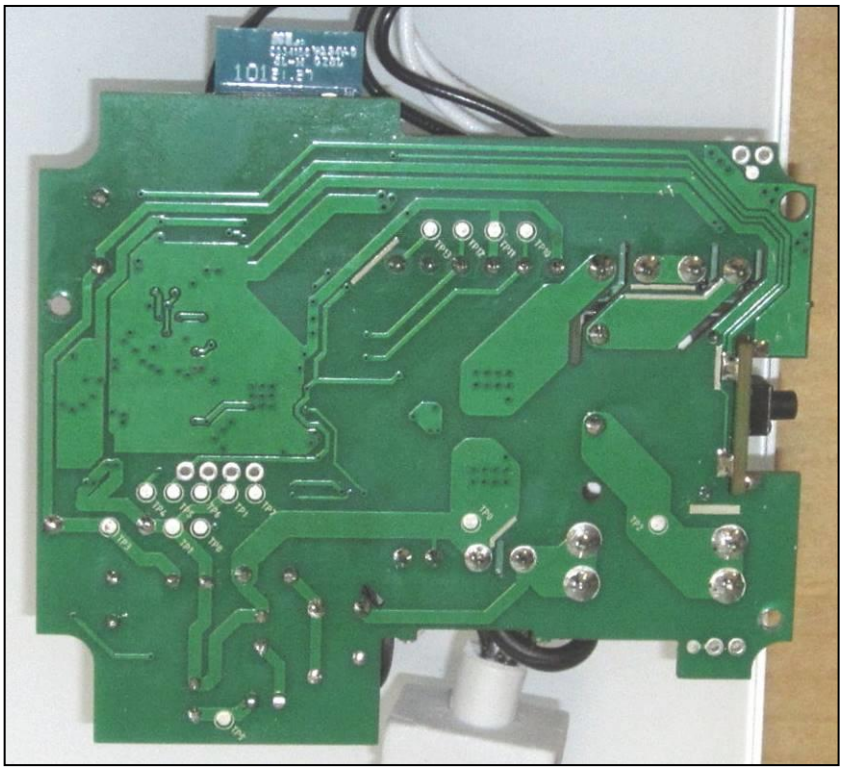
Fixation of feet/brackets to the heater



Fixation of the supporting means

PHOTOS OF THE TESTED OBJECT

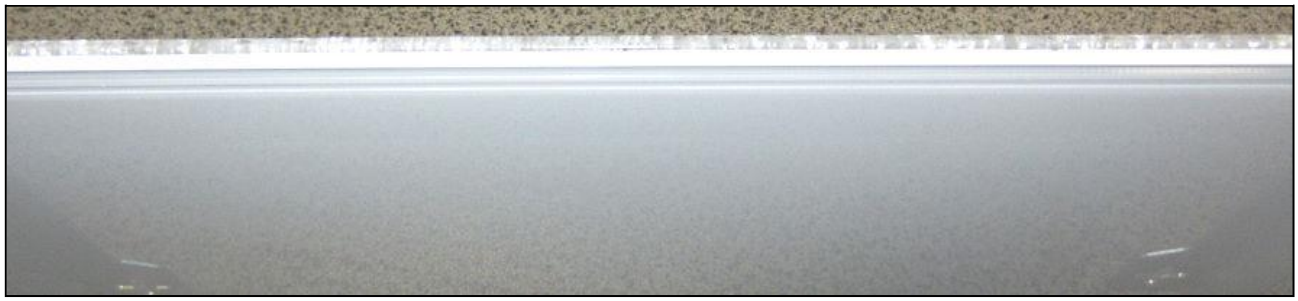




Control circuit board

PHOTOS OF THE TESTED OBJECT

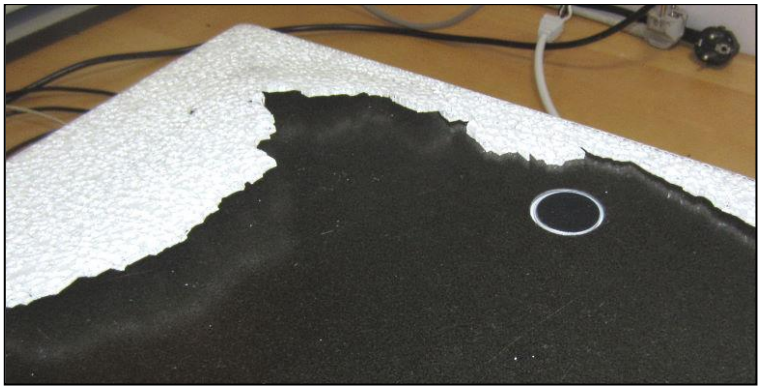
Cracks of the tempered glass (front panel) after 2.0 J blow test

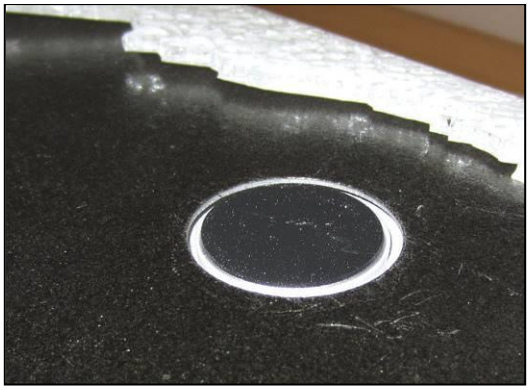


Rear glass panel remained undamaged

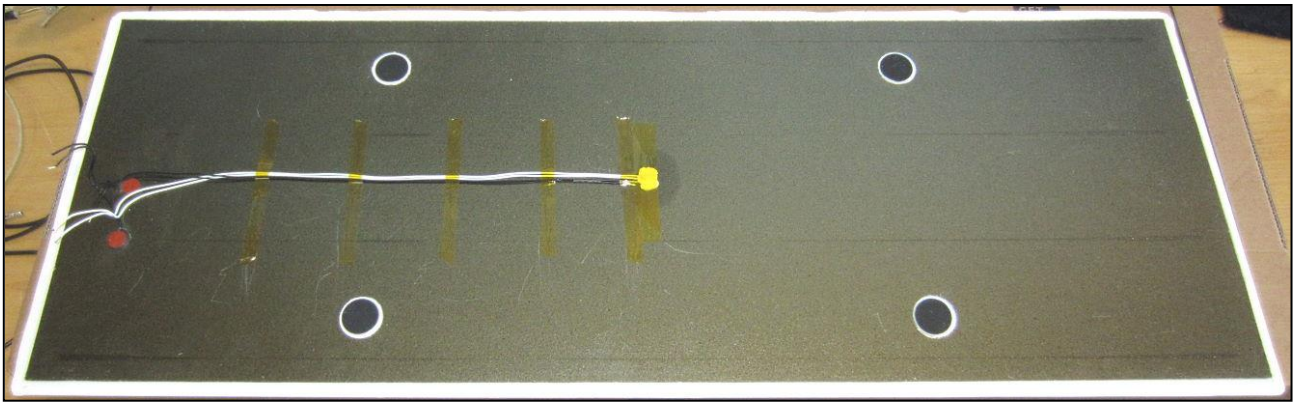
PHOTOS OF THE TESTED OBJECT

View of the heater with pieces of broken glass fallen off





Cuts in the heating element for mounting nuts



Heating element (heating wires between mica layers)

Annex 2

INSTRUCTION MANUAL

AENO

AENO™ Premium Eco Smart Heater
Installation and Operation Manual

Articles: GH1S (-IT, -CH, -UK), GH2S (-IT, -CH, -UK)

Version 1.0.3 | August 2022

Introduction

AENO™ heater is designed for heating residential and office spaces.

The present Manual contains a detailed description of the device, as well as instructions for its installation and operation.

Copyrights

Responsibility and Technical Support

This document was prepared in accordance with all necessary legal requirements and contains detailed and complete information on operation and maintenance of the device. The information is current as of the date indicated in this document. Strict adherence to the instructions in this manual will ensure correct, safe and reliable operation of the device.

Both this manual and the Quick Start Guide are an integral part of the device and should always be available to the user for reference.

ASBIS reserves the right to modify the device and make corrections or changes to this document without prior notice of the user, and shall not be responsible for any potential negative consequences which may arise from the use of an outdated version of the document, as well as for any possible technical and/or typographical errors, either omitted or accidental, or any related damage that may result from the document transfer or the use of the devices.

In case of any discrepancies between language versions of this document, the Russian version of this User Manual shall prevail.

ASBIS shall make no guarantee with respect to any data contained herein including but not limited to the device merchantability and fitness for a particular purpose.

If you have any technical questions, please contact your local ASBIS representative or the technical support department at aeno.com. The most common issues are described in Section 7 (Troubleshooting) of this document.

Please visit aeno.com/documents to download the latest version of this manual.

User information including personal data is protected from unauthorized access and disclosure in accordance with GDPR requirements. You can read the Privacy Policy at aeno.com/privacy-policy.

Conformance to Standards

The device is CE certified and complies with requirements of the following Directives of the European Union:

- 2014/35/EU Low Voltage Directive;
- 2004/30/EU Electromagnetic Compatibility Directive.

The device complies with the UKCA marking requirements for selling the device in the UK

The device has passed all procedures of assessments established in Technical Regulations of the Customs Union and conforms with standards of the Customs Union

The device complies with the requirements of Restriction of the Use of Certain Hazardous Substances (RoHS) in Electronic and Electrical Equipment (2011/65/EU Directive)

Additional confirmation of the product safety and quality by TÜV NORD

The national conformity mark of the Ukraine indicating that the device meets requirements of all applicable technical regulations

The crossed-out trash can symbol is used to label electrical and electronic equipment, and indicates its separate collection.

The symbol is given in accordance with the Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE) and indicates that this equipment requires separate collection at the end of its life and must be disposed of separately from unsorted household waste.

To protect the environment and human health, please dispose of used electrical and electronic equipment according to approved safe disposal guidelines

	AT	BE	BG	CH	CZ	CY	DE	DK	EE	ES	FI
	FR	GR	HR	HU	IE	IT	KZ	LT	LV	LU	MT
	NL	NO	PL	PT	RO	RS	SE	SK	SL	UK	

Limitations and Warnings

Prior to installation and operation of the device, the User shall carefully read and understand information contained herein.

WARNING!
Do not cover the heater to avoid overheating.

WARNING!
Do not install the heater directly under a plug socket.

WARNING!
Do not use the heater if the glass panels are damaged.

ATTENTION!
The warnings, precautions, and instructions contained in this document may not contain every possible hazardous situation. Use common sense when using the device.

Warning symbols and icons

Hot surface. The risk of burns in the case of contact with heated surfaces. Do not touch heating panel until completely cooled down and do not allow the power cable to contact the heating panel

To avoid overheating, do not cover the device or dry clothes on it

The device is intended for indoor use only

IP44

Degree of protection of the device casing that is protection against the ingress of solid objects larger than 1 mm in size, as well as drops and splashes falling from any angle

General warning icon

The device is Class II for protection against electric shock (double insulation)

Do not repair the device on your own as this may result in electric shock or other injury and will void the manufacturer's warranty

Do not expose the device to liquids

The eco-label symbol on the package indicating its recyclability

Recyclable corrugated cardboard packaging

No moving parts in the design of the device prevents the formation of dust

Indication that the device may be broken or damaged if not handled carefully

Indication that the device must be protected from moisture

Toxic substances are not available in the materials from which the device is made

Function of maintaining the set temperature (for remote control)

The device is certified according to the standards applicable in the countries of sale

Packaging is RoHS & REACH compliant and contains no prohibited materials

Innovative design

Producer of raw materials for packaging was certified by the Forest Stewardship Council (FSC™)

Producer of raw materials for making packaging confirms responsible forest management

Safety Operation Rules

1. The device shall be installed and used as described in this manual only. Any other use not specified therein may cause fire and other hazards, as well as injury to persons.
2. The device is intended for operation in a room with an ambient temperature of 0 °C... +40 °C.
3. Keep children and pets away from the area of installation of the Eco Smart Heater, as contact with the device in operation may result in burns.
4. The device may only be operated when it is properly mounted on brackets or special legs as supplied within the scope of delivery.
5. In the case of wall installation, the installation height shall not be higher than 1 m.
6. The included hooks and dowels are designed to mount the unit on a reinforced concrete wall only. When installing on another type of wall, you should choose the appropriate fasteners that are suitable for both the wall and the device weight of more than 10 kg. The manufacturer shall not be liable for any damage resulting from the use of unsuitable fasteners.
7. The installation area shall be level, i.e. without any bends or warps (flat vertical or horizontal surface). If the device is in the wrong position when connected to the source of power, it will emit short beeps.
8. Do not bend the device or otherwise use force for wall installation using screws.
9. When moving the device, you may only hold it by brackets on its back. Do not move the device by the glass panel while it is switched on or hot.
10. If the device is connected to the mains, it is strongly recommended to ensure quick and easy way to disconnect it from the source of power.
11. **Do not mount the device directly under or on top of an electrical socket!**
12. **Do not allow the power cable to come into contact with the heating panel!**
13. To avoid supply network overloading and the risk of fire, do not use an extension cord to connect the device to the power source, or connect the device to the mains socket along with other household appliances.
14. Do not touch the heating panel during operation of the device.
15. Do not use the device in the case of damage or cracks, or any signs of damage to any other parts thereof, e.g. the power cable.
16. If the power cable is damaged, it may only be replaced by an authorized service center or other authorized party.
17. Do not drop, throw, disassemble or attempt to repair the device on your own. Stop using the device, it is has fallen.
18. Do not expose the device to direct sunlight or moisture, oils, chemical or other organic liquids, or vibrations.
19. Do not use the device in a combustible, explosive and/or dusty environment, as well as in areas where corrosion of its materials is possible.

20. Do not operate the device in areas with high level of humidity, such as bathrooms, showers or swimming pools.
21. Do not dry clothes or any other items with the device, and do not place it less than 1 meter away from any fabrics, decorative objects or other flammable objects. **WARNING!** Violation of these recommendations is at the user's risk, and the manufacturer shall not be liable for any damages resulting from this violation.
22. **Do not operate the device on carpets!**
23. If the device is not used (heating mode switched off) for a long period of time, it shall be disconnected from the source of power.
24. To avoid an unpleasant "burnt" smell, it is recommended to keep the device clean and free of dust accumulation.
25. To clean the device, use a water-dampened cotton cloth followed by a dry streak-free cloth cleaning. Do not clean the device until it is switched off and de-energized. Do not use cleaning agents or detergents to clean the device.
26. The device is not intended for use by children under 12 years, or by persons of limited physical, sensory or mental capabilities who have no adequate experience or knowledge in using the device, unless they are supervised or instructed by a person responsible for their safety.
27. Do not use the device in areas with people who are unable to leave the room on their own or who are not under the constant supervision of a person responsible for their safety.

WARNING!
Any damage to the device as a result overturning or falling will void the manufacturer's warranty.

Table of Contents

Figures and Tables

1 General Description and Specifications

1.1 General Purpose

The AENO™ heater is an electric heating device with a combined heat output designed for primary, supplementary and local heating of domestic and other premises (apartments, offices, trade enterprises, gyms, educational institutions, catering enterprises, etc.).

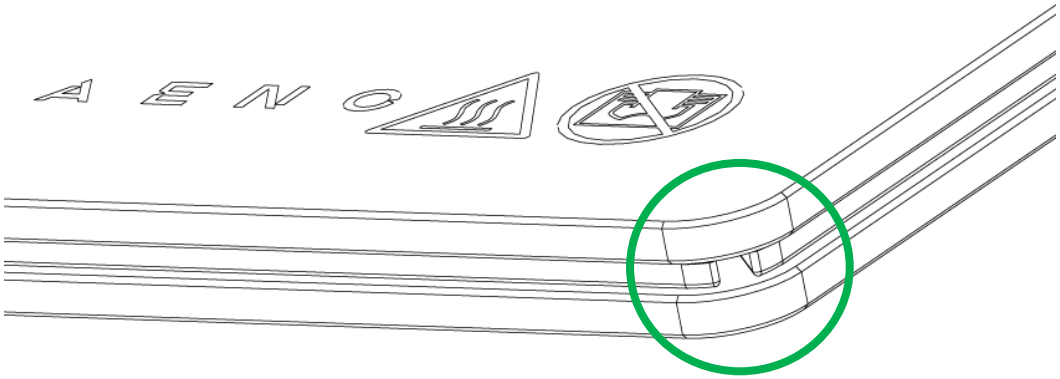
Key benefits of the heater AENO™ are as follows:

- Combined infrared and convection heating;
- Connection via Wi-Fi (2.4 GHz);
- Low power consumption;
- Automatic maintenance of desired temperature in the room;
- Ability to set the maximum temperature of the heating panel;
- Electronic thermostat and tilting sensor;
- Large heat-emitting surface area;
- Possibility of leg installation, as well as horizontal or vertical wall mounting;
- Low dust content in the air due to lower convection (thermal movement of air volumes);
- Remote control via a mobile app or voice assistants, as well as manual control;
- Installation of legs and brackets without tools;
- Elegant glass surface;
- The use of non-toxic materials in production;
- Minimum size of the control unit and matching accessories with the color of the heating panel.

Figure 1 – Appearance

Venting hole

The venting hole in the heater body is required to ensure proper air circulation and is not a defect in the device.



Its location may differ for some models of heaters.

WARNING!
It is forbidden to block the venting hole of the device.

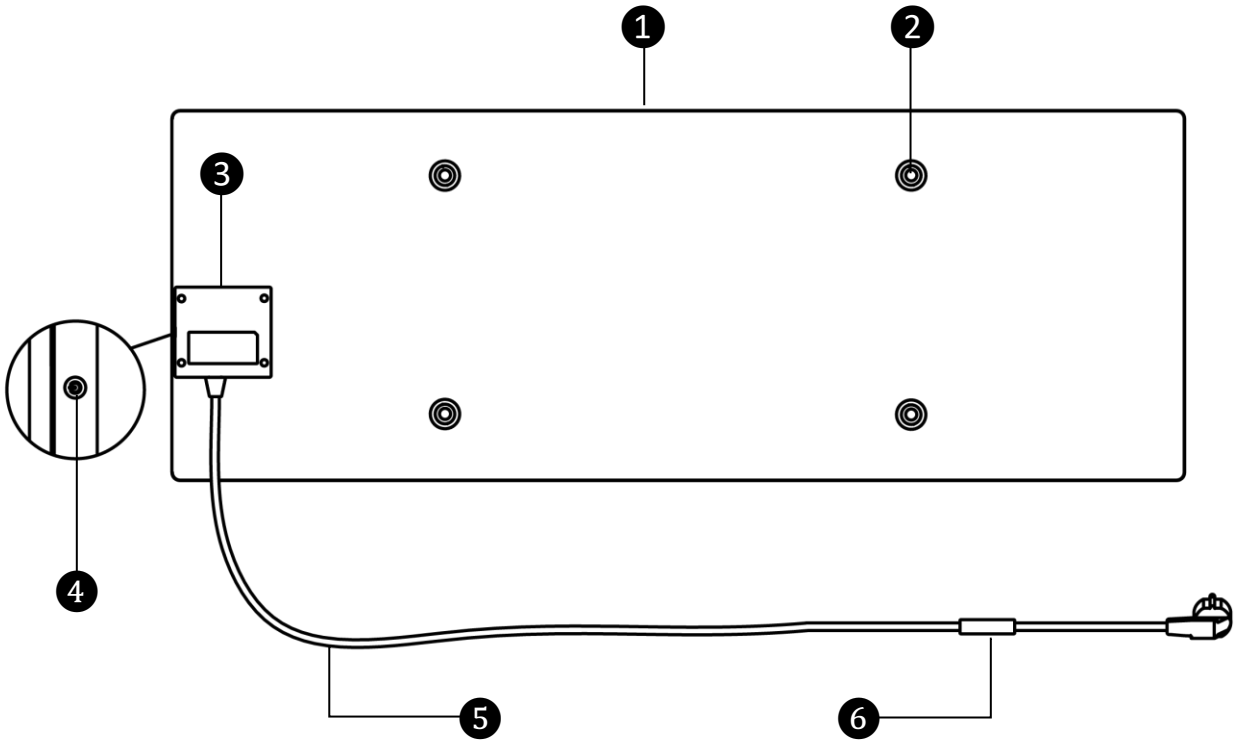
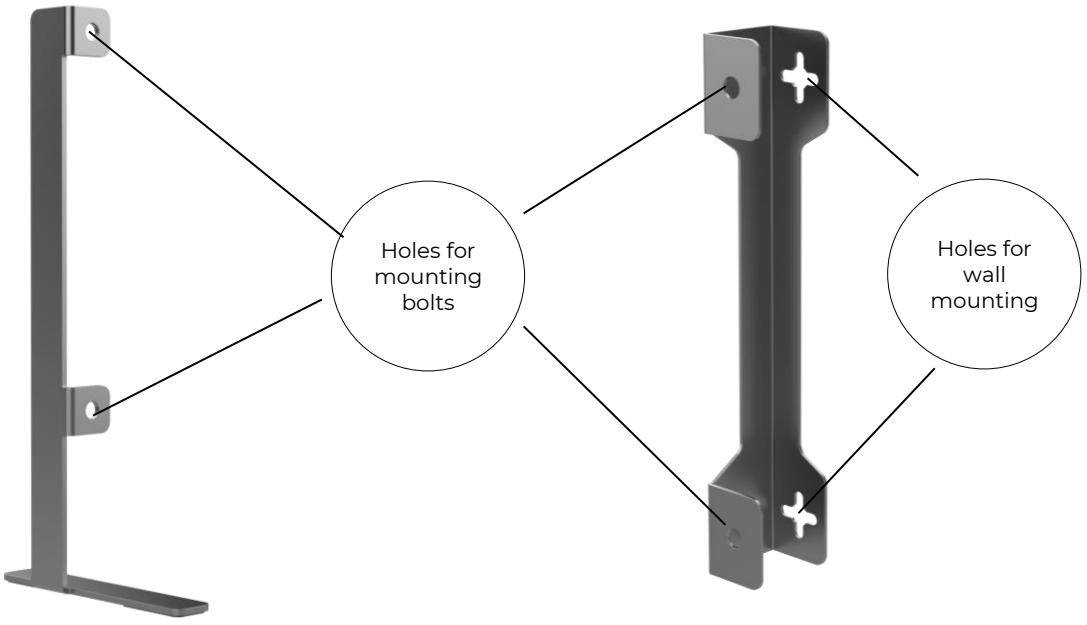


Figure 2 – Buttons, ports and indicators

Legend for buttons, ports and indicators

❶	Heating panel of the device that is emitting heat to warm the room
❷	Hole in the panel for a mounting bolt for screwing legs or wall brackets
❸	Electronic module for the heater control which includes a signaling component (piezo siren) to audibly notify users of the device statuses
❹	LED button for switch the heating mode on and off
❺	Power cable to connect the heater to the mains socket
❻	Sensor that measures the ambient air temperature and ensures accuracy when maintaining the required heating temperature



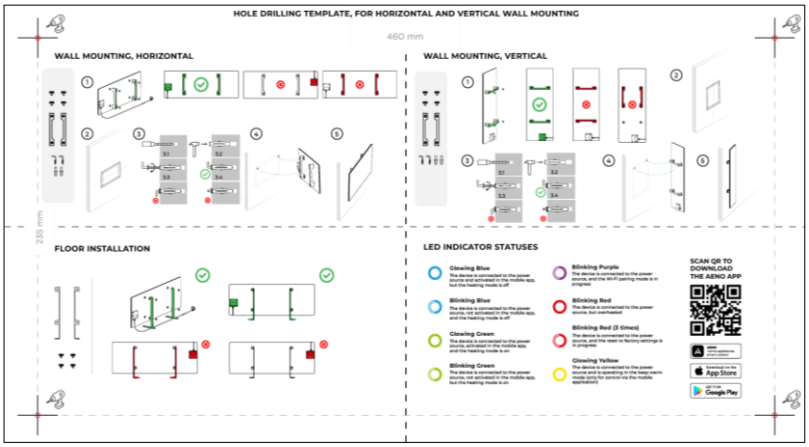
Leg for floor installation*

Bracket for wall mounting*

Mounting bolt*

Screw*

Dowel*



Template for drilling holes in the wall

Figure 3 – Mounting accessories

* The images of accessories are for illustrative purposes only.

Table 1 – Power button functions

Action	Description
Press and hold the power button for no more than 3 seconds	Switching the device from Off to On mode and vice versa
Press and hold the power button for more than 3 seconds	Resetting the fault condition (blinking red) and switching to the Off mode
Press and hold the power button for 4 to 10 seconds	Switching to activation mode in the AENO mobile app
Press and hold the power button for more than 10 seconds	Factory reset
Press the power button 5 times in 4 seconds	Manual disabling of the Child Lock mode

Table 2 – Power button LED indication

Color	Status	Description
Blue	On	The device is connected to the mains and activated in the mobile app, but the heating mode is switched off
	Flickering	The device is connected to the mains, but not activated in the mobile app, and heating mode is switched off
Green	On	The device is connected to the mains and activated in the mobile app, and the heating mode is switched on
	Flickering	The device is connected to the mains, but not activated in the mobile app, and heating mode is switched on
Purple	Blinking fast	The device is connected to the mains, and the process of activation in the mobile app was started
Red	Blinking	The device is connected to the mains, but an error has occurred (Incorrect orientation, safety mechanism actuation, etc.)
	Blinking fast (3 times)	Factory reset process was initiated
Yellow	On	The device is connected to the mains, and the temperature maintenance mode is on (for remote control via the mobile app only)
	Off	The device is not connected to the mains, or a power failure occurred

Blinking means that the LED is on for 500 ms, and then is off for 500 ms.
Blinking fast means that the LED is on for 100 ms, and then is off for 100 ms.
Flickering means that the LED is on for 3,000 ms, and then is off for 300 ms.

1.2 Labeling Rules and the Date of Manufacture

The date of manufacture is indicated on a sticker on the individual packaging and is also encoded in the serial number specified on the box and the device body.

The serial number is formed as follows:

NNNNNNYWWXXXXX,

where

NNNNNN is internal alphanumeric device model identifier (for example, “AGN101”),

Y is the numeric identifier of the year of production, starting from 2020 (e.g., “2” stands for 2022),

WW is a numeric identifier of the production week (for example, “10” is the tenth week of the specified calendar year),

XXXXX is a numeric identifier of the serial number of the manufactured device.

Thus, the date of manufacture is encoded in the three characters of the serial number (seventh through ninth in order).

In this case, the configuration features of the device are encoded in the model designation.

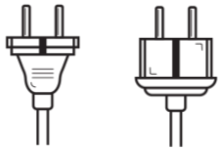
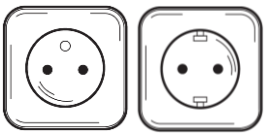
The model name of the device is formed as follows:

A GH 0001 S -IT

- **-IT** — Features of the power cord plug:
  IT = plug type L
  CH = plug type J
  UK = plug type G
  If there is no marking, the device is equipped with a standard plug type E/F
- **S** — The possibility of remote control:
  S = Smart device activated via the AENO app
  If there is no marking, the device is operated manually only
- **0001** — Model number of the AENO™ devices
- **GH** — Device type:
  GH = glass heater
- **A** — Brand name of the device:
  A = AENO™ device

1.3 Types of Electrical Outlets and Plugs

Since electrical outlet standards may vary from country to country, there are several versions of the AENO™ heater plugs depending on the country of sale.

GH1S	GH1S-IT	GH1S-CH	GH1S-UK
Plug type E/F: 	Plug type L: 	Plug type J: 	Plug type G: 
For E, F outlets: 	For L outlets: 	For J outlets: 	For G outlets: 
Voltage: 230 V, Frequency: 50 Hz			

1.4 Technical Specifications

Table 3 – Basic Technical Specifications

Parameter	Value
Article	White: GH1S (Model AGH0001S) GH1S-IT (Model AGH0001S-IT) GH1S-CH (Model AGH0001S-CH) GH1S-UK (Model AGH0001S-UK) Black: GH2S (Model AGH0002S) GH2S-IT (Model AGH0002S-IT) GH2S-CH (Model AGH0002S-CH) GH2S-UK (Model AGH0002S-UK)
Communication Standard	Wi-Fi (IEEE 802.11b/g/n), 18.2 dBm max (~66 mW)
Operating frequency	2,400-2,483.5 GHz

Parameter	Value
Integration	Google Assistant, Amazon Alexa
Server	Cloud
IR angle	Up to 300° (depending on installation area)
IR wavelength	95-100 μm
Room area	Not more than 30 m^2 (depends on the room insulation)
Power	Power supply voltage: 220V to 230 V (AC), 50 Hz Permissible voltage range: 180-253 V (AC) Rated current: 3.0 A (no more than 0.01 A in standby mode) Rated power: 700 W (not more than 2 W in standby mode)
Types of protection	Current protection: 6.3 A Voltage protection: 260 V Panel temperature protection: +135 °C
Protection Class	IP44
Electronic gyroscope	Tip-over shutdown
Operating temperature	0 °C to +40 °C
Operating humidity	up to 75% RH (without condensation)
Storage temperature	-20 °C to +70 °C
Storage humidity	up to 75% RH (without condensation)
Installation options	On a flat horizontal surface (horizontal floor installation). On a flat vertical surface (horizontal or vertical wall mounting). Designed for indoor installation only.
Installation height (wall mounting)	Not higher than 1 meter from the floor
Case Material	Heating plate: tempered glass Control unit: PC plastic

Parameter	Value
Color	Traffic White, Jet Black
Dimensions (L × W × H)	1000×165×417 mm (floor installation) 1000×62×365 mm (wall mounting)
Net Weight	8.7 kg (with accessories)
Warranty period	2 years
Service life	2 years
Certificates	CE, EAC, RoHS

1.5 Scope of Delivery

The AENO™ heater comes with the following devices and accessories:

1. Premium Eco Smart Heater AENO™ – 1 pc.
2. Legs for floor installation – 2 pcs.
3. Brackets for wall mounting
   (assembled with the heater, or separately) – 2 pcs.
4. Mounting kit, namely:
   mounting bolts – 4 pcs.
   hooks – 4 pcs.
   dowels – 4 pcs.
5. Template for drilling holes in the wall – 1 pc.
6. Quick Start Guide – 1 pc.
7. Warranty Card – 1 pc.

1 2 3 4*

Figure 4 – Package contents

* The images of accessories are for illustrative purposes only.

1.6 Packaging and Labeling

The AENO™ heater is supplied in an individual carton package of 107×43×9,1 cm (L×W×H) containing the full name and marking of the device, the list of accessories provided and basic technical specifications thereof, as well as the date of manufacture and information about the Manufacturer of devices.

Weight of the carton:

- Net weight: 8.7 kg;
- Gross weight: 10.9 kg.

2 Installation and Operation

Before installation, the User shall select one of the following possible locations and for the device:

- On a flat and stable horizontal surface for installation on legs;
- on a flat non-tilted vertical surface for mounting on brackets.

The User shall also make sure that the selected location meets the following requirements:

- Availability of a power source at the place where the heater is installed;
- Acceptable location of the electrical outlet and the power cable (see Limitations and Warnings);
- Ambient temperature is above 0 °C.

WARNING!
It is strongly recommended that the Eco Smart Heater is installed out of the reach of children and pets, as contact with the device in operation may result in burns. Do not use the Eco Smart Heater on carpets or near curtains or upholstered furniture.

NOTE
It is not recommended to install the device in areas with a high level of noise and a high-frequency interference. Reinforced concrete floors may reduce the distance of wireless signal transmission.

See below possible installation locations for the Eco Smart Heater.


Figure 5 – Examples of heater installation*

* The images are for illustrative purposes only

WARNING!
Vertical orientation of the heater is only possible when mounted on the wall. In this case, you should also consider the length of the power cable and the distance to the electrical outlet, as well as the position of the control unit where the power button is located (inconvenient orientation of the power button may interfere with manual control of the heater).

2.1 First Installation and Setup

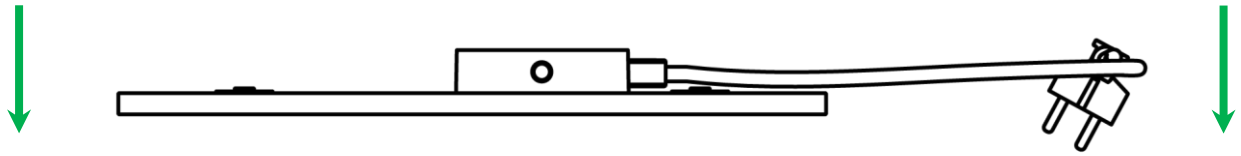
To ensure proper installation and proper operation of the heater, the following steps must be followed:

1. Unpack the device, install it in the desired location and connect it to the source of power supply with the power cable.
2. If necessary, activate the device in the mobile app.

IMPORTANT!
After the first activation in the mobile app, the process of updating the heater firmware can be started (the user will receive a corresponding notification). **Do not unplug the device from the mains until the update process is completed!** Also, do not disconnect the device from the mains for **5 minutes** after resetting to factory settings.

2.1.1 Unpacking and Preparing for Installation/Mounting

1. Unpack the heater and accessories carefully.
2. Place the device on a clean horizontal surface with the heating panel facing down.



NOTE
It is recommended to place the device on a clean cloth surface.

3. Wipe both sides of the heating panel with a damp cloth soaked in a little water, then with a dry cloth that does not leave streaks. Make sure that there are no traces of dust and dirt on the device.
4. Prepare the installation area and install the heater according to the most suitable option (See below).

2.1.2 Preparing the Installation area

For floor installation:

1. Only horizontal orientation is allowed when the heater is mounted on legs (See Figure 1).
2. All types of fabrics, decorations and other flammable objects including rugs and carpets must be kept at least 1 meter away from heater installation area.

For wall mounting:

WARNING!
Hooks and dowels supplied with the heater are designed to mount it on a reinforced concrete wall only. When installing on a different type of wall you should choose the appropriate fasteners.

1. The heater can be mounted horizontally or vertically on the wall (on 2 or 4 hooks).
2. All types of fabrics, decorations and other flammable objects including rugs and carpets must be kept at least 1 meter away from heater installation area.
3. To drill holes in the wall, please use the special template supplied with the heater.

2.1.3 Floor Installation (Option 1)

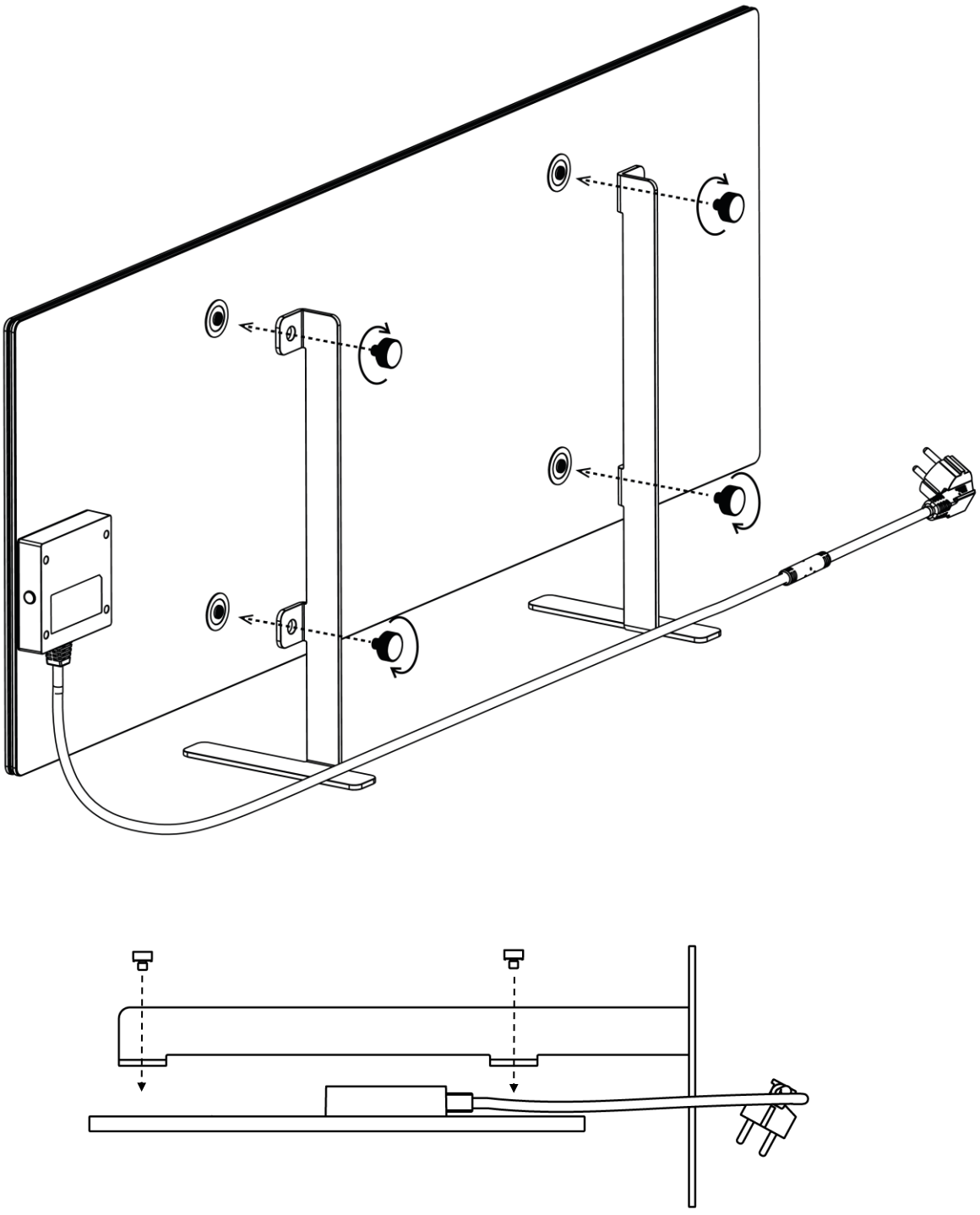
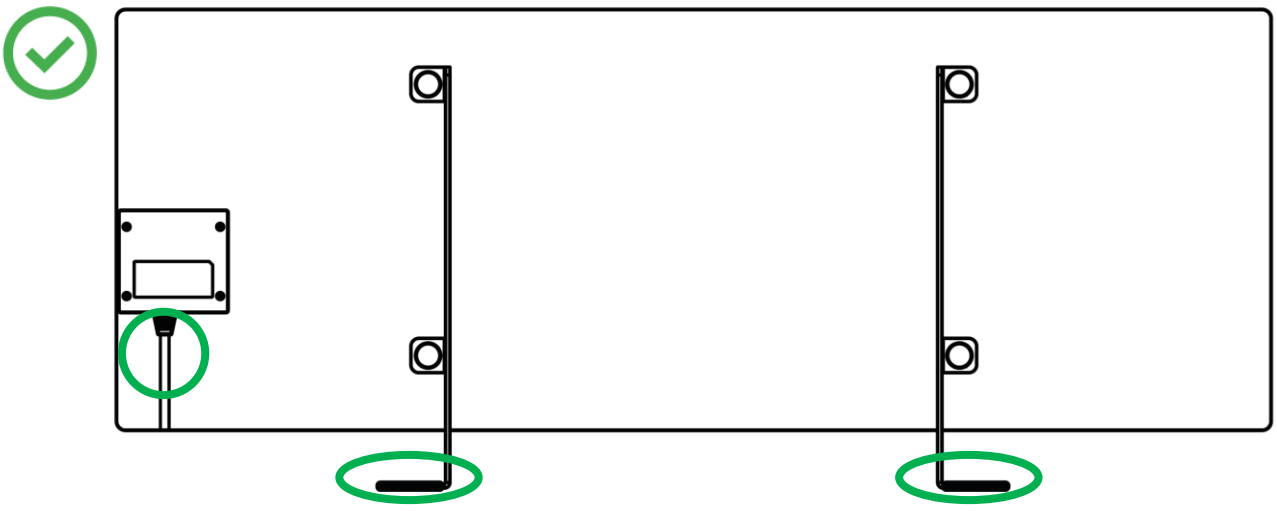
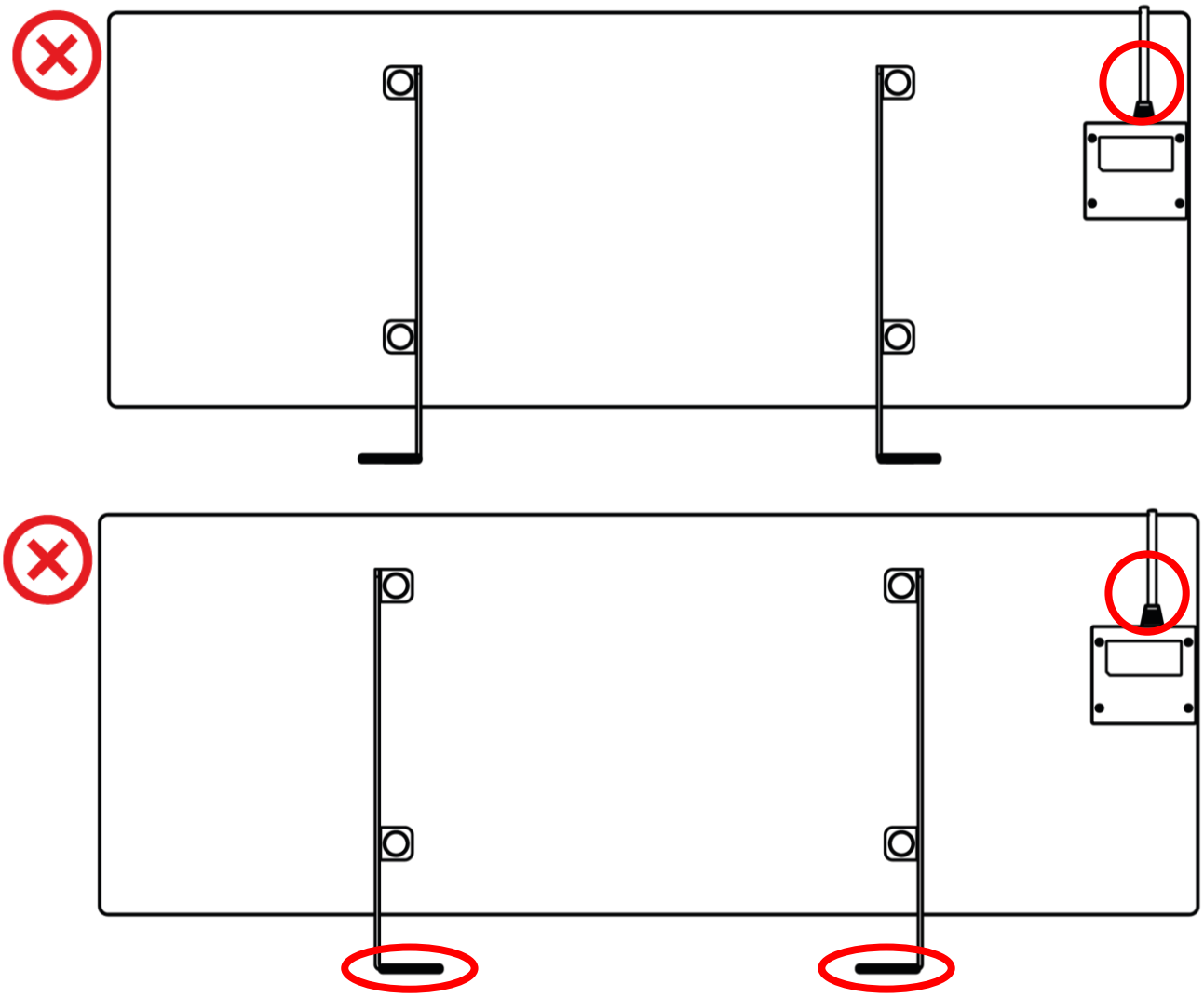


Figure 6 – Mounting on legs (on the floor)

1. Screw the two metal legs to the heating panel with the mounting bolts (See Figure above).

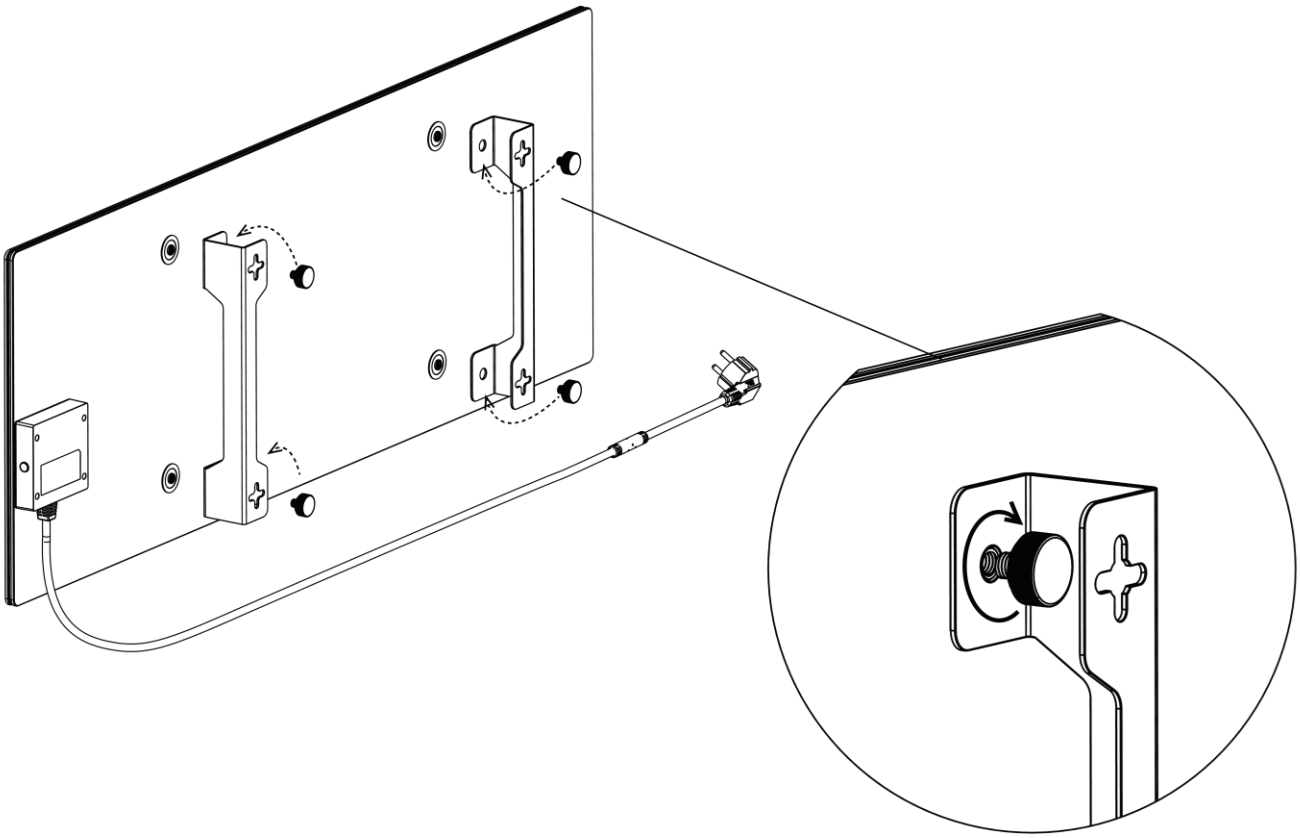
NOTE
During installation, make sure that the mounting bolts are tightened securely and that **legs are correctly oriented** relative to the device body (i.e. the inlet of the power cable to the control unit shall be from below).

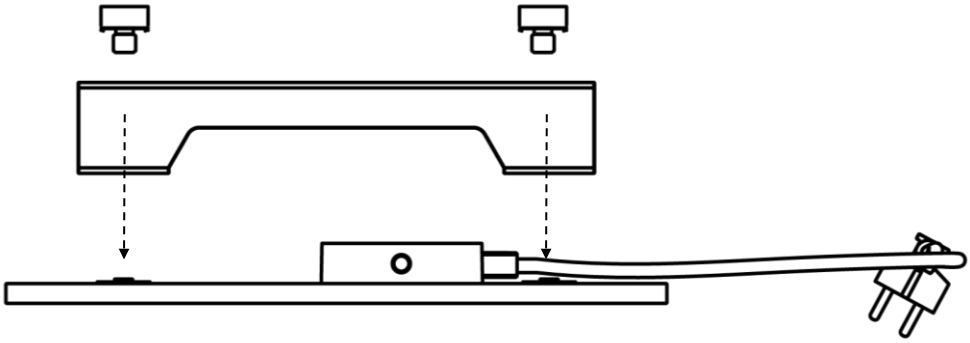




2.1.4 Horizontal Wall Mounting (Option 2)

1. Select the desired orientation of the heater on the wall (horizontally).
2. Screw mounting brackets to the rear surface of the panel correctly.





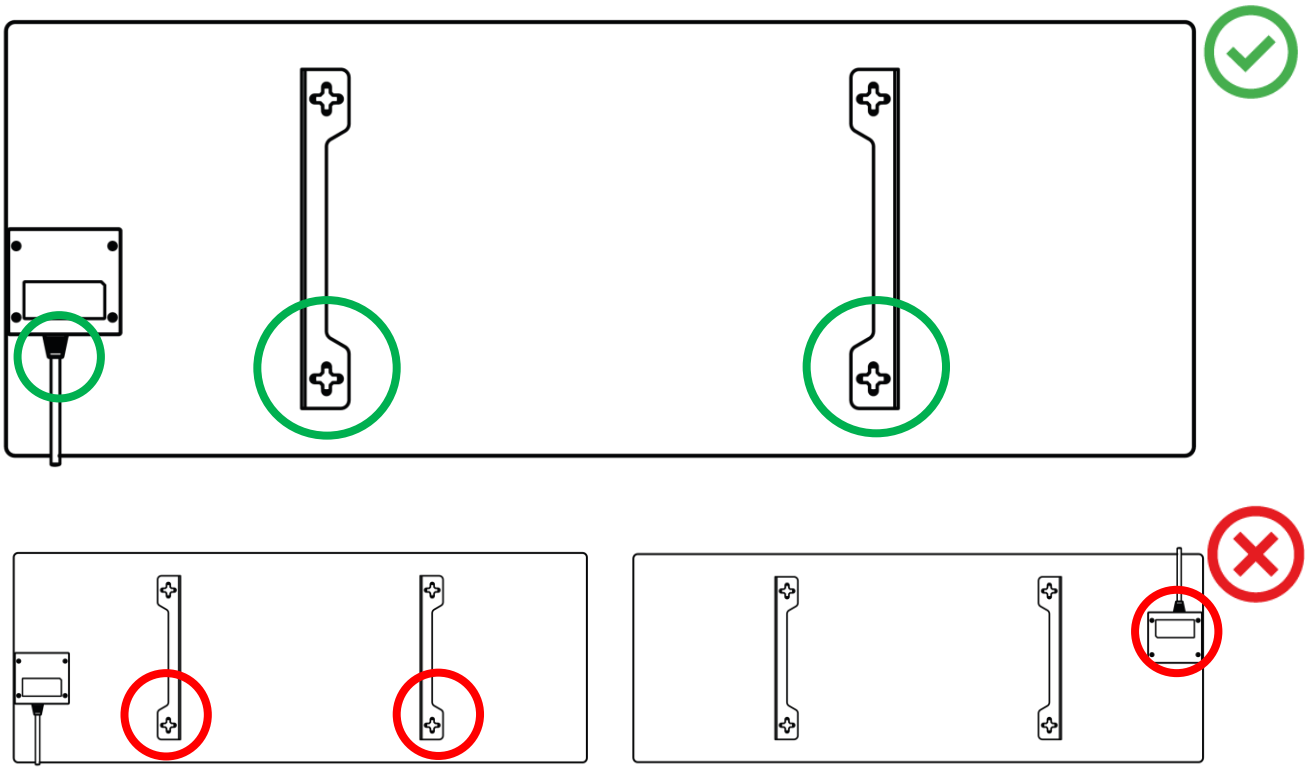
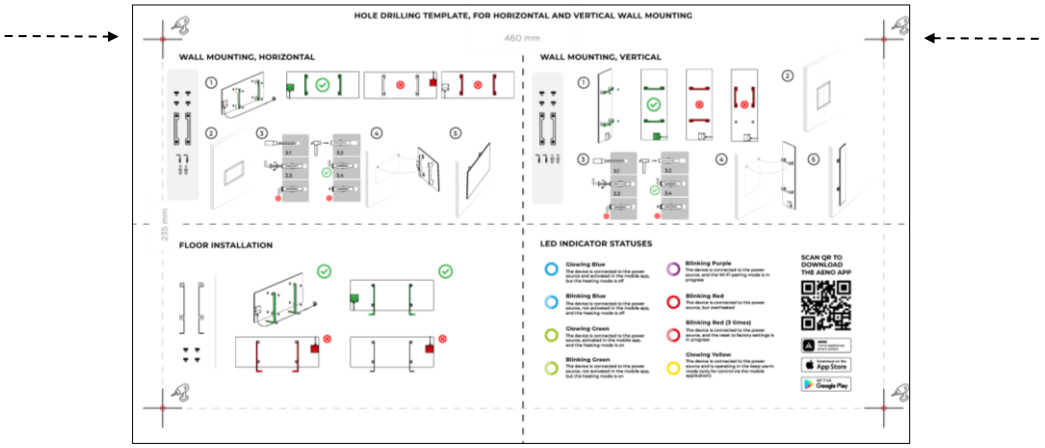
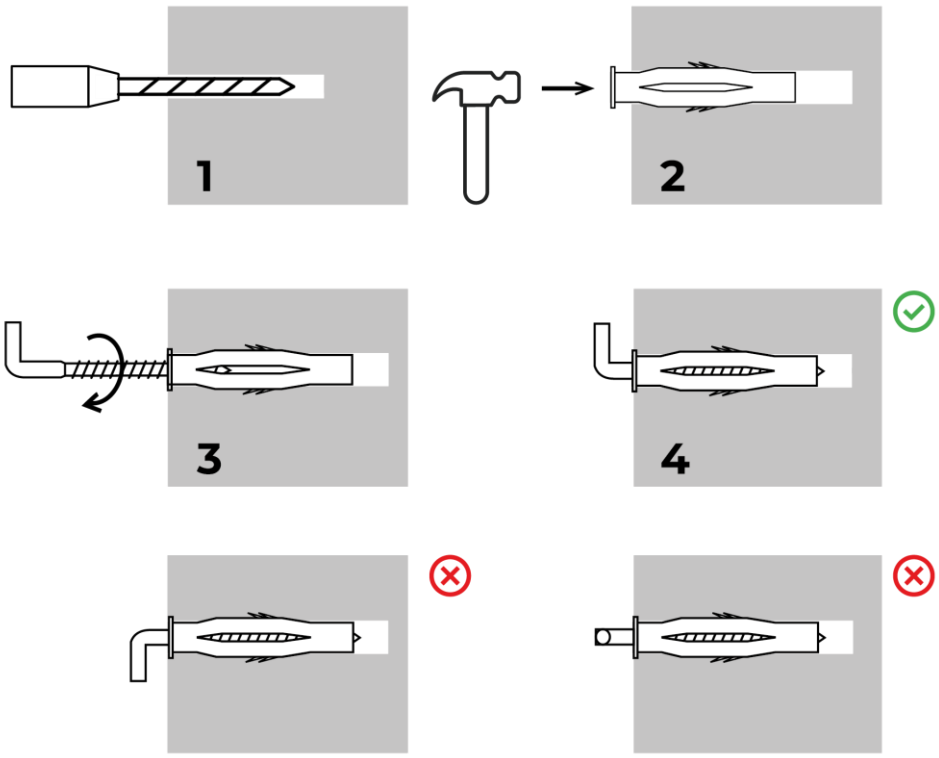


Figure 7 – Installation of the brackets

3. Drill 2 holes in the wall using the special paper template supplied with the device, and then screw in the hooks.



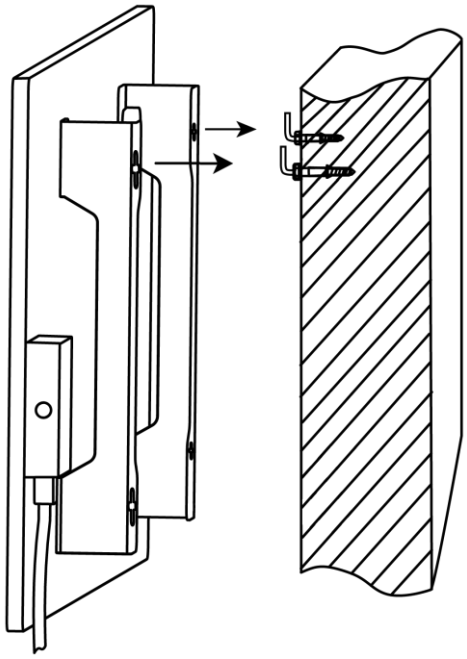
Horizontal orientation of the template



The process of screwing in the hooks

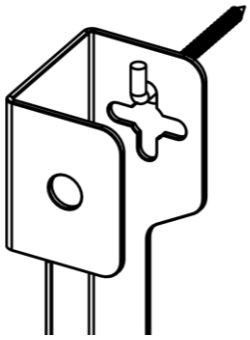
Figure 8 – Preparing of the wall (horizontal mounting)

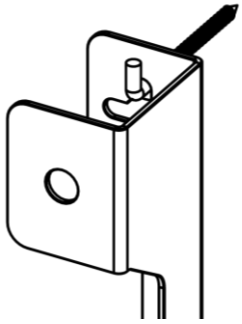
4. Carefully hang the heater on both hooks at a time.



5. Check that the device is securely fixed.

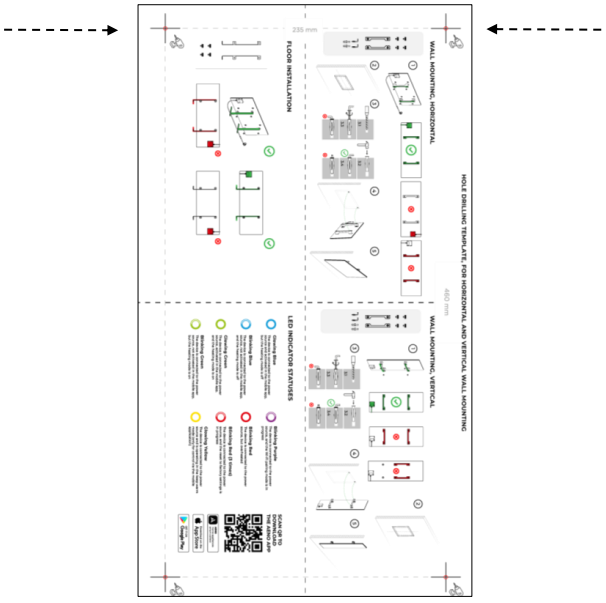
NOTE
During mounting, make sure that the hooks are securely tightened and oriented strictly vertically.



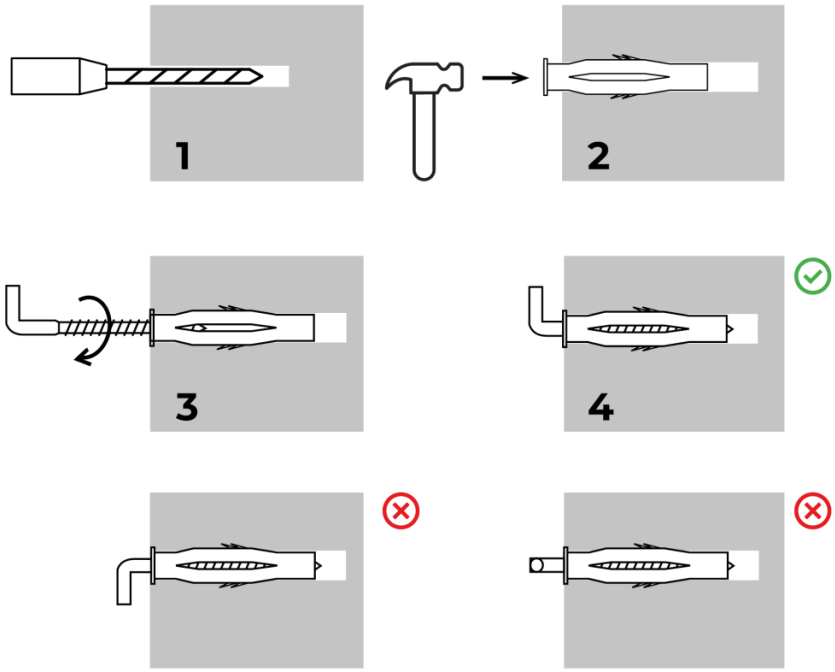


WARNING!
When mounted on the wall, the installation height should not exceed one (1) meter.

2.1.5 Vertical Wall Mounting (Option 3)

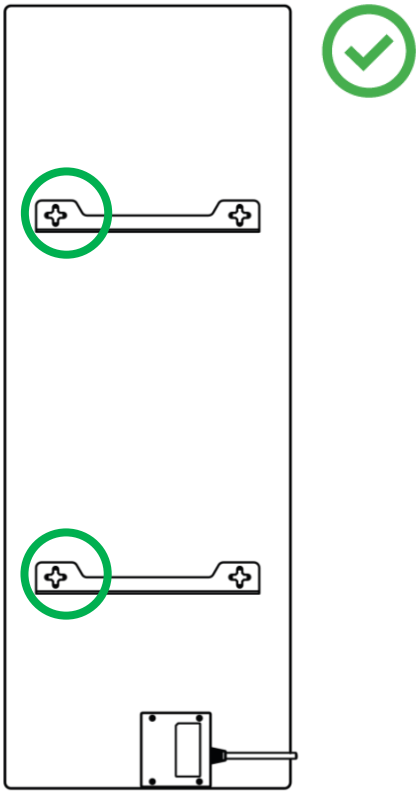


Vertical orientation of the template



The process of screwing in the hooks

Figure 9 – Preparing the wall (vertical mounting)



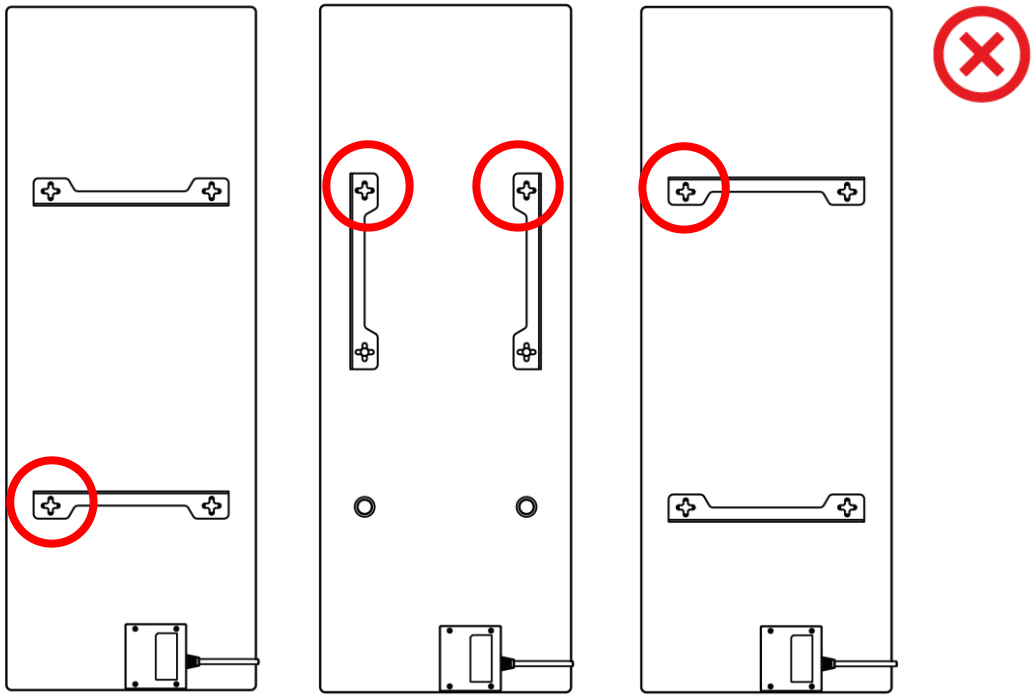
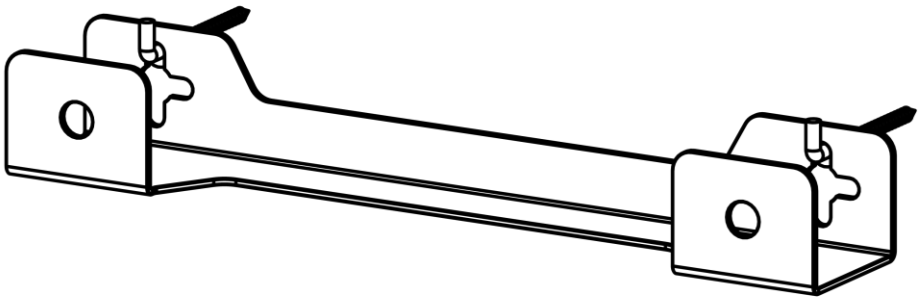


Figure 10 – Vertical installation (wall mounting)

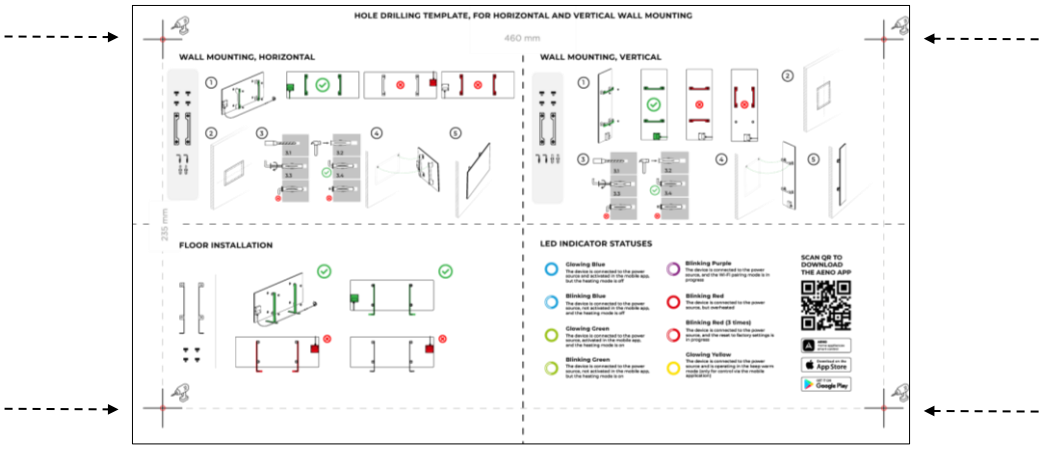
NOTE
The option of mounting the heater with the control unit being on top is acceptable, if the device is installed at a low height and when the location of the electrical outlet does not prevent the heater from being quickly de-energized, as well as if the power cable does not contact the heating panel.

NOTE
During mounting, make sure that the hooks are securely tightened and oriented strictly vertically.



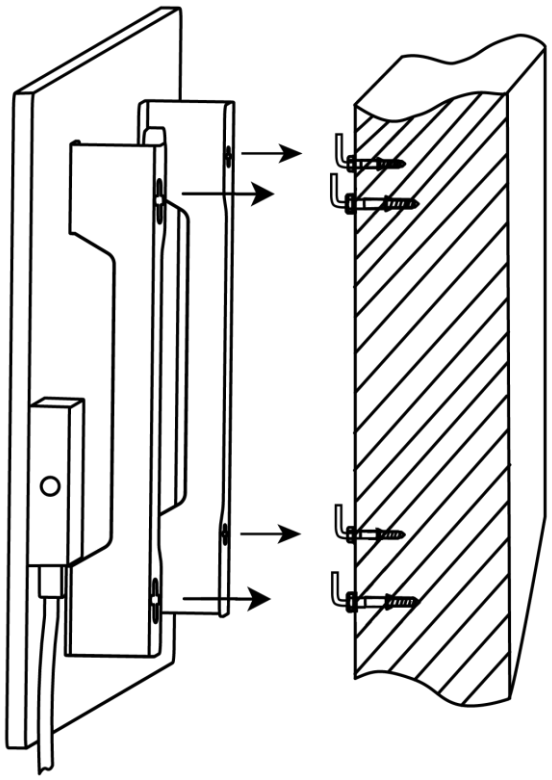
2.1.6 Wall Mounting with 4 Hooks (Additional Fixation)

When mounting on 4 hooks, you need to drill 4 holes in the wall with a template.



Then follow the instructions for assembling the heater as outlined in par. 2.1.4 or par. 2.1.5 above.

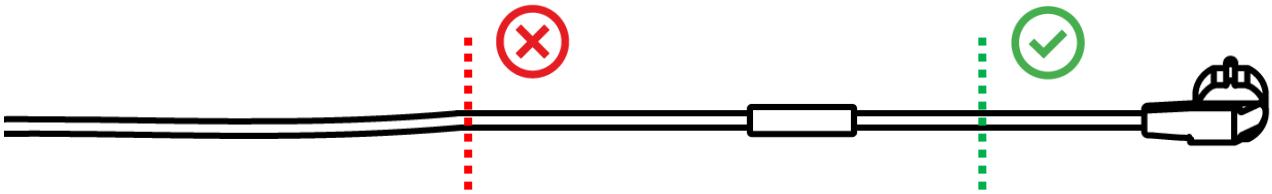
Hang the device on 4 hooks at a time.



2.1.7 Hardwiring Option

If you decide to mount the heater into the wall in such a way as to hide its power cable or to embed the device in the wall, then you should understand and agree to the following:

- The manufacturer's warranty for the device shall become void;
- The manufacturer shall not be liable for possible changes in functionality or poor operation of the device;
- Any installation operations must only be carried out by qualified installers only who have sufficient knowledge and skills to carry out correct and safe hardwiring of the heater;
- When cutting the power cable, it is not allowed to cut off the temperature sensor;



- The device must be installed in such a way as to provide its adequate ventilation and location of the temperature sensor unhidden, i.e. exposed to the room air.

2.1.8 Ceiling Mounting

If you decide to mount the heater on the ceiling, then you should understand and agree to the following:

- Any installation operations must only be carried out by qualified installers only who have sufficient knowledge and skills to carry out correct and safe mounting of the heater on the ceiling;
- The manufacturer shall not be liable for possible installation errors, including but not limited to the use of unsuitable fasteners, as well as for any loss or damage resulting from improper installation work;
- The power cable must not come into contact with the heating surface;
- The device must be installed in such a way as to provide its adequate ventilation and location of the temperature sensor unhidden, i.e. exposed to the room air.

2.2 Initial Power On

To turn the heater on, you should plug it into an electrical outlet using the power cable and press the power button (See Table 1).

NOTE
By default, the heater will be in a pairing mode for 3 minutes after the first power on. After that, the device will be switched to the standby mode (heating off mode).

Next, you should select one of the ways to control the device:

1. Manual control.
2. Remote control via the mobile app.
3. Remote control via voice assistants.

2.3 Manual Control

The heater may be managed with the power button located on the control unit of the device.

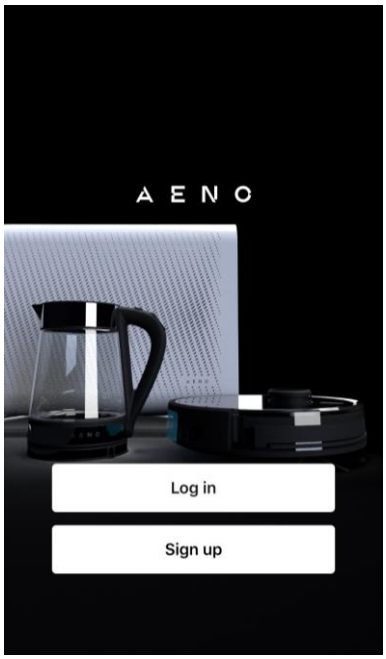
1. Press and hold the power button for no more than 3 seconds to turn it on for heating.
2. To stop heating, press and hold the power button again for no more than 3 seconds, and the device will be switched to the standby mode.

NOTE
See Table 1 above for more information on the functions of the power button.
Please unplug the power cable from the electrical outlet in order to de-energize the heater completely.

2.4 Remote Control via the AENO App

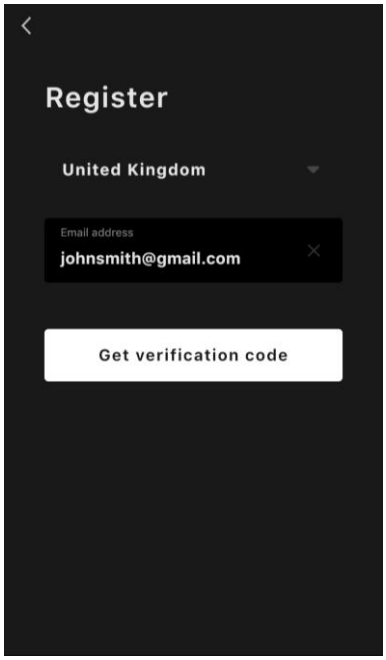
2.4.1 App Installation

- Connect your smartphone to the Internet (2.4 GHz) and download the free AENO mobile app from Google Play or the App Store.
- Register a new account or log in to an existing account.



2.4.2 Registering a New Account

- Launch the AENO app and tap the “Sign Up” button.
- Accept the terms of the user agreement and the Privacy Policy.
- Fill out the following information:
  - Select your country of residence;
  - Enter your email address.
- Tap “Get verification code”.
- An email with the registration verification code will be sent to the specified email address. Please enter this code in a special screen of the mobile app.



If you don't receive the verification code to your email, it is recommended that you do the following:

- Make sure you entered the correct email address.
- Check your Spam folder if the email is not in your Inbox.
- Try registering an account with a different email address if your firewall has blocked the email.

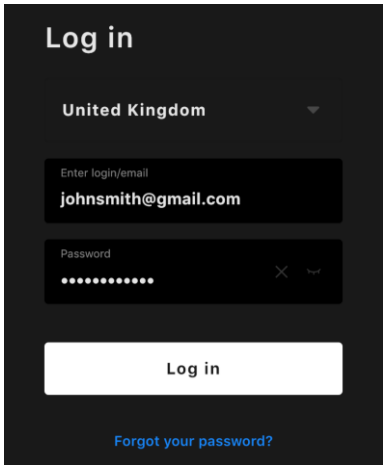
If none of the above tips are helpful, please contact our support team via the contact form on **aeno.com**. In the request, please provide your email address and the timestamp of your registration.

- After the verification code is successfully entered, you should set a password (6 to 20 characters including at least one letter and one number) and tap "Done". Confirm consent to access the data. If you refuse, some of the data associated with the use of the product will be unavailable for you.
- Confirm your consent to receive notifications and promotional applications. You will not receive notifications from the app, if you opt out.
- Tap the button to switch to the app.

2.4.3 Logging into an Existing Account

- Select your country of residence.
- Enter your email address.
- Enter your password and tap the "Log in" button.

If necessary, you may recover your password by taping the "Forgot your password?" text. An email with instructions on changing your password will be sent to the email address linked to your user account.



2.4.4 Eco Smart Heater Activation Process

There are several options for activating the heater in the AENO mobile app:

- Initial activation with automatic detection;
- Further activation in the Auto search mode;

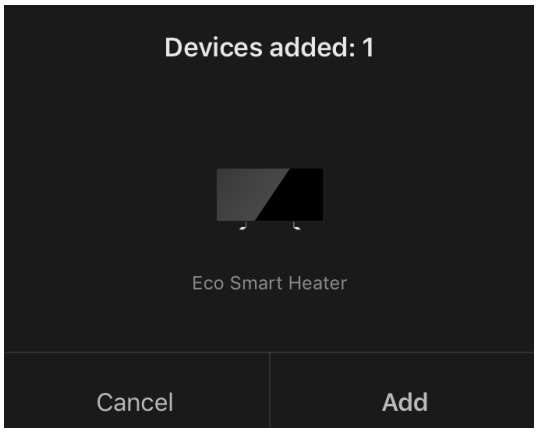
- Further activation in the Manual mode.

Initial activation with automatic detection

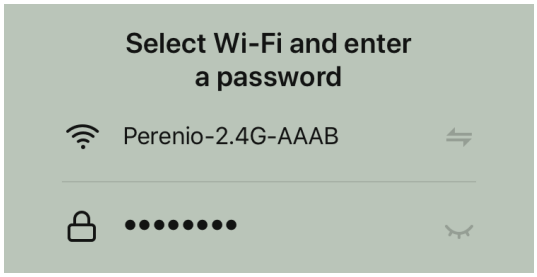
> **NOTE**
> This method can be used to activate the device in the app upon its connection to the mains outlet for the first time.

1. After logging into your account, tap the “+” icon in the “Home” tab.

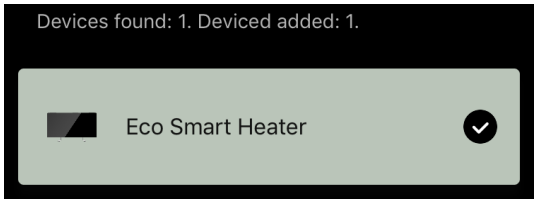
2. Wait till the image of the heater appears in the pop-up window and tap “Add”.



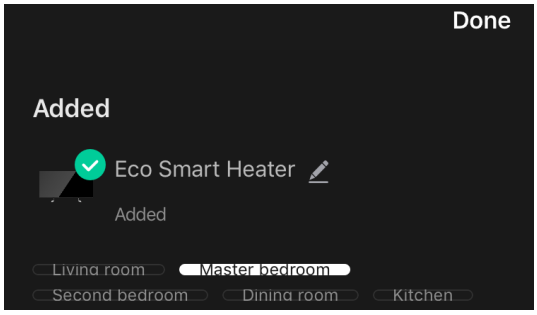
3. Enter the Wi-Fi network password to which the device will be connected (you can choose another network if it is of 2.4 GHz).



4. Wait for the device to be connected to the app and tap “Next”.



5. Specify the desired name for the heater and select the room of installation from the list. After that, tap “Done”.

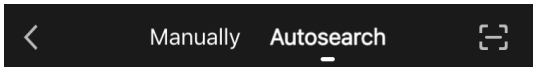


Further activation in the Auto search mode

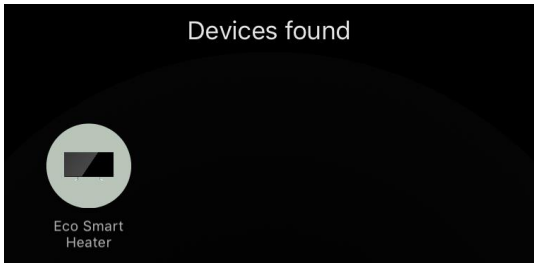
NOTE
This method can be used in all cases where the heater is in the pairing mode.

1. After logging into your account, tap the “+” icon in the “Home” tab.

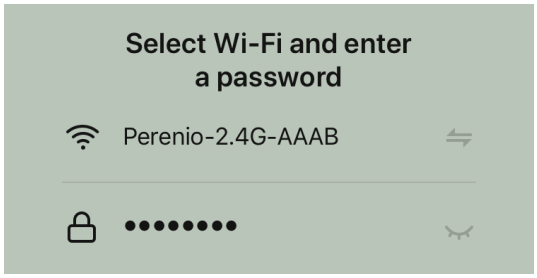
2. Select the Auto Search tab at the top of the screen.



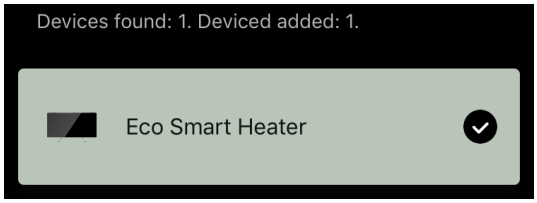
3. Provide the AENO app with all requested accesses.
4. Wait for the heater to be detected and tap the “Next” button.



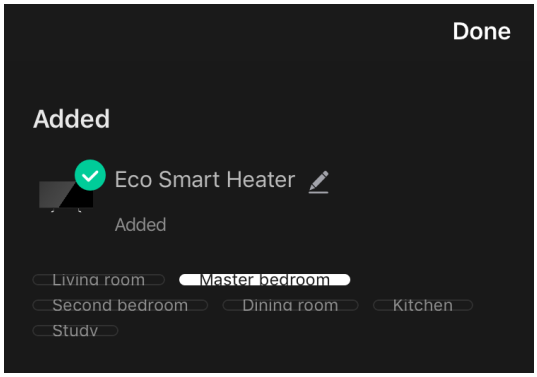
5. Enter the Wi-Fi network password to which the device will be connected (you can choose another network if it is of 2.4 GHz).



6. Wait for the device to be connected to the app and tap “Next”.



7. Specify the desired name for the heater and select the room of installation from the list. After that, tap “Done”.

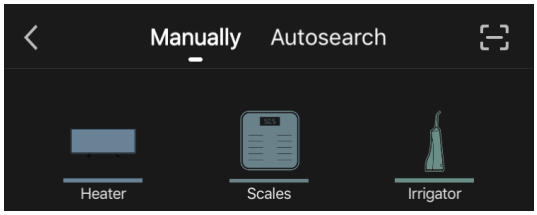


Further activation in the Manual mode

NOTE
This method can be used in all cases where the heater is in the pairing mode and when it was not automatically detected via other activation methods.

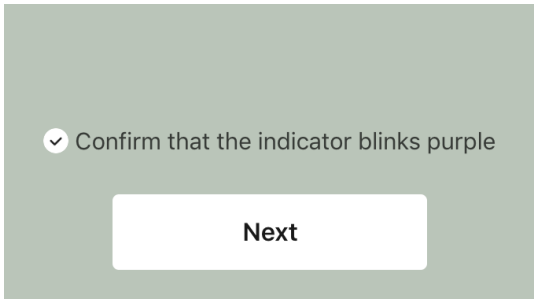
1. After logging into your account, tap the “+” icon in the “Home” tab.

2. Select the “Manually” tab at the top of the screen and then the “Heater” category.

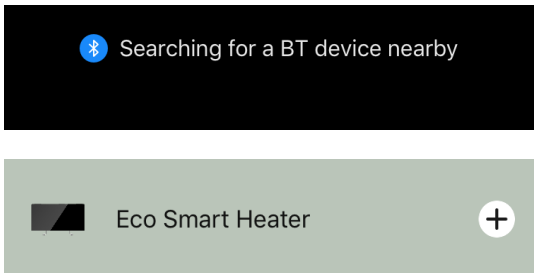


3. Turn on the heater by pressing its power button once. The LED indicator light will turn green.
4. Then press and hold the power button until the LED starts blinking purple.

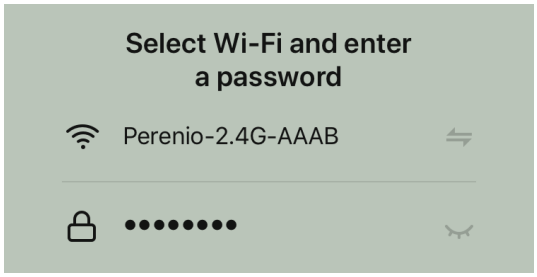
5. On the screen with the connection instructions, confirm that the indicator is blinking purple and tap “Next”.



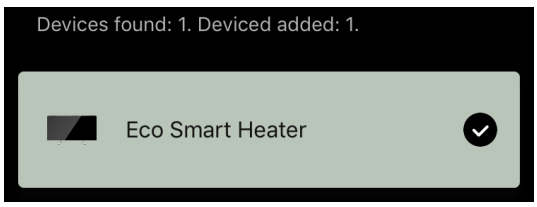
6. Wait for the heater to be detected and tap on the "+" icon next to its name.



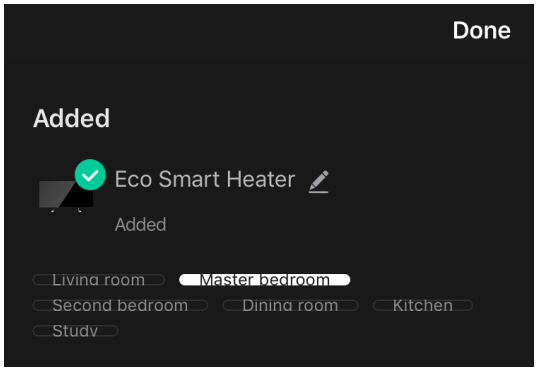
7. Enter the Wi-Fi network password to which the device will be connected (you can choose another network if it is of 2.4 GHz).



8. Wait for the device to be connected to the app and tap “Next”.



9. Specify the desired name for the heater and select the room of installation from the list. After that, tap “Done”.

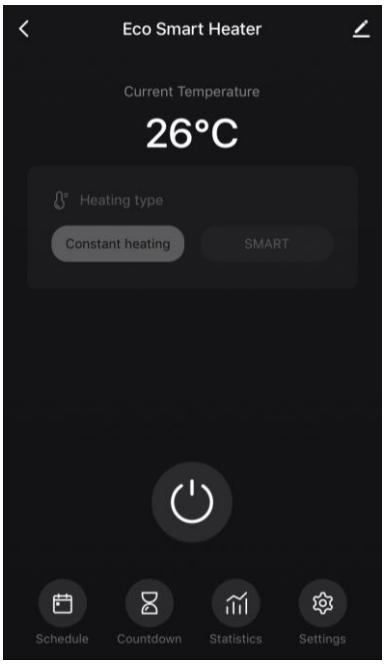


2.4.5 Control Panel of the Eco Heater

The heater’s control panel is displayed if you tap on its image in the list of connected devices in the “Home” tab.

In the control panel the user can:

- View the current room temperature;
- Set the desired room temperature;
- Turn the device on and off and select its operating mode;
- Set timers and view power consumption statistics;
- Change the settings.



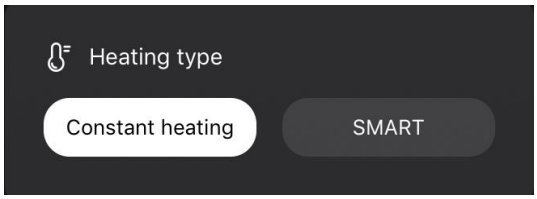
2.4.6 Operating Mode Selection

There are two modes of operation available in the heater's control panel:

- Constant heating, where the heater is switched on and off manually by the user, and the temperature of the room heating cannot be adjusted;
- SMART, where the room temperature is controlled by a built-in sensor. The set value is maintained without the user, i.e. the heating element is switched on or off as needed.

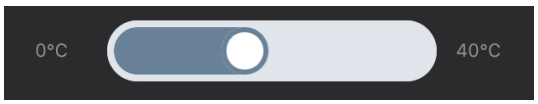
NOTE
The default setting after the heater is activated in the app for the first time is manual operation.

You can select the operating mode only after turning on the heater. You can turn it on manually or from the control panel by pressing the power button .



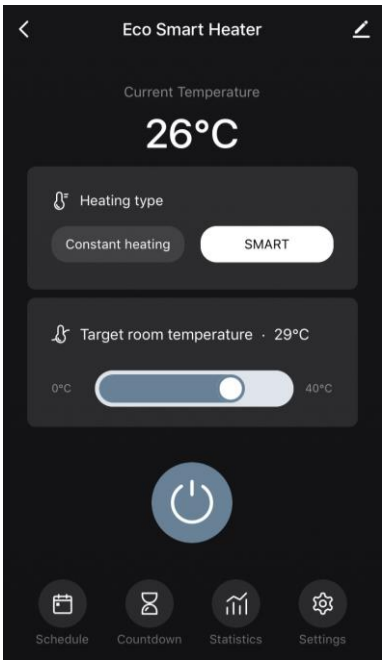
SMART mode settings

The SMART mode allows you to set the desired room heating temperature from 0 to 40 °C.



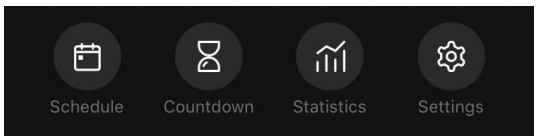
NOTE
If the set temperature is lower than the current room temperature, the device will be switched to the standby mode, i.e. the heating will be turned off.

The step for changing the desired temperature value is 1 °C.

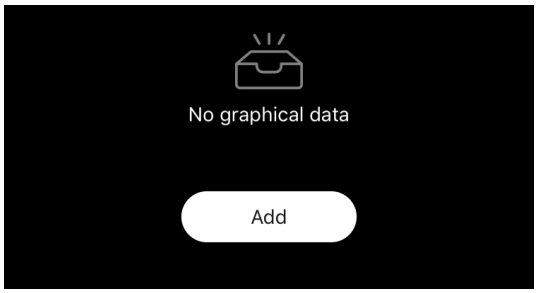


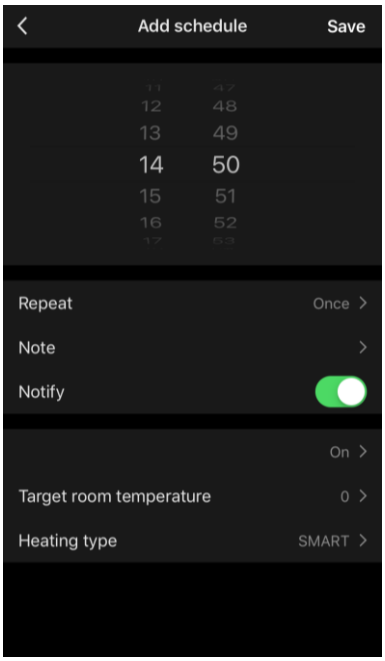
2.4.7 Setting the Heater Schedule

To operate the heater on a schedule, you should tap the “Schedule” tab in the control panel of the device.



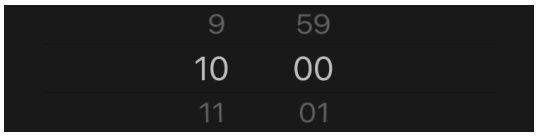
Next, tap on the “Add” button.



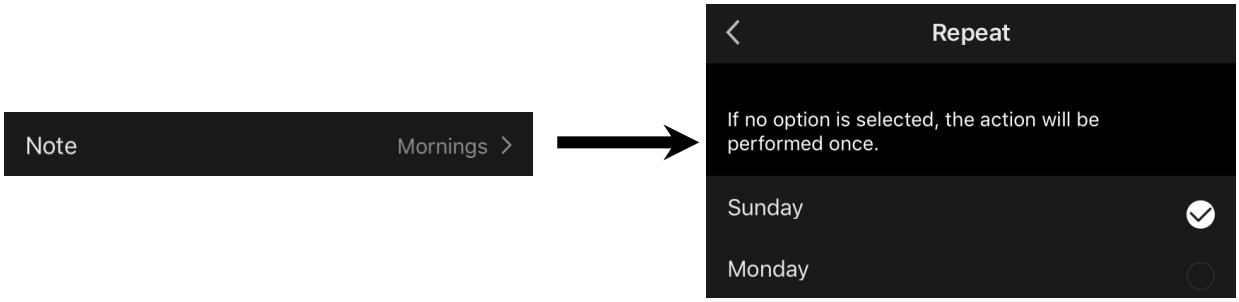


The following settings are available:

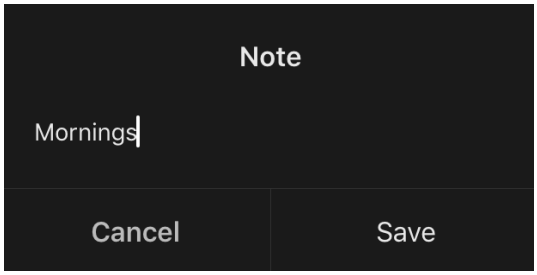
- Start time,



- Repetition by day of the week,

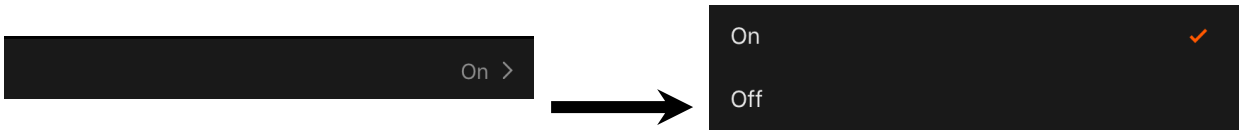


- Entering a user note that will be displayed in the list of schedules and push notifications,

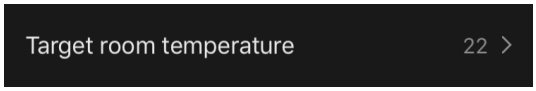


- Option to receive push notifications when this event starts,

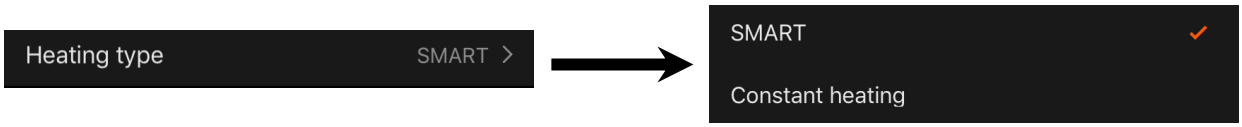
- Action to be triggered by time (switching the heater on or off),



- The desired room temperature for the schedule for turning the heater on,



- The type of heating for the schedule for turning the heater on.

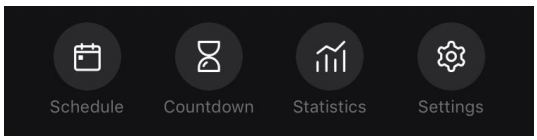


2.4.8 Setting the Countdown Timer

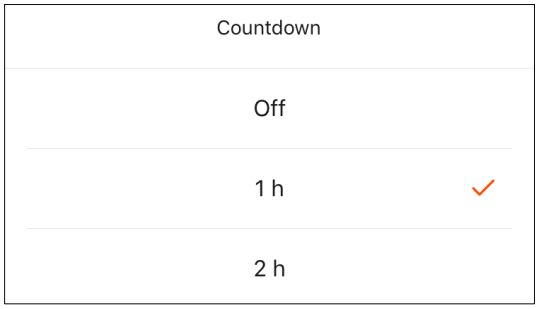
The countdown timer allows the device to be turned off automatically after a specified interval of twenty-four (24) hours.

The time step is 1 hour.

To set the countdown timer, tap the “Timer” tab in the control panel of the heater.



The timer is considered activated when a check mark is placed next to the value of the time interval after which the heater will turn off. Tap “Done” to save the timer settings.

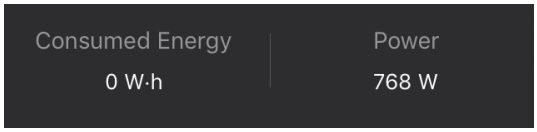


The time when the device is turned off will be displayed in the control panel.

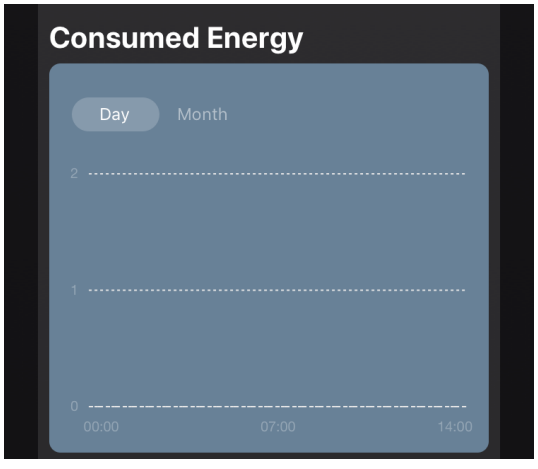
2.4.9 Energy and Power Statistics

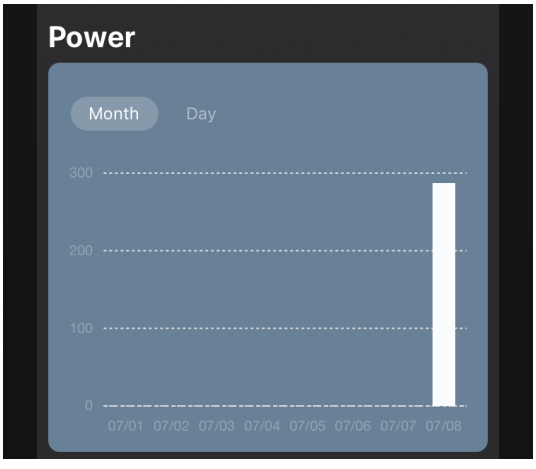
In the Statistics section, you can view the following information:

- Current power consumption and consumed energy of the heater;

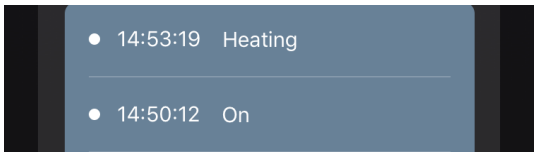


- Energy consumption and power statistics diagrams for the day or the month;

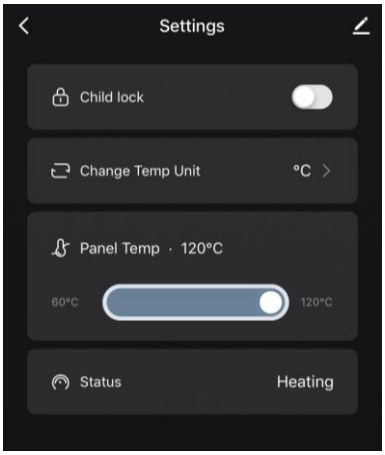




- The list of heater statuses by days with timestamp of the event.



2.4.10 Changing Settings



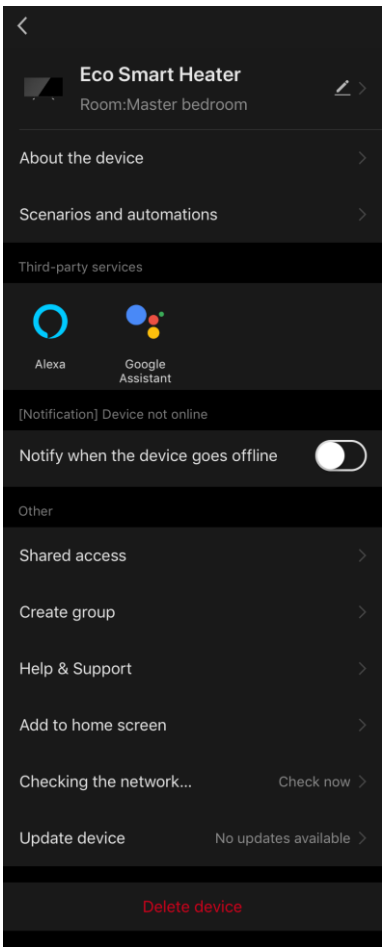
In the “Settings” tab of the heater control panel, the user can perform the following actions:

- Activate the Child Lock mode. When activated, the heater will not respond to pressing a physical button, and all control may be done through the app only;
- Select the temperature scale (°C or °F);
- Set the desired heating temperature of the panel;
- View the current status of the heater.

2.4.11 Additional Settings

To open the additional settings screen, tap the icon in the upper right corner of the device control panel.

In the additional settings panel, you can perform the following:



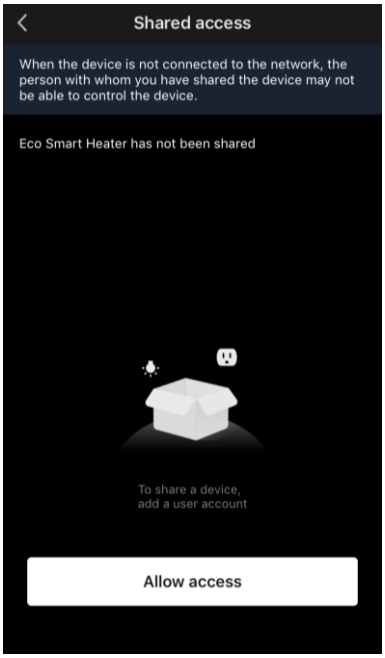
- Change the screen saver, name and the room of installation of the device (tap ✎ next to the heater name);
- About the device: View reference information about the device operation;
- Scenarios and automations: View scenarios where the device is involved;
- Third-party services: Integrate the account with Alexa and Google Assistant services for voice control of devices;
- Notify when the device goes offline: Enable or disable push notifications;
- Shared access: Provide access to device control to another account, for example, for family members;
- Create group: Unite devices to manage them as a single group;
- Help & Support: Get information about the most common problems and how to solve them;
- Add to home screen: Add a device shortcut to your smartphone's home screen for quick access to the device control panel;
- Checking the network: Launch scanning the Wi-Fi network, its signal strength and network connection status;
- Update device: Check and install the latest updates for the device or activate the automatic update;
- Delete device: Remove the device from the mobile app.

Shared Access

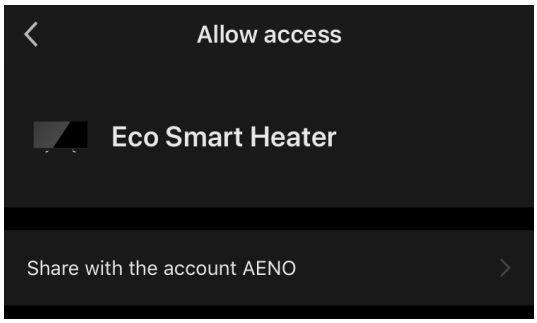
In the AENO app, a device can only be connected to one account. However, the user may share this device with other users.

Through sharing, other users can control the device, change modes and operation settings, but cannot set or modify device data, create scenarios, or remove devices from the application.

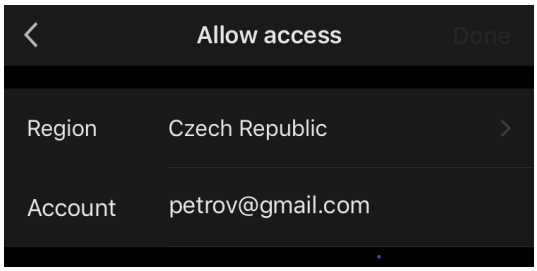
To share your device, open to the additional settings menu and tap “Shared access”.



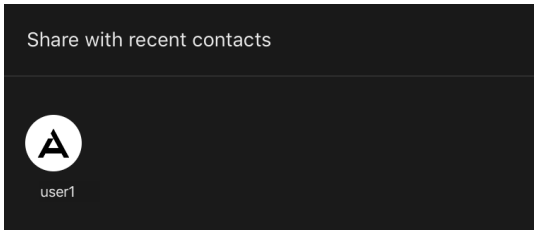
Tap “Allow Access” and tap “Share with the account AENO”.



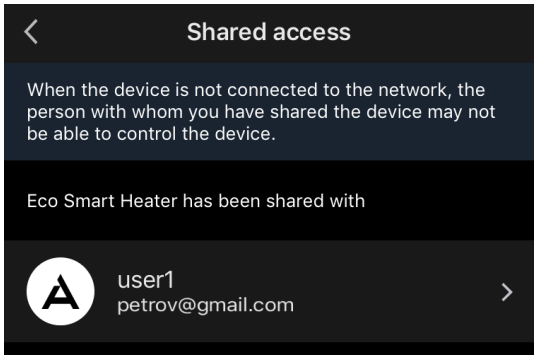
Select the country of residence and the e-mail address of the user you want to share access with. Tap “Done”.



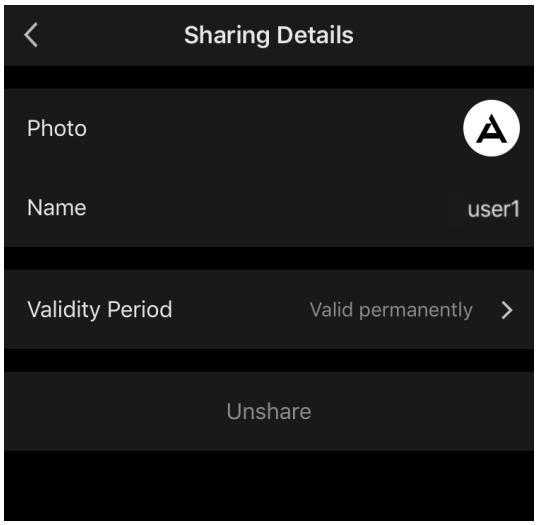
In the “Shared access” section, tap “Allow Access” again, and then tap the icon of the desired user. The corresponding notification will appear that access has been successfully granted.

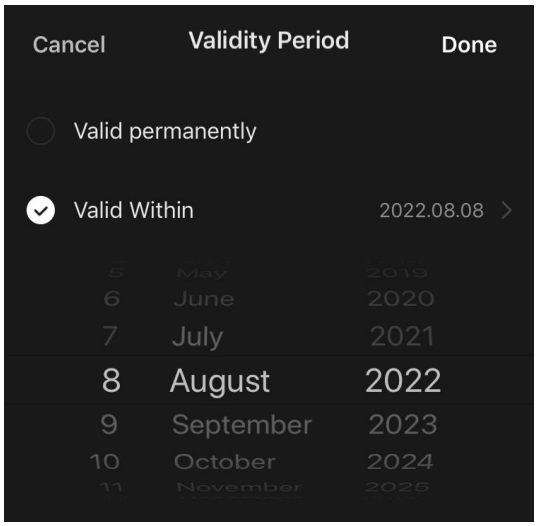


Information about the user will be displayed in the “Shared access” section.



Tap on the line with the added account in this section to set the validity period for the access or to cancel sharing.

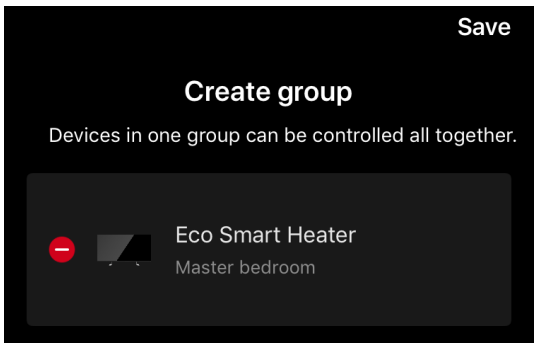




This device will appear in the granted access section of the “Home” tab in this user account.

Create Group

From the AENO app, you can manage individual devices or groups of devices. To group devices, tap “Create group” and select the desired heaters from the list. Then, tap “Save”.



NOTE
Only devices of the same type can be grouped.

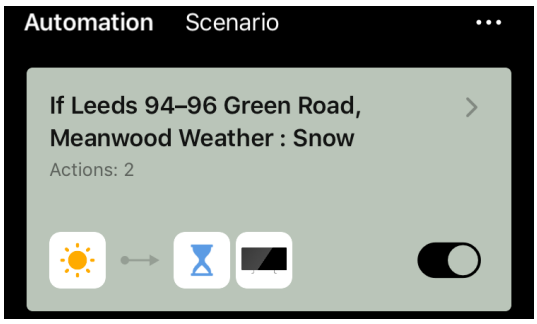
Then, set the desired name for the group and tap “Save”. The created group is displayed in the “Home” tab.

NOTE
For more information on the AENO app functionality, see the corresponding complete user manual available for downloading at aeno.com.

2.4.12 Scenarios and Automations

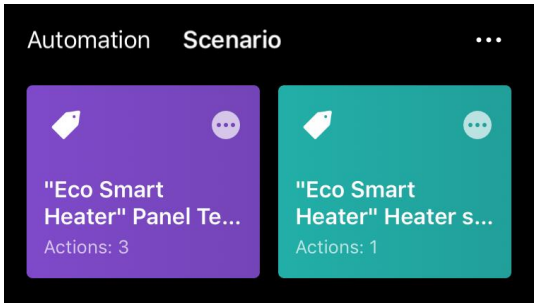
In the “Scenarios” tab, the user can select conditions for automation and/or create and manually run scenario.

Automation is an event that starts automatically and is triggered every time the conditions specified in it are met.



NOTE
In other words, it is an automatic scenario.

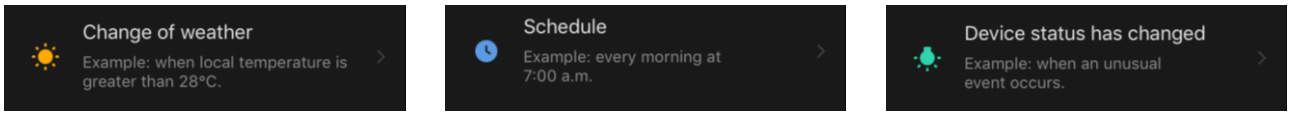
Scenario is an event that is triggered manually at the user's request and is executed once if the conditions specified in it are met.



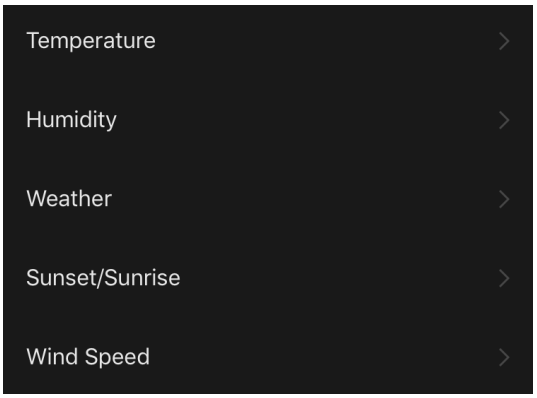
NOTE
In other words, it's a manual scenario.

Automation (creating an automatic scenario)

- Tap the "Scenarios" tab and then tap "+".
- Select one of the conditions launch an automatic scenario.

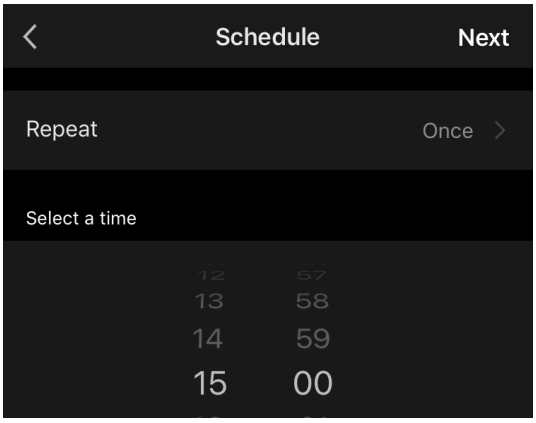


Change of weather: The scenario will run when the weather conditions match the parameter selected by the user. For example, when it gets wet.

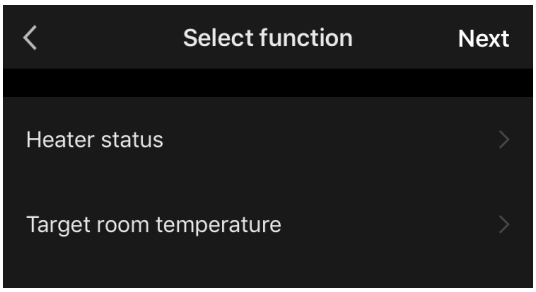


NOTE
In order to start the automation correctly, it is necessary to specify the exact address of the place where you want to read the weather conditions.

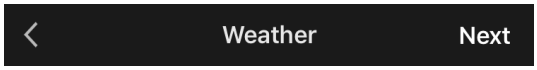
Schedule: The scenario will run at a specific time. Here you can also set the days of the week to repeat this scenario.



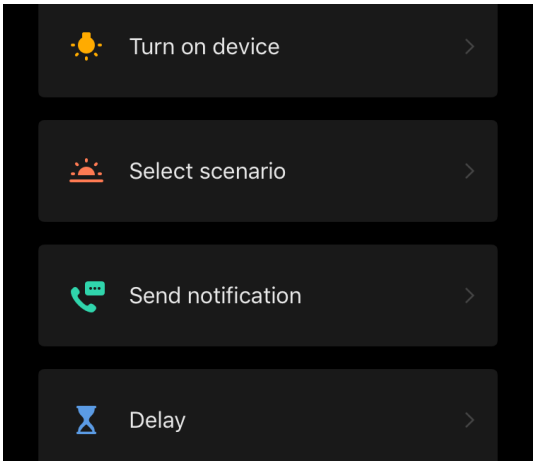
Device status: The scenario will run when the selected event occurs. For example, when the room temperature drops to 19°C or when the heater's power consumption limit set by the user is exceeded.



- Tap “Next” at the top of the screen.



- Select one of the actions that will occur when selected condition appears:



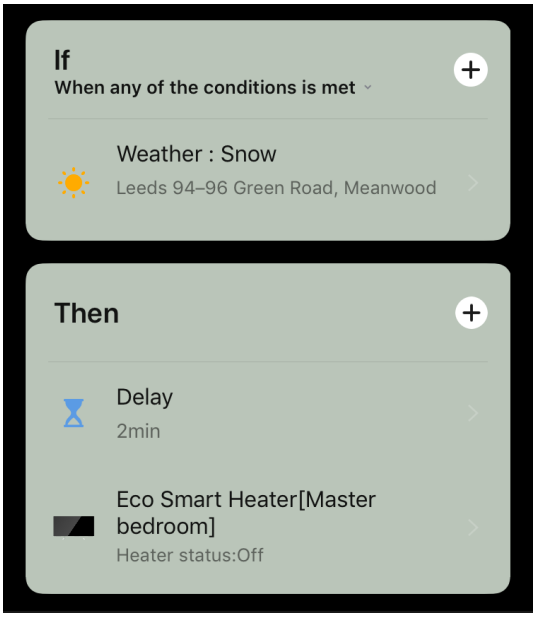
Device status: The selected event will occur. For example, the heating type will be changed or the panel heating temperature will increase to 100 °C.

Select scenario: Previously created scenario or automation will run.

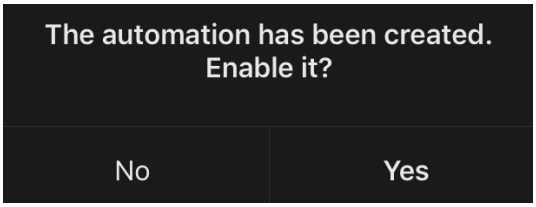
Send notification: The user will receive a notification via the message center.

Delay: The time delay will be set before the next action is triggered. In this case, it is necessary to add one more action after the specified delay.

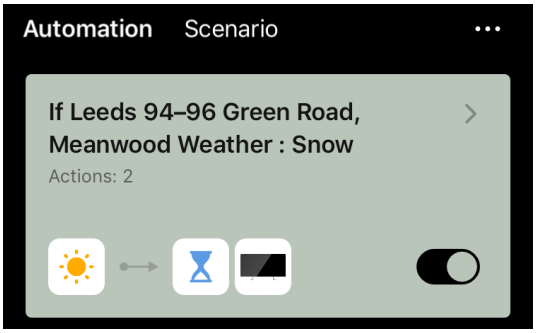
- Tap “Next” at the top of the screen.
- If necessary, add an additional condition and/or action by tapping “+” in the corresponding block.



- Tap “Save”.
- Enable the created automation, if necessary.

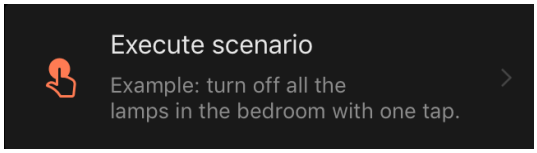


- It can also be activated later in the “Automation” section.

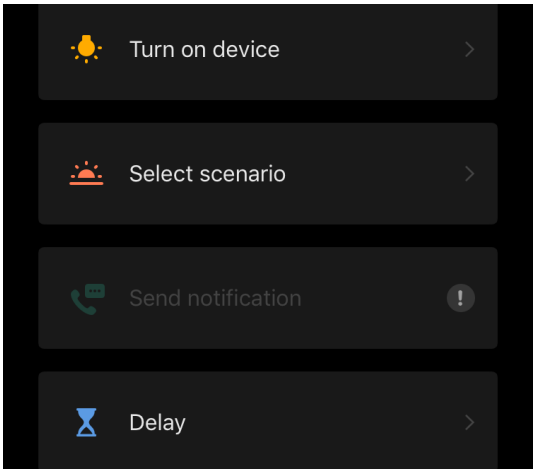


Scenario (creating a manual scenario)

- Tap the “Scenarios” tab and then tap “+”.
- Select the “Execute scenario” condition.



- Select one of the actions that shall be performed after you run the scenario:

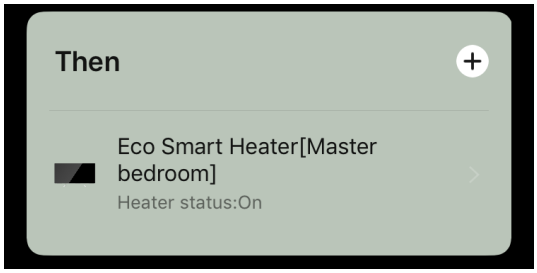


Device status: The selected event will occur. For example, the heating type will be changed or the panel heating temperature will increase to 100 °C.

Select scenario: Previously created scenario or automation will run.

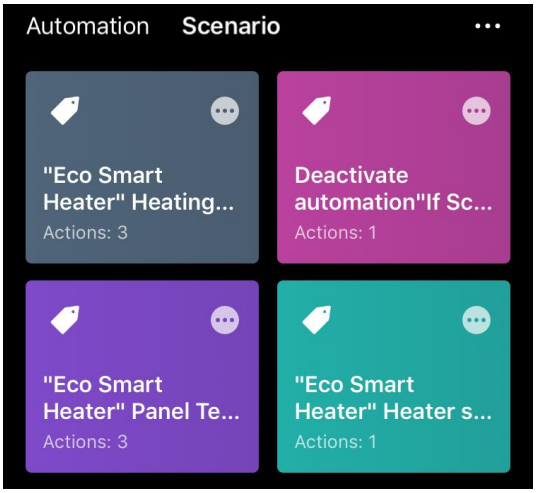
Delay: The time delay will be set before the next action is triggered. In this case, it is necessary to add one more action after the specified delay.

- Tap “Next” at the top of the screen.
- If necessary, add an additional condition and/or action by tapping “+” in the corresponding block.



- Tap “Save”.

- The created scenario will be displayed in the “Scenario” section.



To run the scenario, you should tap its image in the list.

To make changes to the created script, tap “•••”.

2.5 Child Lock Mode

The Child Lock mode means locking the power button of the device via the mobile app.

> **NOTE**
> This mode can only be activated remotely after connecting the device via the mobile app.

If the mode is activated, the heater will beep every time its power button is pressed. The button itself will be locked.

There are two following ways to disable the Child Lock mode:

1. Remotely via the AENO app.
2. Manually by pressing the power button 5 times for 4 seconds.

2.6 Remote control via voice assistants

To control the heater via the Google Assistant or Amazon Alexa app, it must first be activated in the AENO app.

Detailed instructions for managing the heater with voice assistants are available for downloading from the respective manufacturers of these services.

3 Maintenance and Repair

The AENO™ heater does not require special maintenance in the normal course of operation. However, in order to maintain the proper state and stable operation of the device it is recommended to perform the following actions from time to time:

- Follow rules of safe operation of the device;
- Clean the device casing from dirt and dust from time to time (at least once per the heating season);
- Check for updates of the mobile app (If auto update is not enabled);
- Repair mechanical damages to devices (in Service Centers).

The AENO™ heater repairs shall be carried out in Service Centers.

In the case of warranty repairs or replacement, the User shall provide the Seller with the sales receipt and the purchased device.

For details on the replacement and repairs of the AENO™ heater, please contact your local Company representative or the Tech Support Department at aeno.com.

4 Warranty Obligations

The service life of the device is two (2) years. The manufacturer's warranty for this product is two (2) years from the date of retail sale. The manufacturer's warranty on accessories is two (2) years from the date of retail sale.

You may have other rights under the laws of your country that govern the sale of consumer goods. This limited warranty does not affect such rights.

The manufacturer guarantees proper functioning of all materials, components and assembly of AENO™ products provided that the rules of operation set forth in the user manual of the device are followed during the warranty period.

For warranty replacement, the device must be returned to the retailer, along with the receipt verifying the purchase.

The following are not considered defects:

- the smell of new plastic or rubber emitted by the device during the first days of operation;
- change of color shade, gloss of equipment parts during operation;
- noises (not exceeding the sanitary norms) related to the principles of operation of the individual components, namely:
  - fans;
  - water valves;
  - electrical relays;
  - electric motors;
  - belts;
  - compressors;
- noises caused by natural wear and tear (aging) of materials, namely:
  - crackling during heating/cooling;
  - creaks;
  - minor knocking of moving mechanisms;
- the need to replace consumables and wear parts that have become unusable as a result of their natural wear and tear.

4.1 AENO™ Service Centers

For a list of cities where the manufacturer's service is available, visit aeno.com.

4.2 Warranty Service Procedure

If you discover a suspected fault or defect in the device, you should contact an authorized service centre before the warranty period expires and provide the following information:

1. A device with an alleged fault or defect.
2. Original document confirming the purchase.

In the absence of an authorized service centre, the customer should contact the store where the device was purchased.

Warranty service does not cover:

- the adjustments, setting, cleaning and other care of the product as specified in this user manual;
- the replacement of consumables (batteries, filters, light bulbs, dust bags, etc.) as specified in this document.

4.3 Limitation of Liability

Products with manufacturing defects are subject to warranty service during the warranty period. In this case, the warranty period is extended for a period equal to the duration of the repair.

AENO™ products are not eligible for free warranty service if the following damages or defects are found:

- damage caused by force majeure, accidents, negligence, intentional or careless actions (omissions) of the buyer or third parties;
- damage caused by the effects of other objects, including but not limited to exposure to moisture, dampness, extreme temperatures, or environmental conditions (or if they change drastically), corrosion, oxidation, ingress of food or liquid and exposure to chemicals, animals, insects, and their products of vital activity;

- if the device (accessories, components) has been opened (the seals are broken), altered or repaired by anyone other than an authorized service centre, or with unauthorized replacement parts;
- defects or damage caused by improper use, misuse, including use contrary to the operating instructions;
- defects caused by normal wear and tear, including bags, cases, battery packs, or user manuals;
- if the serial number (factory stickers), manufacturing date or model name on the device have been removed, erased, damaged, altered or is illegible in any way;
- in case of violation of the rules and conditions of operation, as well as the installation of the device, set forth in the operating manual;
- cracks and scratches as well as other defects resulting from transportation, operation by the purchaser or negligent handling on his part;
- mechanical damage that occurs after the device has been transferred to the user, including damage caused by sharp objects, bending, crushing, dropping, etc;
- damage caused by non-compliance with standards for parameters of power, telecommunications, cable networks and external factors.

This limited warranty is the exclusive and sole warranty provided and is in lieu of any other express or implied warranties. The manufacturer makes no warranty, either express or implied, beyond the description contained herein, including an implied warranty of merchantability and fitness for a particular purpose. It remains at the discretion of the purchaser to use a faulty, defective and unacceptable device. The manufacturer shall not be liable for damages to other property due to any defects in the device, loss of use of the device, loss of time, or for any special, incidental, indirect or consequential damages, punitive damages and losses, including but not limited to commercial damages, loss of profits, loss of profits, loss of confidential or other information, loss of business or operational interruption due to the device being found to be defective, defective or deficient

NOTE
The manufacturer does not produce equipment for the field of "vital tasks". Devices for "vital tasks" include life support systems, medical equipment, implant-related medical devices, commercial transportation, nuclear equipment or systems, and any other application where equipment failure could result in personal injury or death, or property damage.

5 Storage, Transportation and Disposal of Devices

The device is not intended for use in areas exposed to hazardous and harmful factors.

Long-term storage is only permitted in the original packaging in dark, dry, clean, and well-ventilated enclosed areas. To prevent damage to the glass heating element, it is recommended to store the device in one layer, either vertically or horizontally.

In accordance with the Waste Electrical and Electronic Equipment (WEEE)* regulations, all electrical and electronic products must be collected separately at the end of their service life, and cannot be disposed of together with unsorted household waste.

Parts of worn out devices must be separated and sorted by the material type. In this way, every user can contribute to reuse, recycling and other forms of recovery of waste electrical and electronic equipment. Proper collection, recycling, and disposal of such devices will help avoid potential environmental and health impacts from the harmful substances they contain.

To dispose of the device, it must be returned to the point of sale, or to a local waste collection and recycling company recommended by the state or local authorities. Disposal is carried out in accordance with the applicable laws and regulations of the respective country.

For more details on how to properly dispose of your used device, please contact your device supplier, your waste disposal service or the local authorities responsible for waste disposal.

NOTE.
The User must comply with the temperature and humidity conditions of storage and transportation specified in the Table of technical specifications of the present Installation and Operation Manual.

* Waste Electrical and Electronic Equipment, or WEEE, means used electrical or electronic equipment, including all components, assemblies, consumables that are part of the equipment at the time it is taken out of service (including supplied batteries (if any), components containing mercury, etc.).

The device may be shipped by any kind of covered vehicles (by rail, or road or in sealed heated airplane compartments, etc.) in accordance with the requirements of current regulatory documents applicable to fragile goods sensitive to moisture.

The device and its accessories shall be kept in original packaging during transportation.

Similar conditions shall apply to the device storage at the Seller's warehouse.

If you need to move the assembled device, you should hold it by legs for floor installation.

Do not dispose of the device together with unsorted municipal waste as this would be harmful to the environment.

For the device disposal purposes, it shall be returned to the point of sale or to the local processing center.

For detailed information on recycling of the present device, please contact your waste management company.

6 Other Information

Information about the manufacturer

Name	ASBISc Enterprises PLC
Address	Iapetou 1, Agios Athanasios, 4101 Limassol, Cyprus
Contact info	Тел.: +357-25857090 asbis.com

Information about the importing company

Name	ASBISc Enterprises PLC
Address	Iapetou 1, Agios Athanasios, 4101 Limassol, Cyprus
Contact info	Тел.: +357-25857090 asbis.com

Quality Claims Acceptance and Warranty Service Company

Name	ASBISc Enterprises PLC
Address	Iapetou 1, Agios Athanasios, 4101 Limassol, Cyprus
Contact info	Тел.: +357-25857090 asbis.com

Info on Certificates and Declarations

Certificates	
Declarations	

The addresses of the service centers can be found at aeno.com under “Service and Warranty”.

7 Troubleshooting

The table below shows typical errors and problems that may occur while using the device and possible solutions.

Table 4 – Typical problems and solutions

#	Problem	Possible Reasons	Solution
1	The heater does not turn on	The electric outlet is de-energized or defective; Damage to the power cable or plug	Check the mains voltage or make sure the outlet, the mains plug or the cable is in a good operating condition
2	The heater does not heat when turned on	The desired temperature is set incorrectly	Increase the desired temperature above the current room temperature
3	The heater does not respond to commands from the app	Network connection interrupted	Reconnect the device and the smartphone to the Wi-Fi hotspot
4	The heater does not respond to pushing the power button, and an audible beep sounds when it is pressed	Child lock mode is on	Turn off the mode via the app or manually by pressing the power button 5 times in 4 seconds
5	During operation, the heater beeps and the power button is blinking red	Heater tipping, i.e. panel is tilted for more than 45° from its vertical position	Return the heater to the upright position
6	The power button of the heater blinks red	Panel overheating or the mains voltage surge	Press the power button 5 times for 4 seconds
		Panel or room temperature sensor error	

8 Glossary

Amazon Alexa	A virtual assistant that supports voice communication and control of smart home devices
IoT	The Internet of Things is a system of Internet-connected devices able to collect and exchange data coming from built-in services
IP44	The degree of protection, which indicates that the device is only protected against occasional splashes (Small amounts of moisture). It allows the devices to be used primarily in rooms with a high level of humidity. The device with IP44 is not intended for outdoor use, as it is not protected against rain, snow or large amounts of dust
WEEE	Waste Electrical and Electronic Equipment means used electrical or electronic equipment, including all components, subassemblies, consumables that are part of the equipment at the time it is taken out of service (including supplied batteries/rechargeable batteries (if any), components containing mercury, etc.)

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