PJLA Testing Accreditation N.72347

TEST REPORT
IEC/EN 60335-2-103
Safety of household and similar electrical appliances

Report Number. ..... :	RA-31 ELDO 2024
	Check always the validity and authenticity of this report on www.pro-lab.it
Date of issue ..... :	02/04/2024
Total number of pages ..... :	116

Applicant's name ..... :	ACM International srl
Address ..... :	Via Oros, 2/g – Pomezia (Roma) Italy

Test specification:	
Standard ..... :	IEC 60335-2-103:2015 + A1: 2017; EN 60335-1: 2012; A11: 2014; EN 62233: 2008; see also national deviation
Test procedure ..... :	CE Scheme
Non-standard test method..... :	N/A

Test Report Form No. ..... :	IEC/EN60335_2-103A
Test Report Form(s) Originator .... :	Prolab service srl
Master TRF ..... :	Dated 2013-02

Test item description .....:	Central gear motor for rolling shutter
Trade Mark .....:	ACM Italian rolling power
Manufacturer.....:	As above
Model/Type reference .....:	Unititan, Eurotitan, Unisoft, Titan series (see next pages)
Ratings .....:	230 V; 50 or 60 Hz; IP20; 1/h, 60 min pause

Testing procedure and testing location:		
☐	**CE Testing Laboratory:**	Prolab service srl
Testing location/ address.....:		Via Ratti 82/84 20855 Lesmo (Monza & Brianza) Italy
☐	**Associated CB Testing Laboratory:**	
Testing location/ address.....:		
Tested by (name + signature).....:		
Approved by (name + signature) .....:		
☐	**Testing procedure: TMP**	
Testing location/ address.....:		
Tested by (name + signature).....:		
Approved by (name + signature) .....:		
☐	**Testing procedure: WMT**	
Testing location/ address.....:		
Tested by (name + signature).....:		
Witnessed by (name + signature) ....:		
Approved by (name + signature) .....:		
☐	**Testing procedure: SMT**	
Testing location/ address.....:		
Tested by (name + signature).....:		
Approved by (name + signature) .....:		
Supervised by (name + signature)...:		

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

Summary of testing:

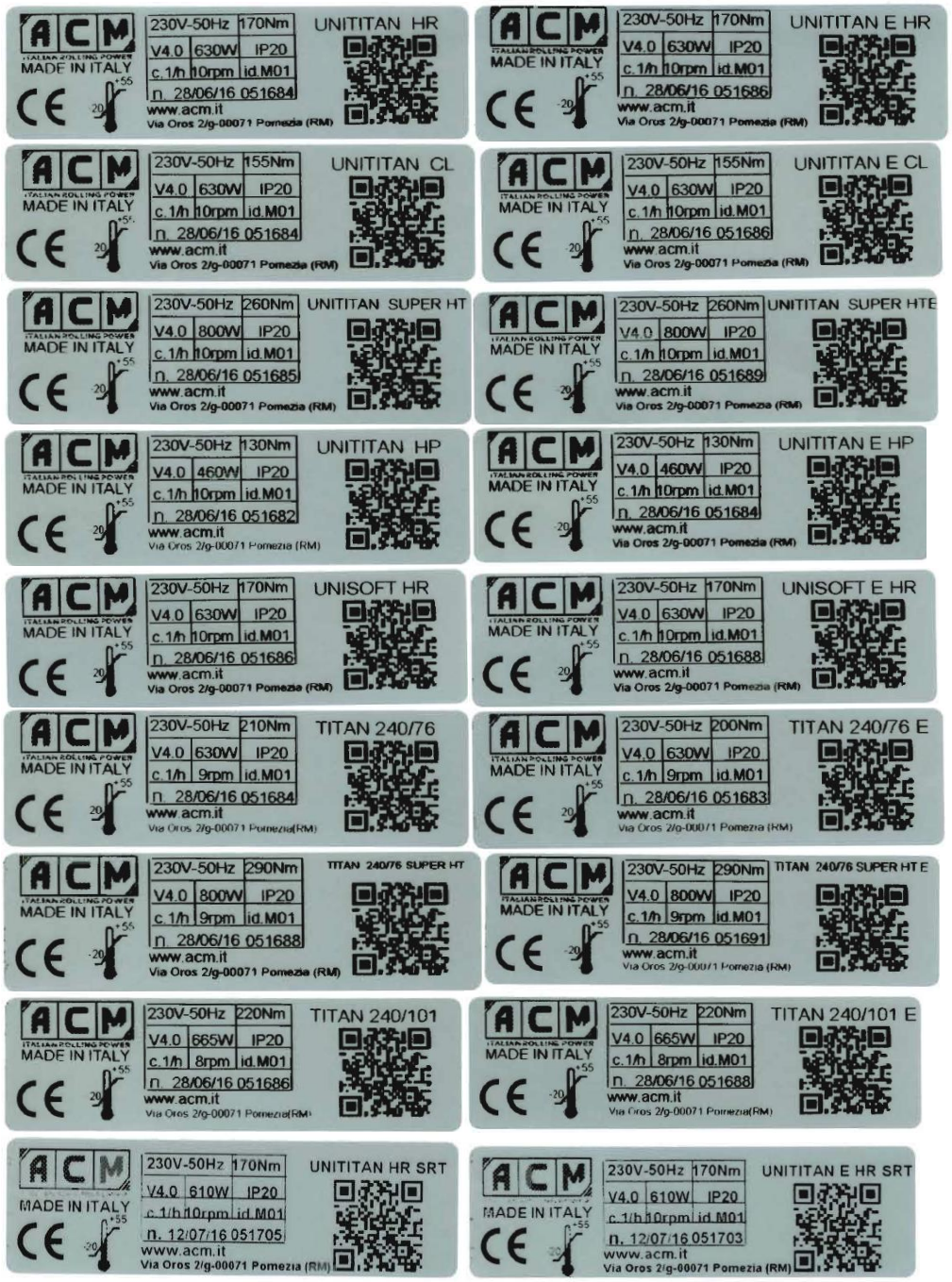
Tests performed (name of test and test clause):	**Testing location:**
Clause 7: marking and instruction, Clause 8: protection against access to live parts, Clause 10: power input and current Clause 11: heating Clause 13: leakage current and electric strength at operating temperature Clause 15: moisture resistance Clause 16: leakage current and electric strength Clause 19: abnormal operating Clause 20: stability and mechanical hazards Clause 21: mechanical strength Clause 22: construction Clause 23: internal wiring Clause 24: components Clause 25: supply connection and external flexible cords Clause 27: provision for earthing Clause 28: screws and connections Clause 29: clearances, creepage distances and solid insulation Clause 30: resistance to heat, fire and tracking All tests and verification performed were covered by ILAC accreditation.	Prolab Service Srl Via G. Ratti 82/84 20855 Lesmo (MB) Italy

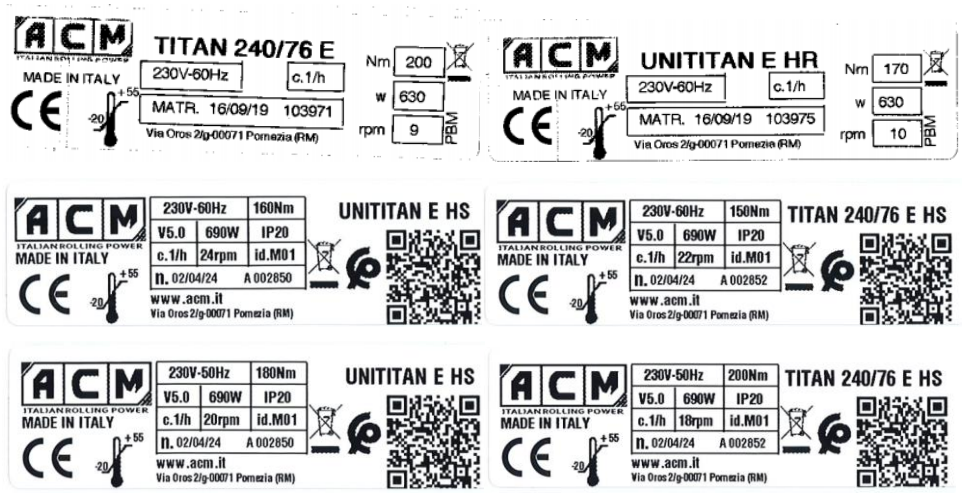
summary of compliance with National Differences

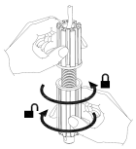
List of countries addressed:/

☒ **The product fulfils the requirements of EN 60335-2-103: 2015**

Copy of marking plate







Test item particulars.....	**: /**

Classification of installation and use ..... :	Professional use; the component has to be installed in other appliances
Supply Connection ..... :	Terminals and power cord
Possible test case verdicts:	
- test case does not apply to the test object .....:	N/A
- test object does meet the requirement .....:	P (Pass)
- test object does not meet the requirement .....:	F (Fail)
Testing .....:	
Date of receipt of test item.....:	16/09/2019
Date (s) of performance of tests .....:	16/09/2019 up to 18/09/2019. update 13/05/2022 second update 30/03/2024

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

In this report :

the Italic font is the requirement of EN.

Black font is the requirements of particular standard (EN 60335-2-103: 2015)

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

Sampling performed by the manufacturer.

Where declared, the measurement uncertainties stated in this document have been determined according to our PT01 procedure. Usually, they have been estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor K=2 corresponding to a confidence level of about 95%; the conformity declared in this document, in the measurement carried out it also considers uncertainty.

This laboratory is accredited in accordance with the recognized International Standard ISO / IEC 17025:2005. This accreditation demonstrates technical competence for a defined purpose and activity management system for the laboratory's quality refers to the official release of June 18, 2005 ISO-ILAC-IAF meeting.

This test report is only for internal use and it is released to provide technical support to the manufacturer.

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

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

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:

☐ **Yes**

☒ **Not applicable**

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

Name and address of factory (ies).....: As applicant

General product information:

The samples under test are motor driver for rolling shutters. The driver has to be installed at least 2.5 m above the ground as declared in the instruction sheet.
The series is provided with similar mechanical part
The models with suffix E in the code, are provided with electromagnetic brake. The brake is the same for all models; the electromagnetic brake has been tested connected to drive.
The difference between model HR,CL, BM, HT are in the mechanical adapter.
The driver is provided without a door , without electronic circuit and controls.
The driver has different enclosure (A, B). The enclosure contain terminals, capacitor, micro switch, internal wiring, bridge diode.
The full test has been carried out on Unititan;
Heating test, abnormal operation on Unititan CL and Unititan HR, Eurotitan, Titan 240-101.
In this report the brake has been tested as part of motor gear
The motor gear is designed to installation in other appliance under machine directive 2006/42/CE, then the final appliance has to be verified with pertinent standard and this standard.

Model	Motor	Power input	Nm	Length motor(mm)	Capacitor (µF)	Frequency (Hz)
Unititan HR	A	630	170	100	20	50
Unititan E HR	A	630	170	100	20	50
Unititan CL	A	630	155	100	20	50
Unititan E CL	A	630	155	100	20	50
Unititan Super HT	B	800	260	120	25	50
Unititan Super E HT	B	800	260	120	25	50
Unititan HP	C	460	130	70	16	50
Unititan E HP	C	460	130	70	16	50
Unisoft HR	A	630	170	100	20	50
Unisoft E HR	A	630	170	100	20	50
Titan 240/76	A	630	210	100	20	50
Titan 240/76 E	A	630	210	100	20	50
Titan 240/76 Super HT	B	800	290	120	25	50
Titan 240/76 Super HT E	B	800	290	120	25	50
Titan 240/76 E HS	G	690	200	100	25	50/60
Titan 240/101	D	665	220	110	25	50
Titan 240/101 E	D	665	220	110	25	50
Unititan HR SRT	E	610	170	80	20	50
Unititan E HR SRT	E	610	170	80	20	50
Unititan E HS	G	690	180	100	25	50/60
Unititan E HR	F	630	170	100	20	60
Titan 240/76 E	F	630	200	100	20	60

History report:

This report RA-31 ELDO 2024 has been issued to adding the new models.

- Unititan E HS
- Titan 240/76 E HS

The new model has the same motor type G and the same capacitor.
The motor can be supplied with 50 or 60 Hz.
The motor has been tested in the 50 and 60 Hz condition

The report RA-34 ELDO 2022 has been issued to adding Amendment A1: 2017 of IEC 60335-2-103: 2015
The clause adding has the indication A1: 2017 with bold font.

RA-64 ELDO 2016: first report
RA-97 ELDO 2016: has been issued to adding the new motor 80 mm (type E)

The report RA-111 ELDO 2019 is based on report RA-97 ELDO 2016. In this report has been adding the two models for frequency 60 Hz. The motors for two models are the same. Th brake is the same because is supplied with dc current.
Modell added:
Titan 240/76 E
Unititan E HR

The test 60 Hz has been carried out on representative model TITAN 240/76 E

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Clause	Requirement + Test	Result - Remark	Verdict
5	GENERAL CONDITIONS FOR THE TESTS		
	Tests performed according to clause 5, e.g. nature of supply, sequence of testing, etc.		P
5.2	When a test has to be carried out with a **driven part**, the **driven part** specified for installation with the **drive** that gives the most unfavourable conditions for the test is used. The **drive** is adjusted in accordance with the instructions.		NA
	The **driven part** may be simulated by an artificial load.		NA
5.3	When a drive incorporates a sub-assembly or a part which has already been tested against relevant clause(s) of this standard, those tests need not be repeated, if the incorporation of the sub-assembly or part into the drive does not change the performance of the sub-assembly or part.		NA
5.5	When a test has to be carried out with a driven part with a wicket door, this is kept in the safe position during the tests. Safe position of a wicket door is the fully closed position when it travels together with the door or the fully open or complete removed position when it does not travel with the door		NA
5.7	If the drive is marked with an ambient temperature range beyond the range of +5 °C to +40 °C, the tests of Clauses 11, 13, 21 and the appropriate clauses 20.ZAA.6 to 20.ZAA.9, 20.ZBB.6 to 20.ZBB.9 and 20.ZCC.6 to 20.ZCC.9 are carried out at the most unfavourable temperature		P
5.10	The **drive** is adjusted to provide the most unfavourable conditions consistent with the instructions		P
5.Z101	Drives shall be tested for compliance with this standard for any of the following modes of operation as intended by the manufacturer. Modes of operation are: – automatic operation (only one activation needed for at least one cycle); – impulse operation (one activation needed for a movement); – biased-off (hold to run) operation	Biased-off	P
6	CLASSIFICATION		
6.1	Protection against electric shock: Class I, II, III ....:	I	P

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Clause	Requirement + Test	Result - Remark	Verdict
6.2	Protection against harmful ingress of water	ordinary	NA
	Drives, or parts of **drives**, that are intended for exposure to outdoor conditions shall be at least IPX4.		NA
7	MARKING AND INSTRUCTIONS		
7.1	Rated voltage or voltage range (V) ....:	230 V	P
	Symbol for nature of supply, or ....:		NA
	Rated frequency (Hz) ....:	50 and 60 Hz	P
	Rated power input (W), or ....:	See table in General product information	P
	Rated current (A) ....:		NA
	trade mark or identification mark. Business name and postal address or code of the manufacturer and, where applicable, his authorized representative:		P
	model or type reference, serial number, if any, and production year..... .....:	Model and serial number	P
	Symbol IEC 60417-5172, for class II appliances		NA
	IP number, other than IPX0..... .....:		NA
	Symbol IEC 60417-5180, for class III appliances, unless		NA
	the appliance is operated by batteries only		NA
	Symbol IEC 60417-5036, for the enclosure of electrically-operated water valves in external hose-sets for connection of an appliance to the water mains, if the working voltage exceeds extra-low voltage		NA
	Single-phase appliances to be connected to the supply mains: 230 V covered		*P*
	Multi-phase appliances to be connected to the supply mains: 400 V covered		*NA*
	Drives shall be marked with their ambient temperature range	-20 ÷ +55°C	P
	Drives shall be marked with:		
	– the rated load, in newtons (N) or in newton-metres (Nm), unless the drive is supplied with a driven part	See table page 6	P
	– the rated number of operating cycles or the cycles per hour, unless the drive is intended for continuous operation	1/h	P

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Clause	Requirement + Test	Result - Remark	Verdict
	– designation of the drive. The designation enables the identification of the drive as specified in the instructions and may be the generic denomination and function of the product (e.g. the terms used in the title of this standard – drive for window, drive for gate, etc. - may be used) or a combination of letters and/or numbers	Id.M01	P
7.2	Warning for stationary appliances for multiple supply		NA
	Warning placed in vicinity of terminal cover		NA
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen		NA
	Different rated values marked with the values separated by an oblique stroke		NA
7.4	Appliances adjustable for different rated voltages, the voltage setting is clearly discernible	Only 230 V	NA
	Requirement met if frequent changes are not required and the rated voltage to which the appliance is to be adjusted is determined from a wiring diagram		NA
7.5	Appliances with more than one rated voltage or one or more rated voltage ranges, marked with rated input or rated current for each rated voltage or range, unless		NA
	the power input is related to the arithmetic mean value of the rated voltage range		NA
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		NA
7.6	Correct symbols used	Rpm, Nm, h	P
	Symbol for nature of supply placed next to rated voltage	Used frequency	NA
	Symbol for class II appliances placed unlikely to be confused with other marking		NA
	Units of physical quantities and their symbols according to international standardized system		NA
	[symbol ISO 7000-0533 (DB:2004-01)] maximum temperature		P
	[symbol ISO 7000-0534 (DB:2004-01)] minimum temperature.		P

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Clause	Requirement + Test	Result - Remark	Verdict
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply, unless		NA
	correct mode of connection is obvious		
7.8	Except for type Z attachment, terminals for connection to the supply mains indicated as follows:		
	- marking of terminals exclusively for the neutral conductor (letter N)		P
	- marking of protective earthing terminals (symbol IEC 60417-5019)		P
	- marking not placed on removable parts		P
7.9	Marking or placing of switches which may cause a hazard		NA
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means ....:		NA
	This applies also to switches which are part of a control		NA
	If figures are used, the off position indicated by the figure 0		NA
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		NA
	Devices used to start/stop operational functions of the appliance distinguished from other manual devices by means of shape, size, surface texture, position, etc.	The appliance is not provided with switch or other control	NA
	An indication that the device has been operated is given by:		NA
	• *a tactile feedback, or*		NA
	• *an audible and visual feedback*		NA
7.11	Indication for direction of adjustment of controls		NA
7.12	Instructions for safe use provided		P
	Details concerning precautions during user maintenance		P
	The instructions include the substance of the following:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- this appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved		P
	- children shall not play with the appliance		P
	- cleaning and user maintenance shall not be made by children without supervision		P
	For a part of class III construction supplied from a detachable power supply unit, the instructions state that the appliance is only to be used with the unit provided		NA
	Instructions for class III appliances state that it must only be supplied at SELV, unless		NA
	it is a battery-operated appliance, the battery being charged outside the appliance		NA
	The instructions shall state the substance of the following:		
	WARNING: Important safety instructions. It is important for the safety of persons to follow these instructions. Save these instructions. The instructions shall include the substance of the following:		P
	– do not allow children to play with fixed controls. Keep remote controls away from children; – explanation of mode indicators;		P
	– details on how to use any manual release, or **reversible drive** used as a manual release, and if applicable, state that activation of the manual release may cause uncontrolled movement of the driven part due to mechanical failures or an out-of-balance condition;		P
	– when operating a biased-off switch, make sure that other persons are kept away;		P
	– when closing a window that has been opened by a fire-sensing system, make sure that other persons are kept away;		NA
	– details on how to re-adjust controls;		P
	– frequently examine the installation for imbalance and signs of wear or damage to cables, springs and mounting. Do not use if repair or adjustment is necessary;		P
	– disconnect the supply when cleaning or other maintenance is being carried out, if the appliance is automatically controlled		P

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Clause	Requirement + Test	Result - Remark	Verdict
7.12.1	Sufficient details for installation supplied		
	For an appliance intended to be permanently connected to the water mains and not connected by a hose-set, this is stated		NA
	The installation instructions shall state the substance of the following:		
	WARNING: Important safety instructions. Follow all instructions since incorrect installation can lead to severe injury.		P
	- the necessary information for safe handling of a drive weighing more than 20 kg. This information shall describe how to use the handling means, such as hooks and ropes	<10Kg	NA
	- before installing the drive, check that the driven part is in good mechanical condition, correctly balanced and opens and closes properly;		P
	- information if a hazardous part of the drive is intended to be installed at a height of at least 2,5 m above floor level or other access level		P
	- that the drive cannot be used with a driven part incorporating a wicket door unless the drive can only be operated with the wicket door in the safe position		P
	- for horizontally moving pedestrian doors, ensure that entrapment between the driven part and the surrounding fixed parts due to the movement of the driven part is avoided. This can be achieved if the relevant distance does not exceed 8 mm. However, the following distances are considered sufficient to avoid entrapments for the parts of the body identified		NA
	- for fingers, a distance greater than 25 mm;		NA
	- for feet, a distance greater than 50 mm;		NA
	- for heads, a distance greater than 300 mm; and		NA
	- for the whole body, a distance greater than 500 mm		NA
	If these distances cannot be achieved, safeguarding is needed		NA
	details of the maximum allowed distance from the wall that is parallel to the sliding movement to the outside of horizontally sliding driven parts;		NA
	details for the installation of the drive and its associated components, including details of relevant accessories required for alternate modes of operation		P

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Clause	Requirement + Test	Result - Remark	Verdict
	that the actuating member of a biased-off switch is to be located within direct sight of the driven part but away from moving parts. Unless it is key operated, it is to be installed at a minimum height of 1,5 m and not accessible to the public		P
	that windows, having a gap exceeding 200 mm when open, are to be closed using a biased-off switch if the opening movement is controlled by a fire-sensing system		NA
	details on how to set controls		P
	after installation, ensure that the mechanism is properly adjusted and that the protection system and any manual release function correctly		P
	permanently fix the label concerning the manual release, adjacent to its actuating member		P
	details for the installation of the drive, including any separately installed protection devices or deformable edges		P
	a list of all components included in the drive when the drive is delivered not assembled.		P
	The installation instructions shall contain a specification of the type of gate, door, garage door or window the drive is intended for, size and mass of the driven part or mass of the driven part and torque required and position(s) where the drive can be installed. When applicable, the installation instructions shall also inform about the need of safeguarding against dropping and/or uncontrolled movements of vertical operating doors and gates		P
7.101	Drives having a manual release shall be supplied with a label describing how to use the release unless the information is already marked on the appliance.		P
7.12.2	Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules		P
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions state that the fixed wiring must be protected		NA
7.12.4	Instructions for built-in appliances:		
	- dimensions of space		P
	- dimensions and position of supporting and fixing		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- minimum distances between parts and surrounding structure		P
	- minimum dimensions of ventilating openings and arrangement		NA
	- connection to supply mains and interconnection of separate components		NA
	- allow disconnection of the appliance after installation, by accessible plug or a switch in the fixed wiring, unless		P
	a switch complying with 24.3		NA
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord		P
	Replacement cord instructions, type Y attachment		NA
	Replacement cord instructions, type Z attachment		NA
7.12.6	Caution in the instructions for appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains, if this cut-out is required to comply with the standard		NA
7.12.7	Instructions for fixed appliances stating how the appliance is to be fixed		P
7.12.8	Instructions for appliances connected to the water mains:		NA
	- max. inlet water pressure (Pa) ....:		NA
	- min. inlet water pressure, if necessary (Pa).....:		NA
	Instructions concerning new and old hose-sets for appliances connected to the water mains by detachable hose-sets		NA
7.13	Instructions and other texts in an official language	GB, IT, FR, ES	P
7.14	Marking clearly legible and durable, rubbing test as specified		P
7.15	Markings on a main part		P
	Marking clearly discernible from the outside, if necessary after removal of a cover		P
	For portable appliances, cover can be removed or opened without a tool		NA
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation		P
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading		NA
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link		NA
7.12.Z1	*The specific instructions related to the safe operation of this appliance is collated together in the front section of the user instructions*		P
	The height of the characters, measured on the capital letters, is at least 3 mm		P
	These instructions are also available in an alternative format, e.g. on a website		P
8	PROTECTION AGAINST ACCESS TO LIVE PARTS		
8.1	Adequate protection against accidental contact with live parts		P
8.1.1	Requirement applies for all positions, detachable parts removed		P
	Lamps behind a detachable cover not removed, if conditions met		NA
	Insertion or removal of lamps, protection against contact with live parts of the lamp cap		NA
	Use of test probe B of IEC 61032, with a force not exceeding 1 N: no contact with live parts		P
	Use of test probe B of IEC 61032 through openings, with a force of 20N: no contact with live parts		P
	Also test probe 18 of EN 61032 is applied		P
	The appliance being in every possible position during the test		P
	The force on the probe in the straight position is increased to 10 N when probe 18 is used		P
	When using test probe 18 the appliance is fully assembled as in normal use without any parts removed, and		P
	parts intended to be removed for user maintenance are also not removed		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.1.2	Use of test probe 13 of IEC 61032, with a force not exceeding 1 N, through openings in class 0 appliances and class II appliances/constructions: no contact with live parts		P
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		NA
8.1.3	For appliances other than class II, use of test probe 41 of IEC 61032, with a force not exceeding 1 N: no contact with live parts of visible glowing heating elements		NA
8.1.4	Accessible part not considered live if:		NA
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V		NA
	- safety extra-low d.c. voltage: not exceeding 42.4 V		NA
	- or separated from live parts by protective impedance		NA
	If protective impedance: d.c. current not exceeding 2 mA, and		NA
	a.c. peak value not exceeding 0.7 mA		NA
	- for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 μF		NA
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μC		NA
	- for peak values over 15kV, the energy in the discharge not exceeding 350 mJ		NA
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		
	- built-in appliances		NA
	- fixed appliances		P
	- appliances delivered in separate units		NA
8.2	Class II appliances and constructions constructed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only		NA
	Only possible to touch parts separated from live parts by double or reinforced insulation		P
	Compliance is checked by applying the test probes of EN 61032		P

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Clause	Requirement + Test	Result - Remark	Verdict
	For built-in appliances and fixed appliances, the test probe B and probe 18 of EN 61032 are applied only after installation		P
	Basic insulation and parts separated from live parts by basic insulation may be touched during adjustment, if a tool is needed to gain access to the adjustment means		NA
10	POWER INPUT AND CURRENT		
10.1	Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in table 1 .:	(see appended table)	P
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		NA
	the rated power input is related to the arithmetic mean value		NA
10.2	Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2.....:	(see appended table)	NA
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		NA
	the rated current is related to the arithmetic mean value of the range		NA
11	HEATING		
11.1	No excessive temperatures in normal use		P
11.2	The appliance is held, placed or fixed in position as described.....:	Simulation as indicated instruction	P
11.3	Temperature rises, other than of windings, determined by thermocouples		P
	Temperature rises of windings determined by resistance method, unless		P
	the windings are non-uniform or it is difficult to make the necessary connections		NA
11.4	Heating appliances operated under normal operation at 1.15 times rated power input (W) .....:		NA
11.5	Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage (V).....:	243.8 V worst condition Model for 60 Hz tested at 60 Hz	P

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Clause	Requirement + Test	Result - Remark	Verdict
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage (V) .....:		NA
11.7	**Drives** for continuous operation are operated for consecutive cycles until steady conditions are established		NA
	Drives not for continuous operation are operated as follows:		NA
	- Drives for gates for one household and horizontally moving garage doors for one household:		NA
	- drives are operated without rest periods for three cycles or the rated number of operating cycles, whichever is longer		NA
	-Drives for windows:		NA
	drives are operated without rest periods for the rated number of operating cycles declared by the manufacturer		NA
	-Other drives:		
	drives are operated without rest periods for the rated number of operating cycles but for not less than five cycles of operation.		NA
	drives not suitable for operation without rest period are operated for 20% more than the rated number of cycles per hour and relevant rest period declared by the manufacturer.	1/h declared ; tested 2 cycle 30 sec + 30 sec operating, 1 h pause, 30 sec + 30 sec operating	P
11.8	Temperature rises monitored continuously and not exceeding the values in table 3 .....:	(see appended table)	P
	If the temperature rise of a motor winding exceeds the value of table 3, or		NA
	if there is doubt with regard to classification of insulation,		NA
	tests of Annex C are carried out		NA
	Sealing compound does not flow out		P
	Protective devices do not operate, except		P
	components in protective electronic circuits tested for the number of cycles specified in 24.1.4		NA
13	LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE		
13.1	Leakage current not excessive and electric strength adequate		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Heating appliances operated at 1.15 times the rated power input (W).....:		NA
	Motor-operated appliances and combined appliances supplied at 1.06 times the rated voltage (V).....:	243.8 V	P
	Protective impedance and radio interference filters disconnected before carrying out the tests		NA
13.2	For class 0, class II and class III appliances, leakage current measured by means of the circuit described in figure 4 of IEC 60990	Class II construction enclosure	P
	For other appliances, a low impedance ammeter may be used		NA
	Leakage current measurements .....:	(see appended table)	P
13.3	The appliance is disconnected from the supply		P
	Electric strength tests according to table 4 .....:	(see appended table)	P
	No breakdown during the tests		P
A1: 2017	***The test voltage for 600 V multi-phase appliances is that specified for a working voltage > 250 V, where U is taken as the rated voltage***		N/A
14	TRANSIENT OVERVOLTAGES		NA
	Appliances withstand the transient over-voltages to which they may be subjected		NA
	Clearances having a value less than specified in table 16 subjected to an impulse voltage test, the test voltage specified in table 6 .....:	(see appended table)	NA
	No flashover during the test, unless		NA
	of functional insulation if the appliance complies with clause 19 with the clearance short-circuited		NA
15	MOISTURE RESISTANCE		
15.1	Enclosure provides the degree of moisture protection according to classification of the appliance	Ordinary degree	NA
	Compliance checked as specified in 15.1.1, taking into account 15.1.2, followed by the electric strength test of 16.3		NA
	No trace of water on insulation which can result in a reduction of clearances or creepage distances below values specified in clause 29		NA

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Clause	Requirement + Test	Result - Remark	Verdict
15.1.1	Appliances, other than IPX0, subjected to tests as specified in IEC 60529 .....:	Indoor use	NA
	Water valves containing live parts in external hoses for connection of an appliance to the water mains tested as specified for IPX7 appliances		NA
15.1.2	Hand-held appliance turned continuously through the most unfavourable positions during the test		NA
	Built-in appliances installed according to the instructions		NA
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		NA
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board		NA
	For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube		NA
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube, and		NA
	for appliances normally used on the floor or table, the movement is limited to two times 90° for a period of 5 min, the support being placed at the level of the pivot axis of the oscillating tube		NA
	Wall-mounted appliances, take into account the distance to the floor stated in the instructions		NA
	Appliances normally fixed to a ceiling are mounted underneath a horizontal unperforated support, the pivot axis of the oscillating tube located at the level of the underside of the support, and		NA
	for IPX4 appliances, the movement of the tube is limited to two times 90° from the vertical for a period of 5 min		NA
	Appliances with type X attachment fitted with a flexible cord as described		NA
	Detachable parts subjected to the relevant treatment with the main part		NA
	However, if a part has to be removed for user maintenance and a tool is needed, this part is not removed		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	Appliances with an automatic cord reel tested with the cord in the most unfavourable position so that the reeling of the wet cord may affect electrical insulation during operation, the cord not being dried before reeling		NA
	tubular **drives** are installed in a tube that is open at both ends and has the largest diameter specified in the instructions. The tube has a length twice that of the motor and is mounted on a support as in normal use. The support is rotated at a speed of 1 r/min.		NA
15.2	Spillage of liquid does not affect the electrical insulation		NA
	Appliances with type X attachment fitted with a flexible cord as described		NA
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		NA
	Detachable parts are removed		NA
	Overfilling test with additional amount of water, over a period of 1 min (l) .....:		NA
	The appliance withstands the electric strength test of 16.3		NA
	No trace of water on insulation that can result in a reduction of clearances or creepage distances below values specified in clause 29		NA
15.3	Appliances proof against humid conditions		P
	Checked by test Cab: Damp heat steady state in IEC 60068-2-78		P
	Detachable parts removed and subjected, if necessary, to the humidity test with the main part	No detachable parts	NA
	Humidity test for 48 h in a humidity cabinet		P
	Reassembly of those parts that may have been removed		P
	The appliance withstands the tests of clause 16		P
16	LEAKAGE CURRENT AND ELECTRIC STRENGTH		
16.1	Leakage current not excessive and electric strength adequate		P
	Protective impedance disconnected from live parts before carrying out the tests		NA
	Tests carried out at room temperature and not connected to the supply		P

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Clause	Requirement + Test	Result - Remark	Verdict
16.2	Single-phase appliances: test voltage 1.06 times rated voltage (V).....:	243.8 V	P
	Three-phase appliances: test voltage 1.06 times rated voltage divided by √3 (V) .....:		NA
	Leakage current measurements .....:	(see appended table)	P
	Limit values doubled if:		
	- all controls have an off position in all poles, or		NA
	- the appliance has no control other than a thermal cut-out, or		NA
	- all thermostats, temperature limiters and energy regulators do not have an off position, or		NA
	- the appliance has radio interference filters		NA
	With the radio interference filters disconnected, the leakage current do not exceed limits specified .....:	(see appended table)	NA
16.3	Electric strength tests according to table 7 .....:	(see appended table)	P
	Test voltage applied between the supply cord and inlet bushing and cord guard and cord anchorage as specified .....:	(see appended table)	P
	No breakdown during the tests		P
A1: 2017	***The test voltage for 600 V multi-phase appliances is that specified for a working voltage > 250 V, where U is taken as the rated voltage***		N/A
17	OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS		NA
	No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use .....:	(see appended table)	NA
	Appliance supplied with 1.06 or 0.94 times rated voltage under the most unfavourable short-circuit or overload likely to occur in normal use (V) .....:		NA
	Basic insulation is not short-circuited		NA
	Temperature rise of insulation of the conductors of safety extra-low voltage circuits not exceeding the relevant value specified in table 3 by more than 15 K		NA
	Temperature of the winding not exceeding the value specified in table 8		NA
	However, limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		NA

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Clause	Requirement + Test	Result - Remark	Verdict
18	ENDURANCE		NA
	Requirements and tests are specified in part 2 when necessary	Not required	NA
19	ABNORMAL OPERATION		
19.1	The risk of fire, mechanical damage or electric shock under abnormal or careless operation obviated		P
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe .....:	Only diode bridge	P
	Appliances incorporating heating elements subjected to the tests of 19.2 and 19.3, and		NA
	if the appliance also has a control that limit the temperature during clause 11 it is subjected to the test of 19.4, and		NA
	if applicable, to the test of 19.5		NA
	Appliances incorporating PTC heating elements are also subjected to the test of 19.6		NA
	Appliances incorporating motors subjected to the tests of 19.7 to 19.10, as applicable		NA
	Appliances incorporating electronic circuits subjected to the tests of 19.11 and 19.12, as applicable		P
	Appliances incorporating contactors or relays subjected to the test of 19.14, being carried out before the tests of 19.11		NA
	Appliances incorporating voltage selector switches subjected to the test of 19.15		NA
	Unless otherwise specified, the tests are continued until a non-self-resetting thermal cut-out operates, or		NA
	until steady conditions are established		P
	If a heating element or intentionally weak part becomes open-circuited, the relevant test is repeated on a second sample		NA
	Compliance is also checked by the test of 19.101		P
19.2	Test of appliances with heating elements with restricted heat dissipation; test voltage (V), power input of 0.85 times rated power input (W) .....:		NA
19.3	Test of 19.2 repeated; test voltage (V), power input of 1.24 times rated power input (W) .....:		NA

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Clause	Requirement + Test	Result - Remark	Verdict
19.4	Test conditions as in clause 11, any control limiting the temperature during tests of clause 11 short-circuited		NA
19.5	Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the sheath		NA
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		NA
	The test is not carried out on appliances intended to be permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during the test of 19.4		NA
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions		NA
	The working voltage of the PTC heating element is increased by 5% and the appliance is operated until steady conditions are re-established. The voltage is then increased in similar steps until 1.5 times working voltage or until the PTC heating element ruptures (V) .....:		NA
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque, or	Model for 60 Hz tested at 60 Hz	P
	locking moving parts of other appliances		P
	Locked rotor, capacitors open-circuited one at a time		P
	Test repeated with capacitors short-circuited one at a time, unless		P
	capacitor is of class P2 of IEC 60252-1	P0	NA
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed.....:	30 sec	P
	Other appliances supplied with rated voltage for a period as specified .....:	Operate thermal protection	NA
	Winding temperatures not exceeding values specified in table 8.....:	(see appended table)	P
19.8	Multi-phase motors operated at rated voltage with one phase disconnected		NA
19.9	Running overload test on appliances incorporating motors intended to be remotely or automatically controlled or liable to be operated continuously		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	Motor-operated and combined appliances for which 30.2.3 is applicable and that use overload protective devices relying on electronic circuits to protect the motor windings, are also subjected to the test		NA
	Winding temperatures not exceeding values as specified .....:	(see appended table)	NA
19.10	Series motor operated at 1.3 times rated voltage for 1 min (V) .....:		NA
	During the test, parts not being ejected from the appliance		NA
	For a **drive** having a manual release, the test is made with the **driven part** disconnected.		NA
19.11	Electronic circuits, compliance checked by evaluation of the fault conditions specified in 19.11.2 for all circuits or parts of circuits, unless		P
	they comply with the conditions specified in 19.11.1		P
	Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly, subjected to the test of 19.11.4.8, unless		NA
	restarting does not result in a hazard		NA
	Appliances having a device with an off position obtained by electronic disconnection, or a device placing the appliance in a stand-by mode, subjected to the tests of 19.11.4		NA
	If the safety of the appliance under any of the fault conditions depends on the operation of a miniature fuse-link complying with IEC 60127, the test of 19.12 is carried out		NA
	During and after each test the following is checked:		
	- the temperature of the windings do not exceed the values specified in table 8		P
	- the appliance complies with the conditions specified in 19.13		P
	- any current flowing through protective impedance not exceeding the limits specified in 8.1.4		NA
	If a conductor of a printed board becomes open-circuited, the appliance is considered to have withstood the particular test, provided both of the following conditions are met:		NA
	- the base material of the printed circuit board withstands the test of Annex E		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	- any loosened conductor does not reduce clearance or creepage distances between live parts and accessible metal parts below the values specified in clause 29		NA
19.11.1	Fault conditions a) to g) in 19.11.2 are not applied to circuits or parts of circuits meeting both of the following conditions:		NA
	- the electronic circuit is a low-power circuit, that is, the maximum power at low-power points does not exceed 15 W according to the tests specified		NA
	- the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction of other parts of the appliance does not rely on the correct functioning of the electronic circuit		NA
19.11.2	Fault conditions applied one at a time, the appliance operating under conditions specified in clause 11, but supplied at rated voltage, duration of the tests as specified:		P
	a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in clause 29		NA
	b) open circuit at the terminals of any component	diode	P
	c) short circuit of capacitors, unless		NA
	they comply with IEC 60384-14		NA
	d) short circuit of any two terminals of an electronic component, other than integrated circuits	Bridge diode	P
	This fault condition is not applied between the two circuits of an optocoupler		NA
	e) failure of triacs in the diode mode		NA
	f) failure of microprocessors and integrated circuits		NA
	g) failure of an electronic power switching device		NA
	Each low power circuit is short-circuited by connecting the low-power point to the pole of the supply source from which the measurements were made		NA
	If the drive can be operated when any of the fault conditions are simulated, the applicable tests of the following are carried out:		P
	- 20. ZAA.5 and 20.ZAA.8 for drives for windows or,		NA
	- 20. ZBB.8 for drives for pedestrian doors or,		NA
	- 20. ZCC.5 and 20.ZCC.8 for drives for doors, garage doors and gates, the drive being supplied at rated voltage.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Either the drive continues to fulfil the requirements, or, after a maximum of one cycle of operation, it shall stop with the driven part in a safe position, or the drive shall change to a biased-off switch mode of operation.		P
19.11.3	If the appliance incorporates a protective electronic circuit which operates to ensure compliance with clause 19, the relevant test is repeated with a single fault simulated, as indicated in a) to g) of 19.11.2		NA
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or		NA
	a device that can be placed in the stand-by mode,		NA
	subjected to the tests of 19.11.4.1 to 19.11.4.7, the device being set in the off position or in the stand-by mode		NA
	Appliances incorporating a protective electronic circuit subjected to the tests of 19.11.4.1 to 19.11.4.7, the tests being carried out after the protective electronic circuit has operated, except that		NA
	appliances operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena.		NA
	Surge protective devices disconnected, unless		NA
	They incorporate spark gaps		NA
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4		NA
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, test level 3		NA
19.11.4.3	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4, test level 3 or 4 as specified		NA
19.11.4.4	The power supply terminals of the appliance subjected to voltage surges in accordance with IEC 61000-4-5, test level 3 or 4 as specified		NA
	Earthed heating elements in class I appliances disconnected		NA
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3		NA

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Clause	Requirement + Test	Result - Remark	Verdict
19.11.4.6	Appliances having a rated current not exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-11		NA
	Appliances having a rated current exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-34		NA
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2		NA
19.11.4.8	The appliance is supplied at rated voltage and operated under normal operation. After 60s the power supply is reduced to a level such that the appliance ceases to respond or parts controlled by the programmable component cease to operate		NA
	The appliance continues to operate normally, or		NA
	requires a manual operation to restart		NA
19.12	If the safety of the appliance for any of the fault conditions specified in 19.11.2 depends on the operation of a miniature fuse-link complying with IEC 60127, the test is repeated, measuring the current flowing through the fuse-link; measured current (A); rated current of the fuse-link (A).....:		NA
19.13	During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts		P
	During the test of 19.101, the winding temperature shall not exceed the values specified in 19.9.		P
	Temperature rises not exceeding the values shown in table 9 .....:	(see appended table)	P
	Compliance with clause 8 not impaired		P
	If the appliance can still be operated it complies with 20.2		P
	Insulation, other than of class III appliances or class III constructions that do not contain live parts, withstands the electric strength test of 16.3, the test voltage as specified in table 4:		
	- basic insulation (V).....:	1250	P
	- supplementary insulation (V) .....:		NA
	- reinforced insulation (V) .....:	3000	P
	After operation or interruption of a control, clearances and creepage distances across the functional insulation withstand the electric strength test of 16.3, the test voltage being twice the working voltage		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The appliance does not undergo a dangerous malfunction, and		P
	no failure of protective electronic circuits, if the appliance is still operable		P
	Appliances tested with an electronic switch in the off position, or in the stand-by mode:		NA
	- do not become operational, or		NA
	- if they become operational, do not result in a dangerous malfunction during or after the tests of 19.11.4		NA
	If the appliance contains lids or doors that are controlled by one or more interlocks, one of the interlocks may be released provided that:		NA
	- the lid or door does not move automatically to an open position when the interlock is released, and		NA
	- the appliance does not start after the cycle in which the interlock was released		NA
19.14	Appliances operated under the conditions of clause 11, any contactor or relay contact operating under the conditions of clause 11 being short-circuited		NA
	For a relay or contactor with more than one contact, all contacts are short-circuited at the same time		NA
	A relay or contactor operating only to ensure the appliance is energized for normal use is not short-circuited		NA
	If more than one relay or contactor operates in clause 11, they are short-circuited in turn		NA
19.15	For appliances with a mains voltage selector switch, the switch is set to the lowest rated voltage position and the highest value of rated voltage is applied		NA
19.101	**Drives**, other than those for continuous operation, are supplied at **rated voltage** and operated continuously under **normal operation**	Operate thermal protection as in locked rotor	P
20	STABILITY AND MECHANICAL HAZARDS		
	The requirements of Clause 20 are contained in the following annexes:		
	- Annex ZAA for drives for windows;		NA
	- Annex ZBB for drives for pedestrian doors;		NA
	- Annex ZCC for drives for doors, garage doors and gates.		P
21	MECHANICAL STRENGTH		

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Clause	Requirement + Test	Result - Remark	Verdict
21.1	Drives shall have adequate mechanical strength and be constructed to withstand such rough handling that may be expected in normal use, during transportation, assembly, dismantling, scrapping and any other action involving the drive		P
	Checked by applying 3 blows to every point of the enclosure like to be weak, in accordance with test Ehb of IEC 60068-2-75, spring hammer test, with an impact energy of 0,5 J	(see appended table)	P
	The appliance shows no damage impairing compliance with this standard, and		P
	compliance with 8.1, 15.1 and clause 29 not impaired		P
	If doubt, supplementary or reinforced insulation subjected to the electric strength test of 16.3		NA
	If necessary, repetition of groups of three blows on a new sample		NA
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements		P
	Test not applicable if the thickness of supplementary insulation is at least 1 mm and reinforced insulation at least 2 mm		P
	The insulation is tested as specified, and does withstand the electric strength test of 16.3		P
22	CONSTRUCTION		
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled	No marked	NA
22.2	Stationary appliance: means to ensure all-pole disconnection from the supply being provided:		
	- a supply cord fitted with a plug, or		NA
	- a switch complying with 24.3, or		NA
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided, or		P
	- an appliance inlet		NA
	Singe-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase, permanently connected class 01 and class I appliances, connected to the phase conductor		NA

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Clause	Requirement + Test	Result - Remark	Verdict
22.3	Appliance provided with pins: no undue strain on socket-outlets		NA
	Applied torque not exceeding 0.25 Nm		NA
	Pull force of 50N to each pin after the appliance has being placed in the heating cabinet; when cooled to room temperature the pins are not displaced by more than 1mm		NA
	Each pin subjected to a torque of 0.4Nm; the pins are not rotating, unless		NA
	rotating does not impair compliance with this standard		NA
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		NA
22.5	No risk of electric shock when touching the pins of the plug, for appliances having a capacitor with rated capacitance exceeding 0,1μF, the appliance being disconnected from the supply at the instant of voltage peak	No plug	NA
	Voltage not exceeding 34 V (V) .....:		NA
22.6	Electrical insulation not affected by condensing water or leaking liquid		NA
	Electrical insulation of Class II appliances not affected if a hose ruptures or seal leaks		NA
	In case of doubt, test as described		NA
22.7	Adequate safeguards against the risk of excessive pressure in appliances containing liquid or gases or having steam-producing devices		NA
22.8	Electrical connections not subject to pulling during cleaning of compartments to which access can be gained without the aid of a tool, and that are likely to be cleaned in normal use		NA
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances, unless		NA
	the substance has adequate insulating properties		NA
22.10	Not possible to reset voltage-maintained non-self-resetting thermal cut-outs by the operation of an automatic switching device incorporated within the appliance, if:		NA
	- a non-self-resetting thermal cut-out is required by the standard, and		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	- a voltage maintained non-self-resetting thermal cut-out is used to meet it		NA
	Non-self-resetting thermal motor protectors have a trip-free action, unless		NA
	they are voltage maintained		NA
	Reset buttons of non-self-resetting controls so located or protected that accidental resetting is unlikely		NA
22.11	Reliable fixing of non-detachable parts that provide the necessary degree of protection against electric shock, moisture or contact with moving parts		P
	Obvious locked position of snap-in devices used for fixing such parts	Used screws	P
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		NA
	Tests as described		NA
22.12	Handles, knobs etc. fixed in a reliable manner		NA
	Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible		NA
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		NA
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		NA
22.13	Unlikely that handles, when gripped as in normal use, make the operator's hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only		NA
22.14	No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance		P
	No exposed pointed ends of self-tapping screws or other fasteners, likely to be touched by the user in normal use or during user maintenance		P
22.15	Storage hooks and the like for flexible cords smooth and well rounded		NA
22.16	Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands and no undue wear of contacts		NA
	Cord reel tested with 6000 operations, as specified		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	Electric strength test of 16.3, voltage of 1000 V applied		NA
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner		NA
22.18	Current-carrying parts and other metal parts resistant to corrosion		P
22.19	Driving belts not relied upon to provide the required level of insulation, unless		NA
	constructed to prevent inappropriate replacement		NA
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless		NA
	material used is non-corrosive, non-hygroscopic and non-combustible		NA
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless		P
	impregnated		NA
	This requirement does not apply to magnesium oxide and mineral ceramic fibres used for the electrical insulation of heating elements		NA
22.22	Appliances not containing asbestos		P
22.23	Oils containing polychlorinated biphenyl (PCB) not used	Not used oils	P
22.24	Bare heating elements, except in class III appliances or class III constructions that do not contain live parts, adequately supported		NA
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		NA
22.25	Sagging heating conductors, except in class III appliances or class III constructions that do not contain live parts, cannot come into contact with accessible metal parts		NA
22.26	For class III constructions the insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation		NA
22.27	Parts connected by protective impedance separated by double or reinforced insulation		NA
22.28	Metal parts of Class II appliances conductively connected to gas pipes or in contact with water, separated from live parts by double or reinforced insulation		NA

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Clause	Requirement + Test	Result - Remark	Verdict
22.29	Class II appliances permanently connected to fixed wiring so constructed that the required degree of access to live parts is maintained after installation		NA
22.30	Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or		P
	so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete		P
22.31	Neither clearances nor creepage distances over supplementary and reinforced insulation reduced below values specified in clause 29 as a result of wear		P
	Neither clearances nor creepage distances between live parts and accessible parts reduced below values for supplementary insulation if wires, screws etc. become loose		P
22.32	Supplementary and reinforced insulation constructed or protected against pollution so that clearances or creepage distances are not reduced below the values in clause 29		P
	Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.2		NA
	Ceramic material not tightly sintered, similar materials or beads alone not used as supplementary or reinforced insulation		NA
	Insulating material in which heating conductors are embedded is considered to be basic insulation, not reinforced insulation		NA
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		NA
22.33	Conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts are not in direct contact with live parts		NA
	Electrodes not used for heating liquids		NA
	For class II constructions, conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts, not in direct contact with basic or reinforced insulation, unless		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	the reinforced insulation consists of at least 3 layers		NA
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation, unless		NA
	the reinforced insulation consists of at least 3 layers		NA
	An air layer not used as basic or supplementary insulation in a double insulation system if likely to be bridged by leaking liquid		NA
22.34	Shafts of operating knobs, handles, levers etc. not live, unless		NA
	the shaft is not accessible when the part is removed		NA
22.35	For other than class III constructions, handles, levers and knobs, held or actuated in normal use, not becoming live in the event of a failure of basic insulation		NA
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of a failure of basic insulation, are either adequately covered by insulation material or their accessible parts are separated from their shafts or fixings by supplementary insulation		NA
	This requirement does not apply to handles, levers and knobs on stationary appliances, other than those of electrical components, provided they are reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		NA
	Insulating material covering metal handles, levers and knobs withstand the electric strength test of 16.3 for supplementary insulation		NA
22.36	For appliances other than class III, handles continuously held in the hand in normal use so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless		NA
	they are separated from live parts by double or reinforced insulation		NA
22.37	Capacitors in Class II appliances not connected to accessible metal parts and their casings, if of metal, separated from accessible metal parts by supplementary insulation, unless		P
	the capacitors comply with 22.42		NA

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Clause	Requirement + Test	Result - Remark	Verdict
22.38	Capacitors not connected between the contacts of a thermal cut-out		P
22.39	Lamp holders used only for the connection of lamps		NA
22.41	No components, other than lamps, containing mercury	No components	P
22.42	Protective impedance consisting of at least two separate components		NA
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited		NA
	Resistors checked by the test of 14.1 a) in IEC 60065		NA
	Capacitors checked by the tests for class Y capacitors in IEC 60384-14		NA
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur		NA
22.44	Appliances not having an enclosure that is shaped or decorated like a toy		P
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.3 due to deformation as a result of an external force applied to the enclosure		P
22.46	For programmable protective electronic circuits used to ensure compliance with the standard, the software contains measures to control the fault/error conditions in table R.1		NA
	Software that contains measures to control the fault/error conditions specified in table R.2 is to be specified in parts 2 for particular constructions or to address specific hazards		NA
	These requirements are not applicable to software used for functional purpose or compliance with clause 11		NA
22.47	Appliances connected to the water mains withstand the water pressure expected in normal use		NA
	No leakage from any part, including any inlet water hose		NA
22.48	Appliances connected to the water mains constructed to prevent backsiphonage of non-potable water		NA

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Clause	Requirement + Test	Result - Remark	Verdict
22.49	For remote operation, the duration of operation is to be set before the appliance can be started, unless		NA
	the appliance switches off automatically or can operate continuously without hazard		NA
22.50	Controls incorporated in the appliance take priority over controls actuated by remote operation		NA
22.51	There is a control on the appliance manually adjusted to the setting for remote operation before the appliance can be operated in this mode		NA
	There is a visual indication showing that the appliance is adjusted for remote operation		NA
	These requirements not necessary on appliances that can operate as follows, without giving rise to a hazard:		NA
	- continuously, or		NA
	- automatically, or		NA
	- remotely		NA
22.52	Socket-outlets on appliances accessible to the user in accordance with the socket-outlet system used in the country in which the appliance is sold		NA
22.101	Drives weighing more than 20 kg shall incorporate suitable means for handling, such as hooks.		NA
22.102	All controls supplied with the **drive** shall be marked to indicate the functions in the same way.	No control provided	NA
	When the drive is provided with a dedicated stop button, that stop button shall be unambiguously identifiable		NA
22.103	Any indication showing the selected mode of operation shall not be misleading		NA
	When several modes of operation can be selected by the user, the selected mode shall be clearly indicated		NA
22.104	It shall only be possible to make adjustments that could affect compliance with this standard by means of a **tool** or by use of a code		P
22.105	A drive for a door or gate incorporating a wicket door shall be constructed so that the drive cannot be operated when the wicket door is not in the safe position	It's depend on controls, not supplied	NA
22.106	**Drives** shall be supplied with all associated components necessary for compliance with this standard for the defined mode of operation. components required for alternative modes of operation may be delivered separately provided they are listed in the instructions		P

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Clause	Requirement + Test	Result - Remark	Verdict
22.107	Controls shall not be capable of overriding an **entrapment protection system** unless they can only activate the **drive** in sight of the **driven part**	No controls supplied	NA
22.Z101	The fixing systems of fixed guards shall only be removable with the use of tools.		NA
	The fixing systems shall remain attached to the guards or to the machinery when the guards are removed.		NA
	Where possible, guards shall be incapable of remaining in place without their fixings.		NA
23	INTERNAL WIRING		
23.1	Wireways smooth and free from sharp edges		P
	Wires protected against contact with burrs, cooling fins etc.		P
	Wire holes in metal well-rounded or provided with bushings		P
	Wiring effectively prevented from coming into contact with moving parts		P
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges		NA
	Beads inside flexible metal conduits contained within an insulating sleeve		NA
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		P
	Flexible metallic tubes not causing damage to insulation of conductors		NA
	Open-coil springs not used		NA
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		NA
	No damage after 10 000 flexings for conductors flexed during normal use, or		NA
	100 flexings for conductors flexed during user maintenance		NA
	Electric strength test of 16.3, 1000 V between live parts and accessible metal parts		NA
	Not more than 10% of the strands of any conductor broken, and		NA
	not more than 30% for wiring supplying circuits that consume no more than 15W		NA
23.4	Bare internal wiring sufficiently rigid and fixed		NA

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Clause	Requirement + Test	Result - Remark	Verdict
23.5	The insulation of internal wiring subjected to the supply mains voltage withstanding the electrical stress likely to occur in normal use		P
	Basic insulation electrically equivalent to the basic insulation of cords complying with IEC 60227 or IEC 60245, or		P
	no breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		P
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by clamping at both ends, or		P
	be such that it can only be removed by breaking or cutting	Sleeve of motor	P
23.7	The colour combination green/yellow only used for earthing conductors		P
23.8	Aluminium wires not used for internal wiring		P
23.9	Stranded conductors not consolidated by soldering where they are subjected to contact pressure, unless		P
	the contact pressure is provided by spring terminals		NA
23.10	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, at least equivalent to that of light polyvinyl chloride sheathed flexible cord (60227 IEC 52)		NA
24	COMPONENTS		
24.1	*Components comply with the safety requirements specified in the relevant standards as far as they reasonably apply*		P
	The requirements of Clause 29 of this standard apply between live parts of components and accessible parts of the appliance.		P
	The requirements of 30.2 of this standard 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 standard for the relevant component are tested according to the requirements of 30.2		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Components that have been previously tested and shown to comply with the resistance to fire requirements in the standard for the relevant component need not be retested provided that:		
	- the severity specified in the component standard is not less than the severity specified in 30.2, and		NA
	- the test report for the component states whether it complied with the standard for the relevant component with or without flame, flames not exceeding 2 s during the test are ignored		NA
	Unless components have been previously tested and found to comply with the relevant standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		P
	For components mentioned in 24.1.1 to 24.1.9, no additional tests specified in the relevant standard for the component are necessary other than those specified in 24.1.1 to 24.1.9		P
	Components that have not been separately tested and found to comply with the relevant standard, and		NA
	components that are not marked or not used in accordance with their marking,		NA
	are tested in accordance with the conditions occurring in the appliance, the number of samples being that required by the relevant standard		NA
	Lamp holders and starter holders that have not been previously tested and found to comply with the relevant standard are tested as a part of the appliance and additionally comply with the gauging and interchangeability requirements of the relevant standard under the conditions occurring in the appliance		NA
	Where the relevant standard specifies these gauging and interchangeability requirements at elevated temperatures, the temperatures measured during the tests of Clause 11 are used		NA
	Plugs and socket-outlets and other connecting devices of interconnection cords are not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1, or		NA
	with connectors and appliance inlets complying with the standard sheets of IEC 60320-1,		NA
	if direct supply to these parts from the supply mains gives rise to a hazard		NA

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Clause	Requirement + Test	Result - Remark	Verdict
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, complying with IEC 60384-14	Capacitor for motor	NA
	If the capacitors have to be tested, they are tested according to Annex F		NA
24.1.2	Safety isolating transformers complying with IEC 61558-2-6		NA
	If they have to be tested, they are tested according to Annex G		NA
24.1.3	Switches complying with IEC 61058-1, the number of cycles of operation being at least 10 000	Certified for 50.000	P
	If they have to be tested, they are tested according to Annex H		NA
	If the switch operates a relay or contactor, the complete switching system is subjected to the test		NA
	If the switch only operates a motor staring relay complying with IEC 60730-2-10 with the number of cycles of a least 10 000 as specified, the complete switching system need not be tested		NA
	If a switch is used to disconnect the **drive** when the manual release is operated, the switch is tested for 300 cycles of operation		NA
24.1.4	Automatic controls complying with IEC 60730-1 with the relevant part 2. The number of cycles of operation being at least:		P
	- thermostats: 10 000		NA
	- temperature limiters: 1 000		NA
	- self-resetting thermal cut-outs: 300		NA
	- voltage maintained non-self-resetting thermal cut-outs: 1 000		NA
	- other non-self-resetting thermal cut-outs: 30		NA
	- timers: 3 000		NA
	- energy regulators: 10 000		NA
	The number of cycles for controls operating during clause 11 need not be declared, if the appliance meets the requirements of this standard when they are short-circuited		NA
	Thermal motor protectors are tested in combination with their motor under the conditions specified in Annex D		P

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Clause	Requirement + Test	Result - Remark	Verdict
	For water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains, the degree of protection declared for subclause 6.5.2 of IEC 60730-2-8 is IPX7		NA
24.1.5	Appliance couplers complying with IEC 60320-1		NA
	However, for appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3		NA
	Interconnection couplers complying with IEC 60320-2-2		NA
24.1.6	Small lamp holders similar to E10 lampholders complying with IEC 60238, the requirements for E10 lampholders being applicable		NA
24.1.7	*If the remote operation of the appliance is via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is EN 41003*		NA
	Compliance with Clause 8 of this standard is not impaired by connecting the appliance to a device covered by EN 41003		*NA*
24.1.8	The relevant standard for thermal links is IEC 60691		NA
	Thermal links not complying with IEC 60691 are considered to be an intentionally weak part for the purposes of Clause 19		NA
24.1.9	Contactors and relays, other than motor starting relays, tested as part of the appliance		NA
	They are also tested in accordance with Clause 17 of IEC 60730-1, the number of cycles of operations in 24.1.4 selected according to the contactor or relay function in the appliance.....:		NA
24.2	Appliances not fitted with:		
	- switches or automatic controls in flexible cords		P
	- devices causing 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 soldering, unless		P
	the solder has a melding point of at least 230 ˚C		NA

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Clause	Requirement + Test	Result - Remark	Verdict
24.3	Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and have a contact separation in all poles, providing full disconnection under overvoltage category III conditions		NA
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1		NA
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance, and used accordingly		P
	Voltage across capacitors in series with a motor winding does not exceed 1,1 times rated voltage, when the appliance is supplied at 1,1 times rated voltage under minimum load	Model 50 Hz Capacitor marked 425 V; (limit 467.5 V) measured 410 V Capacitor marked 400 V; (limit 440 V) measured 388V Model 60 Hz Capacitor marked 400 V; (limit 440 V) measured 404 V	P
24.6	Working voltage of motors connected to the supply mains and having basic insulation that is inadequate for the rated voltage of the appliance, not exceeding 42 V		NA
	In addition, the motors comply with the requirements of Annex I		NA
24.7	Detachable hose-sets for connection of appliances to the water mains comply with IEC 61770		NA
	They are supplied with the appliance		NA
	Appliances intended to be permanently connected to the water mains not connected by a detachable hose-set		NA
24.8	Motor running capacitors in appliances for which 30.2.3 is applicable and that are permanently connected in series with a motor winding, not causing a hazard in event of a failure	Biased-off switch used	NA
	One or more of the following conditions are to be met:		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	- the capacitors are of class P2 according to IEC 60252-1		NA
	- the capacitors are housed within a metallic or ceramic enclosure		NA
	- the distance of separation of the outer surface to adjacent non-metallic parts exceeds 50 mm		NA
	- adjacent non-metallic parts within 50 mm withstand the needle-flame test of Annex E		NA
	- adjacent non-metallic parts within 50 mm classified as at least V-1 according to IEC 60695-11-10		NA
24.Z1	*For motor running capacitors (IEC 60252-1 type P2) with a metallic enclosure having an overpressure fuse the flame testing of internal plastic parts supporting current carrying connections as required in 30.2.2 and 30.2.3.1 is not necessary*		NA
24.Z101	Entrapment protection equipment in compliance with EN 12978 is considered to fulfill the requirements of Clauses 8, 11, 15 and 19 of this standard		NA
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		NA
	- supply cord fitted with a plug,		NA
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance, or		NA
	- pins for insertion into socket-outlets		NA
25.2	Appliance not provided with more than one means of connection to the supply mains		P
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown		NA
25.3	Appliance intended to be permanently connected to fixed wiring provided with one of the following means for connection to the supply mains:		
	- a set of terminals allowing the connection of a flexible cord		NA
	- a fitted supply cord		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	- a set of supply leads accommodated in a suitable compartment		NA
	- a set of terminals for the connection of cables of fixed wiring, cross-sectional areas specified in 26.6, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support	Supplied power cord (separately)	P
	- a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate types of cable or conduit, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		NA
	For a fixed appliance constructed so that parts can be removed to facilitate easy installation, this requirement is met if it is possible to connect the fixed wiring without difficulty after a part of the appliance has been fixed to its support		NA
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimension according to table 10 (mm) .....:		NA
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in clause 29		NA
25.5	Method for assembling the supply cord to the appliance:		
	- type X attachment		NA
	- type Y attachment		P
	- **Type Z attachment** is allowed for **drives** having a **rated power input** not exceeding 100 W and for separate power supplies for indoor use		NA
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		NA
	For multi-phase appliances supplied with a supply cord and that are intended to be permanently connected to fixed wiring, the supply cord is assembled to the appliance by type Y attachment		NA
25.6	Plugs fitted with only one flexible cord		
	Supply cords of single-phase portable appliances having a rated current not exceeding 16 A, fitted with a plug complying with the following standard sheets of IEC/TR 60083:		NA
	- for Class I appliances: *standard sheet C2b, C3b or C4 .....:*		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	- for Class II appliances: *standard sheet C5 or C6 .....:*		NA
25.7	Supply cords, other than for class III appliances, being one of the following types:		
	- rubber sheathed (at least 60245 IEC 53)		NA
	- polychloroprene sheathed (at least 60245 IEC 57)		NA
	The **supply cord** of **drives** for outdoor use shall be polychloroprene sheathed and not be lighter than ordinary polychloroprene sheathed flexible cord (code designation 60245 IEC 57).		NA
	- cross-linked polyvinyl chloride sheathed (at least 60245 IEC 88)		NA
	- polyvinyl chloride sheathed. Not used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of clause 11		NA
	• light polyvinyl chloride sheathed cord (60227 IEC 52), for appliances not exceeding 3 kg		NA
	• ordinary polyvinyl chloride sheathed cord (60227 IEC 53), for other appliances	4 x 0.75	P
	- heat resistant polyvinyl chloride sheathed. Not used for type X attachment other than specially prepared cords		NA
	• heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56), for appliances not exceeding 3 kg		NA
	• heat-resistant polyvinyl chloride sheathed cord (60227 IEC 57), for other appliances		NA
	Supply cords for class III appliances adequately insulated		NA
	Test with 500 V for 2 min for supply cords of class III appliances that contain live parts		NA
	Rubber sheathed cords (60245 IEC 53) are not suitable for appliances intended to be used outdoors or when they are liable to be exposed to significant amount of ultraviolet radiation		N/A
	Halogen-free thermoplastic compound sheathed supply cords have properties at least those of:		
	• *halogen-free thermoplastic compound sheathed cords (H03Z1Z1H2-F or H03Z1Z1-F), for appliances having a mass not exceeding 3 kg*		N/A
	• *halogen-free thermoplastic compound sheathed cords (H05Z1Z1H2-F or H05Z1Z1-F), for other appliances*		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Cross-linked halogen-free compound sheathed supply cords have properties at least those of cross-linked halogen-free compound sheathed cords (H07ZZ-F)		N/A
25.8	Nominal cross-sectional area of supply cords not less than table 11; rated current (A); cross-sectional area (mm²).....:	3.4 A nominal current (800W/230W) ; 0.75 mm^2	P
25.9	Supply cords not in contact with sharp points or edges		P
25.10	Supply cord of class I appliances have a green/yellow core for earthing		P
25.11	Conductors of supply cords not consolidated by soldering where they are subject to contact pressure, unless		P
	the contact pressure is provided by spring terminals		NA
25.12	Insulation of the supply cord not damaged when moulding the cord to part of the enclosure		NA
25.13	Inlet openings so constructed as to prevent damage to the supply cord		P
	If the enclosure at the inlet opening is not of insulating material, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided		NA
	If unsheathed supply cord, a similar additional bushing or lining is required, unless the appliance is		NA
	class 0, or		NA
	a class III appliance not containing live parts		NA
25.14	Supply cords moved while in operation adequately protected against excessive flexing	No moved during operation	NA
	Flexing test, as described:		NA
	- applied force (N).....:		NA
	- number of flexings.....:		NA
	The test does not result in:		NA
	- short-circuit between the conductors, such that the current exceeds a value of twice the rated current		NA
	- breakage of more than 10% of the strands of any conductor		NA
	- separation of the conductor from its terminal		NA
	- loosening of any cord guard		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	- damage to the cord or the cord guard		NA
	- broken strands piercing the insulation and becoming accessible		NA
25.15	For appliances with supply cord and appliances to be permanently connected to fixed wiring by a flexible cord, conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage		P
	The cord cannot be pushed into the appliance to such an extent that the cord or internal parts of the appliance can be damaged		P
	Pull and torque test of supply cord, values shown in table 12: mass (kg); pull (N); torque (not on automatic cord reel) (Nm).....:	100 N ; 0.35 Nm	P
	Cord not damaged and max. 2 mm displacement of the cord	0.3 mm	
25.16	Cord anchorages for type X attachments constructed and located so that:		NA
	- replacement of the cord is easily possible		NA
	- it is clear how the relief from strain and the prevention of twisting are obtained		NA
	- they are suitable for different types of supply cord		NA
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless		NA
	they are separated from accessible metal parts by supplementary insulation		NA
	- the cord is not clamped by a metal screw which bears directly on the cord		NA
	- at least one part of the cord anchorage securely fixed to the appliance, unless		NA
	it is part of a specially prepared cord		NA
	- screws which have to be operated when replacing the cord do not fix any other component, unless		NA
	the appliance becomes inoperative or incomplete or the parts cannot be removed without a tool		NA
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		NA
	- for class 0, 0I and I appliances they are of insulating material or are provided with an insulating lining, unless		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	failure of the insulation of the cord does not make accessible metal parts live		NA
	- for class II appliances they are of insulating material, or		NA
	if of metal, they are insulated from accessible metal parts by supplementary insulation		NA
	After the test of 25.15, under the conditions specified, the conductors have not moved by more than 1 mm in the terminals		NA
25.17	Adequate cord anchorages for type Y and Z attachment, test with the cord supplied with the appliance	Type Y	P
25.18	Cord anchorages only accessible with the aid of a tool, or		P
	Constructed so that the cord can only be fitted with the aid of a tool		P
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		NA
	Tying the cord into a knot or tying the cord with string not used		NA
25.20	The insulated conductors of the supply cord for type Y and Z attachment additionally insulated from accessible metal parts		P
25.21	Space for supply cord for type X attachment or for connection of fixed wiring constructed:		NA
	- to permit checking of conductors with respect to correct positioning and connection before fitting any cover		NA
	- so there is no risk of damage to the conductors or their insulation when fitting the cover		NA
	- for portable appliances, so that the uninsulated end of a conductor, if it becomes free from the terminal, prevented from contact with accessible metal parts		NA
	2 N test to the conductor for portable appliances; no contact with accessible metal parts		NA
25.22	Appliance inlets:		NA
	- live parts not accessible during insertion or removal		NA
	Requirement not applicable to appliance inlets complying with IEC 60320-1		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	- connector can be inserted without difficulty		NA
	- the appliance is not supported by the connector		NA
	- not for cold conditions if temp. rise of external metal parts exceeds 75 K during clause 11, unless		NA
	the supply cord is unlikely to touch such metal parts		NA
25.23	Interconnection cords comply with the requirements for the supply cord, except that:		NA
	- the cross-sectional area of the conductors is determined on the basis of the maximum current during clause 11		NA
	- the thickness of the insulation may be reduced		NA
	If necessary, electric strength test of 16.3		NA
	Type Z attachment is allowed for separate controls		NA
25.24	Interconnection cords not detachable without the aid of a tool if compliance with this standard is impaired when they are disconnected		NA
25.25	Dimensions of pins that are inserted into socket-outlets compatible with the dimensions of the relevant socket-outlet.		NA
	Dimensions of pins and engagement face in accordance with the dimensions of the relevant plug in IEC/TR 60083		NA
26	TERMINALS FOR EXTERNAL CONDUCTORS		
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors		P
	Terminals only accessible after removal of a non-detachable cover, except		P
	for class III appliances that do not contain live parts		NA
	Earthing terminals may be accessible if a tool is required to make the connections and means are provided to clamp the wire independently from its connection		P
26.2	Appliances with type X attachment and appliances for the connection of cables to fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless		NA
	the connections are soldered		NA
	Screws and nuts not used to fix any other component, except		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors		NA
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone, unless		NA
	barriers provided so that neither clearances nor creepage distances between live parts and other metal parts reduced below the values for supplementary insulation if the conductor becomes free at the soldered joint		NA
26.3	Terminals for type X attachment and for connection of cables of fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure but without damaging the conductor		NA
	Terminals fixed so that when the clamping means is tightened or loosened:		NA
	- the terminal does not become loose		NA
	- internal wiring is not subjected to stress		NA
	- neither clearances nor creepage distances are reduced below the values in clause 29		NA
	Compliance checked by inspection and by the test of subclause 9.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified (Nm).....:		NA
	No deep or sharp indentations of the conductors		NA
26.4	Terminals for type X attachment, except those having a specially prepared cord and those for the connection of cables of fixed wiring, no special preparation of conductors such as by soldering, use of cable lugs, eyelets or similar, and		NA
	so constructed or placed that conductors prevented from slipping out when clamping screws or nuts are tightened		NA
26.5	Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection to other parts that result in a hazard		NA
	Stranded conductor test, 8 mm insulation removed		NA
	No contact between live parts and accessible metal parts and,		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		NA
26.6	Terminals for type X attachment and for connection of cables of fixed wiring suitable for connection of conductors with cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm²).....:		NA
	If a specially prepared cord is used, terminals need only be suitable for that cord		NA
26.7	Terminals for type X attachment, except in class III appliances not containing live parts, accessible after removal of a cover or part of the enclosure		NA
26.8	Terminals for the connection of fixed wiring, including the earthing terminal, located close to each other		P
26.9	Terminals of the pillar type constructed and located as specified		NA
26.10	Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless		P
	conductors ends fitted with means suitable for screw terminals		NA
	Pull test of 5 N to the connection		NA
26.11	For type Y and Z attachment, soldered, welded, crimped or similar connections may be used	Y	P
	For Class II appliances, the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone		NA
	If soldering, welding or crimping alone used, barriers provided so that clearances and creepage distances between live parts and other metal parts are not reduced below the values for supplementary insulation if the conductor becomes free		NA
	Conductors connected by soldering are not considered to be positioned or fixed so that reliance is not placed upon the soldering alone to maintain them in position unless they are held in place near the terminals independently of the solder		*NA*
27	PROVISION FOR EARTHING		
27.1	Accessible metal parts of Class 0I and I appliances permanently and reliably connected to an earthing terminal or earthing contact of the appliance inlet		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Earthing terminals and earthing contacts not connected to the neutral terminal		P
	Class 0, II and III appliances have no provision for earthing		NA
	Safety extra-low voltage circuits not earthed, unless		NA
	protective extra-low voltage circuits		NA
27.2	Clamping means of earthing terminals adequately secured against accidental loosening		P
	Terminals for the connection of external equipotential bonding conductors allow connection of conductors of 2.5 to 6 mm², and		NA
	do not provide earthing continuity between different parts of the appliance, and		NA
	conductors cannot be loosened without the aid of a tool		NA
27.3	For a detachable part having an earth connection and being plugged into another part of the appliance, the earth connection is made before and separated after current-carrying connections when removing the part		NA
	For appliances with supply cords, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage		P
27.4	No risk of corrosion resulting from contact between parts of the earthing terminal and the copper of the earthing conductor or other metal		P
	Parts providing earthing continuity, other than parts of a metal frame or enclosure, have adequate resistance to corrosion		P
	If of steel, these parts provided with an electroplated coating with a thickness at least 5 µm		NA
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		NA
	In the body of the earthing terminal is a part of a frame or enclosure of aluminium or aluminium alloys, precautions taken to avoid risk of corrosion		NA
27.5	Low resistance of connection between earthing terminal and earthed metal parts		P

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Clause	Requirement + Test	Result - Remark	Verdict
	This requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit, provided the clearances of basic insulation are based on the rated voltage of the appliance		P
	Resistance not exceeding 0,1 Ω at the specified low-resistance test (Ω) .....:	0.0487 without supply cord	P
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand-held appliances.		NA
	They may be used to provide earthing continuity in other appliances if at least two tracks are used with independent soldering points and the appliance complies with 27.5 for each circuit		NA
28	SCREWS AND CONNECTIONS		
28.1	Fixings, electrical connections and connections providing earthing continuity withstand mechanical stresses		P
	Screws not of soft metal liable to creep, such as zinc or aluminium		P
	Diameter of screws of insulating material min. 3 mm		NA
	Screws of insulating material not used for any electrical connections or connections providing earthing continuity		NA
	Screws used for electrical connections or connections providing earthing continuity screwed into metal		P
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		NA
	For type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw impairs basic insulation		NA
	For screws and nuts; torque-test as specified in table 14.....:	(see appended table)	NA
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure is not transmitted through non-ceramic insulating material liable to shrink or distort, unless		P

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Clause	Requirement + Test	Result - Remark	Verdict
	there is resiliency in the metallic parts to compensate for shrinkage or distortion of the insulating material		NA
	This requirement does not apply to electrical connections in circuits of appliances for which:		NA
	• 30.2.2 is applicable and that carry a current not exceeding 0,5 A	>3 A	NA
	• 30.2.3 is applicable and that carry a current not exceeding 0,2 A		NA
28.3	Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together		NA
	Thread-cutting (self-tapping) screws and thread rolling screws only used for electrical connections if they generate a full form standard machine screw thread		NA
	Thread-cutting (self-tapping) screws not used if they are likely to be operated by the user or installer		NA
	Thread-cutting, thread rolling and space threaded screws may be used in connections providing earthing continuity provided it is not necessary to disturb the connection:		NA
	- in normal use,		NA
	- during user maintenance,		NA
	- when replacing a supply cord having a type X attachment, or		NA
	- during installation		NA
	At least two screws being used for each connection providing earthing continuity, unless		NA
	the screw forms a thread having a length of at least half the diameter of the screw		NA
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		P
	This requirement does not apply to screws in the earthing circuit if at least two screws are used, or		NA
	if an alternative earthing circuit is provided		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if the connections are subjected to torsion		NA
29	CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION		
	Clearances, creepage distances and solid insulation withstand electrical stress		P
	For coatings used on printed circuits boards to protect the microenvironment (Type 1) or to provide basic insulation (Type 2), Annex J applies.....:		NA
	The microenvironment is pollution degree 1 under type 1 protection		NA
	For type 2 protection, the spacing between the conductors before the protection is applied is not less than the values specified in Table 1 of IEC 60664-3		NA
	These values apply to functional, basic, supplementary and reinforced insulation .....:		NA
29.1	Clearances not less than the values specified in table 16, taking into account the rated impulse voltage for the overvoltage categories of table 15, unless .....:	(see appended table)	P
	for basic insulation and functional insulation they comply with the impulse voltage test of clause 14		P
	However, if the distances are affected by wear, distortion, movement of the parts or during assembly, the clearances for rated impulse voltages of 1500V and above are increased by 0,5 mm and the impulse voltage test is not applicable		NA
	Impulse voltage test is not applicable:		NA
	- when the microenvironment is pollution degree 3, or		NA
	- for basic insulation of class 0 and class 01 appliances		NA
	Appliances are in overvoltage category II		P
	A force of 2 N is applied to bare conductors, other than heating elements		NA
	A force of 30 N is applied to accessible surfaces		P
A1:2017	**For a rated voltage > 300 V and ≤ 346 V, the rated impulse voltage is for**	Voltage < 300 V	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– overvoltage category I: 2 500 V; **– overvoltage category II: 4 000 V;** **– overvoltage category III: 6 000 V**		
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage		P
	The values of table 16 or the impulse voltage test of clause 14 are applicable.....:	(see appended table)	NA
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1,0 mm if the microenvironment is pollution degree 1		NA
	Lacquered conductors of windings considered to be bare conductors		P
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16:	(see appended table)	P
29.1.3	Clearances of reinforced insulation not less than those specified for basic insulation in table 16, using the next higher step for rated impulse voltage .....:	(see appended table)	P
	For double insulation, with no intermediate conductive part between basic and supplementary insulation, clearances are measured between live parts and the accessible surface, and the insulation system is treated as reinforced insulation		P
29.1.4	Clearances for functional insulation are the largest values determined from:		
	- table 16 based on the rated impulse voltage .....:	(see appended table)	P
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		NA
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		NA
	If values of table 16 are largest, the impulse voltage test of clause 14 may be applied instead, unless		NA
	the microenvironment is pollution degree 3, or		NA
	the distances can be affected by wear, distortion, movement of the parts or during assembly		NA
	However, clearances are not specified if the appliance complies with clause 19 with the functional insulation short-circuited		NA
	Lacquered conductors of windings considered to be bare conductors		P

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Clause	Requirement + Test	Result - Remark	Verdict
	However, clearances at crossover points are not measured		P
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		NA
29.1.5	Appliances having higher working voltages than rated voltage, clearances for basic insulation are the largest values determined from:		NA
	- table 16 based on the rated impulse voltage .....:		NA
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		NA
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		NA
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1 or Clause 4 of IEC 60664-4, the clearances of supplementary insulation are not less than those specified for basic insulation		NA
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1, the clearances of reinforced insulation dimensioned as specified in Table F.7a are to withstand 160% of the withstand voltage required for basic insulation		NA
	If clearances for basic insulation are selected from Clause 4 of IEC 60664-4, the clearances of reinforced insulation are twice the value required for basic insulation		NA
	If the secondary winding of a step-down transformer is earthed, or if there is an earthed screen between the primary and secondary windings, clearances of basic insulation on the secondary side not less than those specified in table 16, but using the next lower step for rated impulse voltage		NA
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation are based on the working voltage used as the rated voltage in table 15		NA
29.2	Creepage distances not less than those appropriate for the working voltage, taking into account the material group and the pollution degree.....:	(see appended table)	P
	Pollution degree 2 applies, unless		P
	- precautions taken to protect the insulation; pollution degree 1		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	- insulation subjected to conductive pollution; pollution degree 3		NA
	A force of 2 N is applied to bare conductors, other than heating elements		NA
	A force of 30 N is applied to accessible surfaces		P
	In a double insulation system, the working voltage for both the basic and supplementary insulation is taken as the working voltage across the complete double insulation system		P
29.2.1	Creepage distances of basic insulation not less than specified in table 17.....:	(see appended table)	P
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 17 .....:		NA
	Except for pollution degree 1, corresponding creepage distance not less than the minimum specified for the clearance in table 16, if the clearance has been checked according to the test of clause 14 .....:		NA
29.2.2	Creepage distances of supplementary insulation at least those specified for basic insulation in table 17, or .....:	(see appended table)	P
	Table 2 of IEC 60664-4, as applicable .....:		NA
29.2.3	Creepage distances of reinforced insulation at least double those specified for basic insulation in table 17, or .....:	(see appended table)	P
	Table 2 of IEC 60664-4, as applicable .....:		NA
29.2.4	Creepage distances of functional insulation not less than specified in table 18.....:	(see appended table)	P
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 18 .....:		NA
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		NA
29.3	Supplementary and reinforced insulation have adequate thickness, or a sufficient number of layers, to withstand the electrical stresses		P
	Compliance checked:		

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Clause	Requirement + Test	Result - Remark	Verdict
	- by measurement, in accordance with 29.3.1, or		P
	- by an electric strength test in accordance with 29.3.2, or		NA
	- by an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3, and		NA
	for accessible parts of reinforced insulation consisting of a single layer, by measurement in accordance with 29.3.4, or		NA
	- as specified in subclause 6.3 of IEC 60664-4 for insulation that is subjected to any periodic voltage having a frequency exceeding 30 kHz		NA
29.3.1	Supplementary insulation have a thickness of at least 1 mm	1.71 mm enclosure	P
	Reinforced insulation have a thickness of at least 2 mm		NA
29.3.2	Each layer of material withstand the electric strength test of 16.3 for supplementary insulation		NA
	Supplementary insulation consist of at least 2 layers		NA
	Reinforced insulation consist of at least 3 layers		NA
29.3.3	The insulation is subjected to the dry heat test Bb of IEC 60068-2-2, followed by		NA
	the electric strength test of 16.3		NA
	If the temperature rise during the tests of clause 19 does not exceed the value specified in table 3, the test of IEC 60068-2-2 is not carried out		NA
29.3.4	Thickness of accessible parts of reinforced insulation consisting of a single layer not less than specified in table 19.....:		NA
A1:2017	**For a rated voltage > 300 V and ≤ 346 V, the minimum thickness for accessible parts of reinforced insulation consisting of a single layer is for**	Voltage <300 V	N/A
	– overvoltage category I: 0,6 mm; **– overvoltage category II: 1,2 mm;** **– overvoltage category III: 2,0 mm**		N/A
29.3.Z1	*Appliance 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*		P

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Clause	Requirement + Test	Result - Remark	Verdict
30	RESISTANCE TO HEAT AND FIRE		
30.1	External parts of non-metallic material,		P
	parts supporting live parts, and	motor connector; other component certified	P
	parts of thermoplastic material providing supplementary or reinforced insulation	Enclosure (black, orange, red)	P
	sufficiently resistant to heat		P
	Ball-pressure test according to IEC 60695-10-2		P
	External parts tested at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C).....:	(see appended table)	P
	Parts supporting live parts tested at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125 °C, whichever is the higher; temperature (°C).....:	(see appended table)	P
	Parts of thermoplastic material providing supplementary or reinforced insulation tested at 25 °C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C) .....:	(see appended table)	NA
30.2	Parts of non-metallic material resistant to ignition and spread of fire		P
	This requirement does not apply to:		
	parts having a mass not exceeding 0,5 g, provided the cumulative effect is unlikely to propagate flames that originate inside the appliance by propagating flames from one part to another, or		NA
	decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance		NA
	Compliance checked by the test of 30.2.1, and in addition:		P
	- for attended appliances, 30.2.2 applies	See below	P
	- for unattended appliances, 30.2.3 applies		NA
	For appliances for remote operation, 30.2.3 applies		NA
	For base material of printed circuit boards, 30.2.4 applies		NA
	For drives operated by a biased-off switch, 30.2.2 is applicable		P
	For other **drives,** 30.2.3 is applicable.		NA

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Clause	Requirement + Test	Result - Remark	Verdict
30.2.1	Parts of non-metallic material subjected to the glow-wire test of IEC 60695-2-11 at 550 °C		NA
	However, test not carried out if the material is classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 550 °C, or		NA
	the material is classified at least HB40 according to IEC 60695-11-10		NA
	Parts for which the glow-wire test cannot be carried out need to meet the requirements in ISO 9772 for material classified HBF		NA
30.2.2	Appliances operated while attended, parts of non-metallic material supporting current-carrying connections, and		P
	parts of non-metallic material within a distance of 3mm of such connections,	Enclosure orange and black	P
	subjected to the glow-wire test of IEC 60695-2-11		
	The test severity is:		
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation	Enclosure black red and orange, terminal block, fast-on holder, connector motor, micro switch, capacitor	P
	- 650 °C, for other connections		NA
	Glow-wire applied to an interposed shielding material, if relevant		NA
	The glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least:		NA
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation		NA
	- 650 °C, for other connections		NA
	The glow-wire test is also not carried out on small parts. These parts are to:		NA
	- comprise material having a glow-wire flammability index of at least 750 °C, or 650 °C as appropriate, or		NA
	- comply with the needle-flame test of Annex E, or		NA
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10 .....:		NA
	Glow-wire test not applicable to conditions as specified .....:		NA
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	The tests are not applicable to conditions as specified .....:		NA
30.2.3.1	Parts of non-metallic material supporting connections carrying a current exceeding 0,2 A during normal operation, and		NA
	parts of non-metallic material, other than small parts, within a distance of 3 mm,		NA
	subjected to the glow-wire test of IEC 60695-2-11 with a test severity of 850 °C		NA
	Glow-wire applied to an interposed shielding material, if relevant		NA
	The glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 850 °C		NA
30.2.3.2	Parts of non-metallic material supporting connections, and		NA
	parts of non-metallic material within a distance of 3mm,		NA
	subjected to glow-wire test of IEC 60695-2-11		NA
	The test severity is:		NA
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		NA
	- 650 °C, for other connections		NA
	Glow-wire applied to an interposed shielding material, if relevant		NA
	However, the glow-wire test of 750 °C or 650 °C as appropriate, is not carried out on parts of material fulfilling both or either of the following classifications:		NA
	- a glow-wire ignition temperature according to IEC 60695-2-13 of at least:		NA
	• 775 °C, for connections carrying a current exceeding 0,2 A during normal operation		NA
	• 675 °C, for other connections		NA
	- a glow-wire flammability index according to IEC 60695-2-12 of at least:		NA
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		NA
	- 650 °C, for other connections		NA
	The glow-wire test is also not carried out on small parts. These parts are to:		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	- comprise material having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		NA
	- comprise material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		NA
	- comply with the needle-flame test of Annex E, or		NA
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10		NA
	The consequential needle-flame test of Annex E applied to non-metallic parts that encroach within the vertical cylinder placed above the centre of the connection zone and on top of the non-metallic parts supporting current-carrying connections, and parts of non-metallic material within a distance of 3 mm of such connections if these parts are those:		NA
	- parts that withstood the glow-wire test of IEC 60695-2-11 of 750 °C or 650 °C as appropriate, but produce a flame that persist longer than 2 s, or		NA
	- parts that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		NA
	- small parts, that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		NA
	- small parts for which the needle-flame test of Annex E was applied, or		NA
	- small parts for which a material classification of V-0 or V-1 was applied		NA
	However, the consequential needle-flame test is not carried out on non-metallic parts, including small parts, within the cylinder that are:		NA
	- parts having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		NA
	- parts comprising material classified as V-0 or V-1 according to IEC 60695-11-10, or		NA
	- parts shielded by a flame barrier that meets the needle-flame test of Annex E or that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		NA
30.2.4	Base material of printed circuit boards subjected to the needle-flame test of Annex E		NA
	Test not applicable to conditions as specified.....:		NA
31	RESISTANCE TO RUSTING		

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Clause	Requirement + Test	Result - Remark	Verdict
	Relevant ferrous parts adequately protected against rusting		P
	For parts intended to be installed outdoors, compliance is checked by the salt mist test of IEC 60068-2-52, severity 2 being applicable		NA
	Before the test, coatings are scratched by means of a hardened steel pin, the end of which has the form of a cone with an angle of 40°. Its tip is rounded with a radius of 0,25 mm ± 0,02 mm. The pin is loaded so that the force exerted along its axis is 10 N ± 0,5 N. The scratches are made by drawing the pin along the surfaces of the coating at a speed of approximately 20 mm/s. Five scratches are made at least 5 mm apart and at least 5 mm from the edges		NA
	After the test, the **drive** shall not have deteriorated to such an extent that compliance with this standard, in particular with Clauses 8 and 27, is impaired. The coating shall not be broken and shall not have loosened from the metal surface		NA
32	RADIATION, TOXICITY AND SIMILAR HAZARDS		
	Appliance does not emit harmful radiation or present a toxic or similar hazard due to their operation in normal use		P
	Compliance is checked by the limits or tests specified in part 2, if relevant		P
	Compliance regarding electromagnetic fields is checked according to EN 62233		*P*
32.101	Appliances incorporating a laser shall be constructed so that they provide adequate protection from laser radiation.		NA
A	ANNEX A (INFORMATIVE) ROUTINE TESTS		
	Description of routine tests to be carried out by the manufacturer		P
B	ANNEX B (NORMATIVE) APPLIANCES POWERED BY RECHARGEABLE BATTERIES		NA
	The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance		NA
	This annex does not apply to battery chargers		NA
3.1.9	Appliance operated under the following conditions:		NA
	- the appliance, supplied by its fully charged battery, operated as specified in relevant part 2		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	- the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		NA
	-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		NA
	- 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		NA
3.6.2	Part to be removed in order to discard the battery is not considered to be detachable		NA
5.B.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		NA
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals		NA
	The positive terminal indicated by symbol IEC 60417-5005 and the negative terminal by symbol IEC 60417-5006		NA
7.6	Symbols 60417-5005 and IEC 60417-5006		NA
7.12	The instructions give information regarding charging		NA
	The instructions for appliances incorporating batteries intended to be replaced by the user includes required information		NA
	Details about how to remove batteries containing materials hazardous to the environment given		NA
7.15	Markings placed on the part of the appliance connected to the supply mains		NA
8.2	Appliances having batteries that according to the instruction may be replaced by the user need only have basic insulation between live parts and the inner surface of the battery compartment		NA
	If the appliance can be operated without batteries, double or reinforced insulation required		NA
11.7	The battery is charged for the period stated in the instructions or 24 h .....:		NA
19.1	Appliances subjected to tests of 19.B.101, 19.B.102 and 19.B.103		NA

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Clause	Requirement + Test	Result - Remark	Verdict
19.10	Not applicable		NA
19.B.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		NA
19.B.102	For appliances having batteries that can be removed without the aid of a tool, short-circuit of the terminals of the battery, the battery being fully charged,		NA
19.B.103	Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		NA
21.B.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength		NA
	Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-31, the number of falls being:		NA
	- 100, if the mass of the part does not exceed 250 g (g) .....:		NA
	- 50, if the mass of the part exceeds 250 g .....:		NA
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		NA
22.3	Appliances having pins for insertion into socket-outlets tested as fully assembled as possible		NA
25.13	An additional lining or bushing not required for interconnection cords in class III appliances or class III constructions operating at safety extra-low voltage not containing live parts		NA
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		NA
	For other parts, 30.2.2 applies		NA
C	ANNEX C (NORMATIVE) AGEING TEST ON MOTORS		NA
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		NA
	Test conditions as specified		NA
D	ANNEX D (NORMATIVE) THERMAL MOTOR PROTECTORS		
	Applicable to appliances having motors that incorporate thermal motor protectors necessary for compliance with the standard		P
	Test conditions as specified		P

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Clause	Requirement + Test	Result - Remark	Verdict
E	ANNEX E (NORMATIVE) NEEDLE-FLAME TEST		NA
	Needle-flame test carried out in accordance with IEC 60695-11-5, with the following modifications:		NA
7	Severities		NA
	The duration of application of the test flame is 30 s ± 1 s		NA
9	Test procedure		NA
9.1	The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1		NA
9.2	The first paragraph does not apply		NA
	If possible, the flame is applied at least 10 mm from a corner		NA
9.3	The test is carried out on one specimen		NA
	If the specimen does not withstand the test, the test may be repeated on two additional specimens, both withstanding the test		NA
11	Evaluation of test results		NA
	The duration of burning not exceeding 30 s		NA
	However, for printed circuit boards, the duration of burning not exceeding 15 s		NA
F	ANNEX F (NORMATIVE) CAPACITORS		NA
	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, with the following modifications:		NA
1.5	Terms and definitions		NA
1.5.3	Class X capacitors tested according to subclass X2		NA
1.5.4	This subclause is applicable		NA
1.6	Marking		NA
	Items a) and b) are applicable		NA
3.4	Approval testing		NA
3.4.3.2	Table 3 is applicable as described		NA
4.1	Visual examination and check of dimensions		NA
	This subclause is applicable		NA
4.2	Electrical tests		NA

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Clause	Requirement + Test	Result - Remark	Verdict
4.2.1	This subclause is applicable		NA
4.2.5	This subclause is applicable		NA
4.2.5.2	Only table 11 is applicable		NA
	Values for test A apply		NA
	However, for capacitors in heating appliances the values for test B or C apply		NA
4.12	Damp heat, steady state		NA
	This subclause is applicable		NA
	Only insulation resistance and voltage proof are checked		NA
4.13	Impulse voltage		NA
	This subclause is applicable		NA
4.14	Endurance		NA
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 are applicable		NA
4.14.7	Only insulation resistance and voltage proof are checked		NA
	No visible damage		NA
4.17	Passive flammability test		NA
	This subclause is applicable		NA
4.18	Active flammability test		NA
	This subclause is applicable		NA
G	ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS		NA
	The following modifications to this standard are applicable for safety isolating transformers:		NA
7	Marking and instructions		NA
7.1	Transformers for specific use marked with:		NA
	-name, trademark or identification mark of the manufacturer or responsible vendor .....:		NA
	-model or type reference .....:		NA
17	Overload protection of transformers and associated circuits		NA
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		NA
22	Construction		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		NA
29	Clearances, creepage distances and solid insulation		NA
29.1, 29.2, 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		NA
	For insulated winding wires complying with subclause 19.12.3 of IEC 61558-1 there are no requirements for clearances or creepage distances		NA
	For windings providing reinforced insulation, the distance specified in item 2c of table 13 of IEC 61558-1 is not assessed		NA
	For safety isolating transformers subjected to periodic voltages with a frequency exceeding 30 kHz, the clearances, creepage distances and solid insulation values specified in IEC 60664-4 are applicable, if greater than the values specified in items 2a, 2c and 3 in table 13 of IEC 61558-1		NA
H	ANNEX H (NORMATIVE) SWITCHES		NA
	Switches comply with the following clauses of IEC 61058-1, as modified below:		NA
	The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		NA
	Before being tested, switches are operated 20 times without load		NA
8	Marking and documentation		NA
	Switches are not required to be marked		NA
	However, a switch that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference		NA
13	Mechanism		NA
	The tests may be carried out on a separate sample		NA
15	Insulation resistance and dielectric strength		NA
15.1	Not applicable		NA
15.2	Not applicable		NA
15.3	Applicable for full disconnection and micro-disconnection		NA
17	Endurance		NA
	Compliance is checked on three separate appliances or switches		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	For 17.2.4.4, the number of cycles declared according to 7.1.4 is 10 000, unless		NA
	otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335 .....:		NA
	Switches for operation under no load and which can be operated only by a tool, and		NA
	switches operated by hand that are interlocked so that they cannot be operated under load,		NA
	are not subjected to the tests		NA
	However, switches without this interlock are subjected to the test of 17.2.4.4 for 100 cycles of operation		NA
	Subclauses 17.2.2 and 17.2.5.2 not applicable		NA
	The ambient temperature during the test is that occurring in the appliance during the test of Clause 11 in IEC 60335-1		NA
	The temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1 (K) .....:		NA
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		NA
	This clause is applicable to clearances and creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in table 24		NA
I	ANNEX I (NORMATIVE) MOTORS HAVING BASIC INSULATION THAT IS INADEQUATE FOR THE RATED VOLTAGE OF THE APPLIANCE		NA
	The following modifications to this standard are applicable for motors having basic insulation that is inadequate for the rated voltage of the appliance:		NA
8	Protection against access to live parts		NA
8.1	Metal parts of the motor are considered to be bare live parts		NA
11	Heating		NA
11.3	The temperature rise of the body of the motor is determined instead of the temperature rise of the windings		NA
11.8	The temperature rise of the body of the motor, where in contact with insulating material, not exceeding values in table 3 for the relevant insulating material		NA

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Clause	Requirement + Test	Result - Remark	Verdict
16	Leakage current and electric strength		NA
16.3	Insulation between live parts of the motor and its other metal parts is not subjected to the test		NA
19	Abnormal operation		NA
19.1	The tests of 19.7 to 19.9 are not carried out		NA
19.I.101	*The appliance is supplied at rated voltage and operated under normal operation with each of the fault conditions specified*		NA
	- short circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit		NA
	- short circuit of each diode of the rectifier		NA
	- open circuit of the supply to the motor		NA
	- open circuit of any parallel resistor, the motor being in operation		NA
	Only one fault simulated at a time, the tests carried out consecutively		NA
	The duration of the test is as specified in 19.7		NA
22	Construction		NA
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 double or reinforced insulation		NA
	Compliance checked by the tests specified for double and reinforced insulation		NA
J	ANNEX J (NORMATIVE) COATED PRINTED CIRCUIT BOARDS		NA
	Testing of protective coatings of printed circuit boards carried out in accordance with IEC 60664-3 with the following modifications:		NA
5.7	Conditioning of the test specimens		NA
	When production samples are used, three samples of the printed circuit board are tested		NA
5.7.1	Cold		NA
	The test is carried out at -25 °C		NA
5.7.3	Rapid change of temperature		NA
	Severity 1 is specified		NA
5.9	Additional tests		NA
	This subclause is not applicable		NA

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Clause	Requirement + Test	Result - Remark	Verdict
K	ANNEX K (NORMATIVE) OVERVOLTAGE CATEGORIES		P
	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		NA
	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		NA
	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		NA
	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		NA
L	ANNEX L (INFORMATIVE) GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES		NA
	Information for the determination of clearances and creepage distances		NA
M	ANNEX M (NORMATIVE) POLLUTION DEGREE		P
	The information on pollution degrees is extracted from IEC 60664-1		P
	Pollution		
	The microenvironment determines the effect of pollution on the insulation, taking into account the macroenvironment		P
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar		NA
	Minimum clearances specified where pollution may be present in the microenvironment		P
	Degrees of pollution in the microenvironment		

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Clause	Requirement + Test	Result - Remark	Verdict
	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		NA
	- 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		NA
	- pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow		NA
N	ANNEX N (NORMATIVE) PROOF TRACKING TEST		NA
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		NA
7	Test apparatus		NA
7.3	Test solutions		NA
	Test solution A is used		NA
10	Determination of proof tracking index (PTI)		NA
10.1	Procedure		NA
	The proof voltage is 100V, 175V, 400V or 600V...:		NA
	The test is carried out on five specimens		NA
	In case of doubt, additional test with proof voltage reduced by 25V, the number of drops increased to 100		NA
10.2	Report		NA
	The report states if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V		NA
O	ANNEX O (INFORMATIVE) SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30		P
	Description of tests for determination of resistance to heat and fire		P

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Clause	Requirement + Test	Result - Remark	Verdict
P	ANNEX P (INFORMATIVE) GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN WARM DAMP EQUABLE CLIMATES		NA
	Modifications applicable for class 0 and 01 appliances having a rated voltage exceeding 150V, intended to be used in countries having a warm damp equable climate and that are marked WDaE		NA
	Modifications may also be applied to class 1 appliances having a rated voltage exceeding 150V, intended to be used in countries having a warm damp equable climate and that are marked WdaE, if liable to be connected to a supply mains that excludes the protective earthing conductor		NA
5.7	The ambient temperature for the tests of clauses 11 and 13 is 40 +3/0 °C		NA
7.1	The appliance marked with the letters WDaE		NA
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		NA
	The instructions state that the appliance is considered to be suitable for use in countries having a warm damp equable climate, but may also be used in other countries		NA
11.8	The values of Table 3 are reduced by 15 K		NA
13.2	The leakage current for class I appliances not exceeding 0,5 mA		NA
15.3	The value of t is 37 °C		NA
16.2	The leakage current for class I appliances not exceeding 0,5 mA (mA):		NA
19.13	The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3		NA
Q	ANNEX Q (INFORMATIVE) SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS		NA
	Description of tests for appliances incorporating electronic circuits		NA
R	ANNEX R (NORMATIVE) SOFTWARE EVALUATION		NA
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 validated in accordance with the requirements of this annex		NA
R.1	Programmable electronic circuits using software		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 constructed so that the software does not impair compliance with the requirements of this standard		NA
R.2	Requirements for the architecture		NA
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 use measures to control and avoid software-related faults/errors in safety-related data and safety-related segments of the software		NA
R.2.1.1	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.2 have one of the following structures:		NA
	- single channel with periodic self-test and monitoring		NA
	- dual channel (homogenous) with comparison		NA
	- dual channel (diverse) with comparison		NA
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 have one of the following structures:		NA
	- single channel with functional test		NA
	- single channel with periodic self-test		NA
	- dual channel without comparison		NA
R.2.2	Measures to control faults/errors		NA
R.2.2.1	When redundant memory with comparison is provided on two areas of the same component, the data in one area is stored in a different format from that in the other area		NA
R.2.2.2	Programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.2 and that use dual channel structures with comparison, have additional fault/error detection means for any fault/errors not detected by the comparison		NA
R.2.2.3	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, means are provided for the recognition and control of errors in transmissions to external safety-related data paths		NA

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Clause	Requirement + Test	Result - Remark	Verdict
R.2.2.4	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, the programmable electronic circuits incorporate measures to address the fault/errors in safety-related segments and data indicated in table R.1 and R.2 as appropriate		NA
R.2.2.5	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, detection of a fault/error occur before compliance with clause 19 is impaired		NA
R.2.2.6	The software is referenced to relevant parts of the operating sequence and the associated hardware functions		NA
R.2.2.7	Labels used for memory locations are unique		NA
R.2.2.8	The software is protected from user alteration of safety-related segments and data		NA
R.2.2.9	Software and safety-related hardware under its control is initialized and terminates before compliance with clause 19 is impaired		NA
R.3	Measures to avoid errors		NA
R.3.1	General		NA
	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, the following measures to avoid systematic fault in the software are applied		NA
	Software that incorporates measures used to control the fault/error conditions specified in table R.2 is inherently acceptable for software required to control the fault/error conditions specified in table R.1		NA
R.3.2	Specification		NA
R.3.2.1	Software safety requirements:	Software Id:	NA
	The specification of the software safety requirements includes the descriptions listed		NA
R.3.2.2	Software architecture		NA

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Clause	Requirement + Test	Result - Remark	Verdict
R.3.2.2.1	The specification of the software architecture includes the aspects listed - techniques and measures to control software faults/errors (refer to R.2.2); - interactions between hardware and software; - partitioning into modules and their allocation to the specified safety functions; - hierarchy and call structure of the modules (control flow); - interrupt handling; - data flow and restrictions on data access; - architecture and storage of data; - time-based dependencies of sequences and data	Document ref. No:	NA
R.3.2.2.2	The architecture specification is validated against the specification of the software safety requirements by static analysis		NA
R.3.2.3	Module design and coding		NA
R.3.2.3.1	Based on the architecture design, software is suitably refined into modules		NA
	Software module design and coding is implemented in a way that is traceable to the software architecture and requirements		NA
R.3.2.3.2	Software code is structured		NA
R.3.2.3.3	Coded software is validated against the module specification by static analysis		NA
	The module specification is validated against the architecture specification by static analysis		NA
R.3.3.3	Software validation		NA
	The software is validated with reference to the requirements of the software safety requirements specification		NA
	Compliance is checked by simulation of:		NA
	- input signals present during normal operation		NA
	- anticipated occurrences		NA
	- undesired conditions requiring system action		NA
ZAA	ANNEX ZAA (NORMATIVE) Stability and mechanical hazards for drives for windows		NA

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Clause	Requirement + Test	Result - Remark	Verdict
ZBB	ANNEX ZBB (NORMATIVE) Stability and mechanical hazards for drives for power operated pedestrian doors		NA
ZCC	ANNEX ZCC (NORMATIVE) Stability and mechanical hazards for drives for horizontally and vertically gates, doors and garage doors		P
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury	See below	NA
	Protective enclosures, guards and similar parts are non-detachable, and		NA
	have adequate mechanical strength		P
	Enclosures that can be opened by overriding an interlock are considered to be detachable parts		NA
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard by unexpected closure		P
	Not possible to touch dangerous moving parts with the test probe described	See below	NA
	Moving parts of drives intended to be installed at a height of at least 2,5 m above the ground are considered to be positioned so that adequate protection is provided		P
	Chains moving at less than 0,2 m/s are not considered to be dangerous moving parts	No chains	NA
	Moving parts of **drives** intended to be installed at a height of at least 2,5 m above the ground or other access level are considered to be positioned so to provide adequate protection against personal injury in normal use.		P
20.ZCC.1	**Drives** shall prevent vertically moving doors, garage doors or gates from closing unexpectedly.	Model with brake. The model without brake the instruction indicate to use a safety device	P

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Clause	Requirement + Test	Result - Remark	Verdict
20.ZCC.3	A manual release or **reversible drive** shall be easy to operate.	Manual release	P
	Operation of the release shall not give rise to a hazard such as kickback or unexpected operation of the **drive**.		P
	The **drive** shall not create any hazard when the manual release is activated		P
	Operation of a **reversible drive** used as a means for a manual release shall not give rise to a hazard	Operate with 196 N	P
20.ZCC.4	A mechanical fault in the **drive** shall not result in a hazardous operation	The appliance is provided with 2 screws for fixing the tube of shutter 1 screw for fixing the shutter. In case of loosening of this screw, the shutter doesn't drop because is supported by the screw. The periodic check as indicate in the instruction is used to verified this screw.	P
20.ZCC.5	**Drives** controlled by a **biased-off switch** shall stop when the actuating member of the actuator is released.	The appliance is not provided with control and switch	P
20.ZCC.6	During the movement of the **drive** in either direction, the actuation of a manual control shall stop the movement if there is no separate button for the stop function.		NA
	If the **drive** has a single button for controlling the movement, further actuation shall reverse the direction of movement		NA
	If the **drive** has three buttons for controlling the movement, one button shall be a stop button.		NA
	These requirements do not apply to controls affecting automatic **modes of operation**		NA
	Any button that has a stop function shall not require a key to stop the **drive**		NA
20.ZCC.7	**Drives** shall not restart automatically after the movement has stopped unintentionally	As above	NA
20.ZCC.8	**Drives** not controlled by a **biased off switch** shall incorporate an **entrapment protection system** that reduces the risk of injury when the door, garage door or gate moves	Appliance controlled by a biased-off	NA
20.ZCC.9	**Entrapment protection systems** shall provide an adequate level of protection in the event of a failure within the system installation wiring.		NA

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Clause	Requirement + Test	Result - Remark	Verdict

TABLE R.1 [e] – GENERAL FAULT/ERROR CONDITIONS

Component [a]	Fault/error	Acceptable measures [b, c]	Definitions	Document reference for applied measure	Document reference for applied test	Ver-dict
1 CPU 1.1 Registers	Stuck at	Functional test, or periodic self-test using either: - static memory test, or - word protection with single bit redundancy	H.2.16.5 H.2.16.6 H.2.19.6 H.2.19.8.2			
1.2 VOID						
1.3 Programme counter	Stuck at	Functional test, or Periodic self-test, or Independent time-slot monitoring, or Logical monitoring of the programme sequence	H.2.16.5 H.2.16.6 H.2.18.10.4 H.2.18.10.2			
2 Interrupt handling and execution	No interrupt or too frequent interrupt	Functional test, or time-slot monitoring	H.2.16.5 H.2.18.10.4			
3 Clock	Wrong frequency (for quartz synchronized clock: harmonics/ sub-harmonics only)	Frequency monitoring, or time slot monitoring	H.2.18.10.1 H.2.18.10.4			
4. Memory 4.1 Invariable memory	All single bit faults	Periodic modified checksum, or multiple checksum, or word protection with single bit redundancy	H.2.19.3.1 H.2.19.3.2 H.2.19.8.2			

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Clause	Requirement + Test	Result - Remark	Verdict

4.2 Variable memory	DC fault	Periodic static memory test, or word protection with single bit redundancy	H.2.19.6 H.2.19.8.2			
4.3 Addressing (relevant to variable and invariable memory)	Stuck at	Word protection with single bit redundancy including the address	H.2.19.8.2			
5 Internal data path	Stuck at	Word protection with single bit redundancy	H.2.19.8.2			
5.1 VOID						
5.2 Addressing	Wrong address	Word protection with single bit redundancy including the address	H.2.19.8.2			
6 External communication	Hamming distance 3	Word protection with multi-bit redundancy, or CRC – single work, or Transfer redundancy, or Protocol test	H.2.19.8.1 H.2.19.4.1 H.2.18.2.2 H.2.18.14			
6.1 VOID						
6.2 VOID						
6.3 Timing	Wrong point in time	Time-slot monitoring, or scheduled transmission Time-slot and logical monitoring, or comparison of redundant communication channels by either: - reciprocal comparison - independent hardware comparator	H.2.18.10.4 H.2.18.18 H.2.18.10.3 H.2.18.15 H.2.18.3			
	Wrong sequence	Logical monitoring, or time-slot monitoring, or Scheduled transmission	H.2.18.10.2 H.2.18.10.4 H.2.18.18			

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Clause	Requirement + Test	Result - Remark	Verdict

7 Input/output periphery	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13			
7.1 VOID						
7.2 Analog I/O 7.2.1 A/D and D/A-converter	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13			
7.2.2 Analog multiplexer	Wrong addressing	Plausibility check	H.2.18.13			
8 VOID						
9 Custom chips [d] e.g. ASIC, GAL, gate array	Any output outside the static and dynamic functional specification	Periodic self-test	H.2.16.6			
NOTE A Stuck-at fault model denotes a fault model representing an open circuit or a non-varying signal level. A DC fault model denotes a stuck-at fault model incorporating short circuit between signal lines.						
[a] For fault/error assessment, some components are divided into their sub-functions. [b] For each sub-function in the table, the Table R.2 measure will cover the software fault/error. [c] Where more than one measure is given for a sub-function, these are alternatives. [d] To be divided as necessary by the manufacturer into sub-functions. [e] Table R.1 is applied according to the requirements of R.1 to R.2.2.9 inclusive.						

ZA	**ANNEX ZA** (NORMATIVE) **SPECIAL NATIONAL CONDITIONS**		
	Norway		
19.5	The test is also applicable to appliances intended to be permanently connected to fixed wiring		N/A
	Norway		
22.2	The second paragraph of this subclause, dealing with single-phase, permanently connected class I appliances having heating elements, is not applicable due to the supply system		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	All CENELEC countries		
25.6 and 25.25	Information concerning National plug and socket-outlets is available from the CENELEC website. Normative national requirements concerning plug and socket-outlets are shown in the relevant National standard		P
	Ireland and United Kingdom		
25.8	In the table, the lines for 10 A and 16 A are replaced by:		
	> 10 and ≤ 13 1,25		NA
	> 13 and ≤ 16 1,5		NA
ZB	**ANNEX ZB** (INFORMATIVE) **A-DEVIATIONS**		
	Ireland		
25.6	These regulations apply to all plugs for domestic use at a voltage of 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		NA
	United Kingdom		
25.6	These regulations apply to all plugs for domestic use at a voltage of 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 and EN 50075 to be fitted to shavers and toothbrushes		NA
ZC	**ANNEX ZC** (NORMATIVE) **NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS**		
	A list of referenced documents in this standard		P
ZD	**ANNEX ZD** (INFORMATIVE) **IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	A table with IEC and CENELEC code designations for flexible cords		
ZE	**ANNEX ZE** (INFORMATIVE) **SPECIFIC ADDITIONAL REQUIREMENTS FOR APPLIANCES AND MACHINES INTENDED FOR COMMERCIAL USE**		
	The relevant requirements of Annex ZE of Part 1 have been incorporated in the text of this Part 2.		P
ZF	**ANNEX ZF** (INFORMATIVE) **CRITERIA APPLIED FOR THE ALLOCATION OF PRODUCTS COVERED BY STANDARDS IN THE EN 60335 SERIES UNDER LVD OR MD**		
	List of standards under CENELEC/TC61 with the allocation under the LVD (Low Voltage Directive) or the MD (Machinery Directive).....:	This standard required the MD	P
ZG	**ANNEX ZG** (NORMATIVE) **UV APPLIANCES**		
	The following modifications to this standard apply to appliances having UV emitters		NA
	This annex is not applicable to appliances covered by the scopes of IEC 60335-2-27, IEC 60335-2-59 or IEC 60335-2-109		NA
7.12.ZG	The instructions for appliances incorporating UVC emitters include the substance of the following: WARNING — This appliance contains a UV emitter. Do not stare at the light source		NA
32	For appliances incorporating UV emitters the manufacturer delivers a declaration providing evidence that the plastic material exposed to the radiation is UV resistant		NA
ZZ	**ANNEX ZZ** (INFORMATIVE) **COVERAGE OF ESSENTIAL REQUIREMENTS OF EC DIRECTIVES**		
	Description of the relation between this European standard and the LVD (Low Voltage Directive, 2006/95/EC) and the MD (Machinery Directive, 2006/42/EC)		P

A1: 2017		
DD	**Drives for horizontally and vertically moving doors and gates**	
20	**Stability and mechanical hazards**	

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Clause	Requirement + Test	Result - Remark	Verdict
DD.20.107.2	**if the drive is an automatic drive, or a drive that operates the driven part in at least one direction by a command that can be initiated via a connection to a telecommunication or communication network, the test of DD.20.107.2.3 is applied**	**Not applied for EU deviation**	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

Annex EN 62233:2008			
Clause	Requirement + Test	Result - Remark	Verdict
EMF- ELECTROMAGNETICS FIELDS			
	The tested product also complies with the requirements of EN 62233:2008		
	Limit ……100%	Measured max. 2.66 % (50 Hz models)	P
	Limit ……100%	Measured max. 7.46 % (60 Hz models)	P
	Distance 10 cm		

10.1	**TABLE: Power input deviation**				P
Input deviation of/at:	**P rated (W)**	**P measured (W)**	**Δ P**	**Required Δ P**	**Remark**
Unititan HR	630	606.9	/	+15%	2.75
Unititan E HR	630	582.6	/	+15%	2.63
Unititan CL	630	631	+0.16%	+15%	2.82
Unititan E CL	630	593.3	/	+15%	2.66 A
Unititan Super HT	800	797.3	/	+15%	3.62 A
Unititan Super E HT	800	735.8	/	+15%	3.34 A
Unititan E HS	690	467	/	+15%	2.3 A
Unititan E HR SRT	610	611	+0.16%	+15%	2.75 A
Unititan HR SRT	610	595	/	+15%	2.58 A
Unititan E HR @ 60 Hz	630	700	+11.11%	+15%	3.3 A
Eurotitan E HR	460	455.5	/	+15%	2.00 A
Titan 200/101-E	665	682	2.56%	+15%	3.03 A
Titan 240/76 E @ 60 Hz	630	724	+14.92%	+15%	3.3 A
Titan 240/76 E HS	690	463	/	+15%	2.3 A

Supplementary information:

When missing the frequency, it's 50 Hz

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Clause	Requirement + Test	Result - Remark	Verdict

10.2	TABLE: Current deviation					NA
Current deviation of/at:	**I rated (A)**	**I measured (A)**	**Δ I**	**Required Δ I**	**Remark**	
Supplementary information:						

11.8	TABLE: Heating test		P
	Test voltage (V).....:	243.8; 50/60 Hz	—
	Ambient (°C).....:	25	—

Thermocouple locations	**Max. temperature rise measured, Δ T (K)**	**Max. temperature rise limit, Δ T (K)**
Capacitor ambient (T85)	2	60
Micro switch (T125)	1	100
Terminal block (power cord) T110	0.8	85
Enclosure black parts	2	Clause 30
Enclosure orange parts	2	Clause 30
Supplementary information:		

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Clause	Requirement + Test	Result - Remark	Verdict

11.8	**TABLE: Heating test, resistance method**		P
	Test voltage (V).....:	243.8 V; 50 Hz	—
	Ambient, t1 (°C) .....:	23.8	—
	Ambient, t2 (°C) .....:	23.8	—

Temperature rise of winding	**R1 (Ω)**	**R2 (Ω)**	**Δ T (K)**	**Max. Δ T (K)**	**Insulation class**
Unitian E HT winding 1	32.21	45.63	107.6	115	F
Unititan E HT winding 2	31.70	45.30	110.8	115	F
Unitian super HT winding 1	23.96	34.12	109.5	115	F
Unitian super HT winding 2	23.95	34.15	110.0	115	F
Unititan E CL winding 1	31.55	44.98	110.0	115	F
Unititan E CL	31.88	45.48	110.2	115	F
Unititan E HS winding 1	15.7(ta20.7)	19.2(ta20.7)	56.9	115	F
Unititan E HS winding 2	15.4(ta20.7)	19.7(ta20.7)	71.3	115	F
Titan 240/76 E HS winding 1	15.0(ta21.7)	18.6(ta21.7)	60.9	115	F
Titan 240/76 E HS winding 2	15.2(ta21.7)	19.3(ta21.7)	68.4	115	F
Brake	1.516	1.654	23.5	115	F

Supplementary information:

30 sec up, 30 sec down, 1 h pause, 2 cycle

11.8	**TABLE: Heating test, resistance method**		P
	Test voltage (V):	243.8 V; 50 Hz	—
	Ambient, t1 (°C):	21	—
	Ambient, t2 (°C):	21	—

Temperature rise of winding	**R1 (Ω)**	**R2 (Ω)**	**Δ T (K)**	**Max. Δ T (K)**	**Insulation class**
Eurotitan E HR	53.1	73.9	100.1	115	F
Eurotitan E HR	53.0	75.2	107.0	115	F
Ambient, t1 (°C):			22.8		—
Ambient, t2 (°C):			22.8		—
Titan 240/101 E	37.4	50.8	92.2	115	F
	37.2	50.7	93.4	115	F

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

30 sec up, 30 sec down, 1 h pause, 2 cycle

11.8	**TABLE: Heating test, resistance method**					P
	Test voltage (V):			243.8 V; 50 Hz		—
	Ambient, t1 (°C):			23.8		—
	Ambient, t2 (°C):			23.8		—
Unititan HR SRT winding 1	36.40	52.1	111.6	115	F	
Unititan HR SRT winding 2	36.30	51.97	111.5	115	F	

11.8	**TABLE: Heating test, resistance method**					P
	Test voltage (V):			243.8 V; 60 Hz		—
	Ambient, t1 (°C):			25		—
	Ambient, t2 (°C):			25		—
Titan 240/76 E winding 1	20.3	28.8	99.7	115	F	
Titan 240/76 E winding 2	20.2	28.1	110.5	115	F	

13.2	**TABLE: Leakage current**		P
	Heating appliances: 1.15 x rated input (W) ..:		—
	Motor-operated and combined appliances: 1.06 x rated voltage (V).....:	243.8	—
Leakage current between		**I (mA)**	**Max. allowed I (mA)**
LN and metallic parts earthed (50 Hz)		0.098	3.5
LN and metallic parts earthed (60 Hz)		0.135	3.5
LN and insulation parts		≤0.001	0.35
Supplementary information:			

13.3	**TABLE: Dielectric strength**	P
Test voltage applied between:	**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
LN and metallic parts	1000	No
LN and enclosure	3000	No

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

14	**TABLE: Transient overvoltages**					NA
Clearance between:		**Cl (mm)**	**Required Cl (mm)**	**Rated impulse voltage (V)**	**Impulse test voltage (V)**	**Flashover (Yes/No)**
Supplementary information:						

16.2	**TABLE: Leakage current**		P
	Single phase appliances: 1.06 x rated voltage (V) .....:	243.8	—
	Three phase appliances 1.06 x rated voltage divided by √3 (V).....:		—

Leakage current between	**I (mA)**	**Max. allowed I (mA)**
LN and metallic parts earthed (50 Hz)	0.098	3.5
LN and metallic parts earthed (60 Hz)	0.135	3.5
LN and insulation parts	≤0.001	0.35
Supplementary information:		

16.3	**TABLE: Dielectric strength**	
Test voltage applied between:	**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
LN and metallic parts	1250	No
LN and enclosure	3000	No
Supplementary information:		

17	**TABLE: Overload protection**		NA
Thermocouple locations		**Max. temperature rise measured, Δ T (K)**	**Max. temperature rise limit, Δ T (K)**

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

17	**TABLE: Overload protection, resistance method**		NA
	Test voltage (V).....:		—
	Ambient, t1 (°C) .....:		—
	Ambient, t2 (°C) .....:		—

Temperature of winding	**R1 (Ω)**	**R2 (Ω)**	**Δ T (K)**	**T (°C)**	**Max. T (°C)**

Supplementary information:

19	**Abnormal operation conditions**	**P**

Operational characteristics	**YES/NO**	**Operational conditions**
Are there electronic circuits to control the appliance operation?	no	
Are there "off" or "stand-by" position?	no	
The unintended operation of the appliance results in dangerous malfunction?	no	

Sub-clause	**Operating conditions description**	**Test results description**	**PEC description**	**EMP 19.11.4**	**Software type required**	**19.11.3 PEC**	**Final result**
19.2				N.A			
19.3				NA			
19.4				NA			
19.5				NA			
19.6				N.A			
19.7				P			
19.8				NA			
19.9				NA			
19.10				NA			
19.11.2				P			

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Clause	Requirement + Test	Result - Remark	Verdict

19.11.4.8				NA			
19.10X				NA			

Supplementary information:	
19.11.2	
Short circuit of ~ and + of bridge diode	**The brake operate in ac current, then for 50% of duty cycle operate for other 50 % doesn't operate. Motor operate with not correctly because supply with a semi wave ac current and the brake operate for 50 % of duty cycle. The motor operate very slowly because braked. After 10 min operate thermal protection of motor**
Short circuit of ~ and - of bridge diode	**As above**
Short circuit of + and - of bridge diode	**Motor operate normally; brake doesn't operate**
Short circuit of ~ and ~ of bridge diode	**The motor operate normally**
Open circuit of + bridge diode	**Motor and brake doesn't operate**
Open circuit of - of bridge diode	**Motor and brake doesn't operate**

19.7	**TABLE: Abnormal operation, locked rotor/moving parts**		P
	Test voltage (V).....:	230 V 50 Hz	—
	Ambient, t1 (°C) .....:	23.1	—
	Ambient, t2 (°C) .....:	23.1	—

Temperature of winding	**R1 (Ω)**	**R2 (Ω)**	**T (K)**	**T (°C)**	**Max. T (°C)**
Unititan E CL winding	63.43(A)	103.4(A)	162.3	185.4	240
Unitian E HT winding	63.91(A)	104.2(A)	162.4	185.5	240
Unitian super HT winding	47.65(A)	78(A)	163.4	183.1	240
Unitian HR SRT winding	72.7(A)	124.1(A)	182.1	206.0	240
Unititan E HS winding	30.3(A)(B)	47.8(A)	147.0	167.1.0	240

Supplementary information:

a) sum of winding 1 and winding 2

b) temperature ambient 20.1°C

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Clause	Requirement + Test	Result - Remark	Verdict

19.7	**TABLE: Abnormal operation, locked rotor/moving parts**		P
	Test voltage (V).....:	230 V 50 Hz	—
	Ambient, t1 (°C) .....:	25	—
	Ambient, t2 (°C) .....:	25	—

Temperature of winding	**R1 (Ω)**	**R2 (Ω)**	**Δ T (K)**	**T (°C)**	**Max. T (°C)**
Eurotitan	105.5[A]	173[A]	155.1	180.9	240

Supplementary information:

a)sum of winding 1 and winding 2

19.7	**TABLE: Abnormal operation, locked rotor/moving parts**		P
	Test voltage (V).....:	230 V 60Hz	—
	Ambient, t1 (°C) .....:	25	—
	Ambient, t2 (°C) .....:	25	—

Temperature of winding	**R1 (Ω)**	**R2 (Ω)**	**Δ T (K)**	**T (°C)**	**Max. T (°C)**
Titan 240/76 E	40.5[A]	173[A]	164.6	188.2	240

Supplementary information:

a)sum of winding 1 and winding 2

19.9	**TABLE: Abnormal operation, running overload**		NA
	Test voltage (V).....:		—
	Ambient, t1 (°C) .....:		—
	Ambient, t2 (°C) .....:		—

Temperature of winding	**R1 (Ω)**	**R2 (Ω)**	**Δ T (K)**	**T (°C)**	**Max. T (°C)**

Supplementary information:

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Clause	Requirement + Test	Result - Remark	Verdict

19.13	**TABLE: Abnormal operation, temperature rises**		P
Thermocouple locations		**Max. temperature rise measured, Δ T (K)**	**Max. temperature rise limit, Δ T (K)**
Power cord		3	150
Supplementary information:			

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Clause	Requirement + Test	Result - Remark	Verdict

21.1	TABLE: Impact resistance			P
Impacts per surface	**Surface tested**	**Impact energy (Nm)**	**Comments**	
3	Enclosure orange (1)	0.5	/	
3	Enclosure orange	0.5	/	
3	Enclosure black	0.5	/	

Supplementary information:

1)removable parts

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Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1])**
Power cord	Various	H05VV-F	4x0.75mm	60227 IEC 53	HAR
Terminal block	BM	BM9200	2.5mm; 400 V	EN 60335-1; EN 60695-2-11	Enec 02
Micro switch	Omron	D3VJ-16222-2C5	16(4) A; 250 Vac; T125; 5E4	IEC 61058	Enec 15
Capacitor	Various	/	P0; 25/85/21; 450 V; 50/60 Hz; 25 µF; P0	EN 60252-1	VDE
Capacitor	Various	/	P0; 25/85/21; 400 V; 50/60 Hz; 20 µF; P0	EN 60252-1	VDE
Capacitor	Various	/	P0; 25/85/21; 400 V; 50/60 Hz; 20 µF; P0	EN 60252-1	VDE
Motor (type A)	El-mi srl	F-16M	230 V; 50 Hz, 100 mm	EN 60335-2-103	Tested in appliance
Motor (type B)	El-mi srl	F-19M	230 V; 50 Hz, 120 mm	EN 60335-2-103	Tested in appliance
Motor (type C)	El-mi srl	F-17M	230 V; 50 Hz, 70 mm	EN 60335-2-103	Tested in appliance
Motor (type D)	El-mi srl	F-130M	230 V; 50 Hz, 110 mm	EN 60335-2-103	Tested in appliance
Motor (type E)	El-mi srl	F-80M	230 V; 50 Hz, 80 mm	EN 60335-2-103	Tested in appliance
Motor (type F)	El-mi srl	F-18M	230 V; 60 Hz, 100 mm	EN 60335-2-103	Tested in appliance
Motor (type G)	El-mi srl	F-18M	230 V; 60 Hz, 100 mm	EN 60335-2-103	Tested in appliance
Diode bridge	Various	/	Up to 1000V; 15 A; -55 +150°C; peak forward 300 A	EN 60335-2-103	Tested in appliance
Brake	ACM	P-50	230 V ; 50 Hz	EN 60335-2-103	Tested in appliance

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

[1]) Provided evidence ensures the agreed level of compliance. See OD-CB2039.

28.1	TABLE: Threaded part torque test		NA
Threaded part identification	**Diameter of thread (mm)**	**Column number (I, II, or III)**	**Applied torque (Nm)**
Supplementary information:			

29.1	TABLE: Clearances		P
	Overvoltage category .... :		—

		Type of insulation:				
Rated impulse voltage (V):	**Min. cl (mm)**	**Basic (mm)**	**Supplementary (mm)**	**Reinforced (mm)**	**Functional (mm)**	**Verdict / Remark**
330	0,2* / 0,5 / 0,8**					
500	0,2* / 0,5 / 0,8**					
800	0,2* / 0,5 / 0,8**					
1 500	0,5 / 0,8** / 1,0***					
2 500	1,5 / 2,0***	>3	>4	>4	>4	
4 000	3,0 / 3,5***					
6 000	5,5 / 6,0***					
8 000	8,0 / 8,5***					
10 000	11,0 / 11,5***					

Supplementary information:

***) For tracks on printed circuit boards if pollution degree 1 and 2**
****) For pollution degree 3**
*****) If the construction is affected by wear, distortion, movement of the parts or during assembly**

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation	P
Working voltage (V)	**Creepage distance (mm) Pollution degree**	

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Clause	Requirement + Test	Result - Remark	Verdict

	1	2			3			Type of insulation			
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb*	B**	S**	R**	Verdict
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9		—	—	
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9	—		—	
≤50	0,36	1,2	1,7	2,4	3,0	3,4	3,8	—	—		
125	0,28	0,75	1,05	1,5	1,9	2,1	2,4		—	—	
125	0,28	0,75	1,05	1,5	1,9	2,1	2,4	—		—	
125	0,56	1,5	2,1	3,0	3,8	4,2	4,8	—	—		
250	0,56	1,25	1,8	**2,5**	3,2	3,6	4,0	P	—	—	P
250	0,56	1,25	1,8	**2,5**	3,2	3,6	4,0	—	P	—	P
250	1,12	2,5	3,6	**5,0**	6,4	7,2	8,0	—	—	P	P
400	1,0	2,0	2,8	4,0	5,0	5,6	6,3		—	—	
400	1,0	2,0	2,8	4,0	5,0	5,6	6,3	—		—	
400	2,0	4,0	5,6	8,0	10,0	11,2	12,6	—	—		
500	1,3	2,5	3,6	5,0	6,3	7,1	8,0		—	—	
500	1,3	2,5	3,6	5,0	6,3	7,1	8,0	—		—	
500	2,6	5,0	7,2	10,0	12,6	14,2	16,0	—	—		
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0		—	—	
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	—		—	
>630 and ≤800	3,6	6,4	9,0	12,6	16,0	18,0	20,0	—	—		
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5		—	—	
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	—		—	
>800 and ≤1000	4,8	8,0	11,2	16,0	20,0	22,0	25,0	—	—		
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0		—	—	
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	—		—	
>1000 and ≤1250	6,4	10,0	14,2	20,0	25,0	28,0	32,0	—	—		
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0		—	—	
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	—		—	
>1250 and ≤1600	8,4	12,6	18,0	25,0	32,0	36,0	40,0	—	—		
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0		—	—	

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Clause	Requirement + Test	Result - Remark	Verdict

>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	—		—	
>1600 and ≤2000	11,2	16,0	22,0	32,0	40,0	44,0	50,0	—	—		
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0		—	—	
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	—		—	
>2000 and ≤2500	15,0	20,0	28,0	40,0	50,0	56,0	64,0	—	—		
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0		—	—	
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	—		—	
>2500 and ≤3200	20,0	25,0	36,0	50,0	64,0	72,0	80,0	—	—		
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0		—	—	
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	—		—	
>3200 and ≤4000	25,0	32,0	44,0	64,0	80,0	90,0	100,0	—	—		
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0		—	—	
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	—		—	
>4000 and ≤5000	32,0	40,0	56,0	80,0	100,0	112,0	126,0	—	—		
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0		—	—	
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	—		—	
>5000 and ≤6300	40,0	50,0	72,0	100,0	126,0	142,0	160,0	—	—		
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0		—	—	
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	—		—	
>6300 and ≤8000	50,0	64,0	90,0	126,0	160,0	180,0	200,0	—	—		
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0		—	—	
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	—		—	
>8000 and ≤10000	64,0	80,0	112,0	160,0	200,0	220,0	250,0	—	—		
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0		—	—	
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	—		—	
>10000 and ≤12500	80,0	100,0	142,0	200,0	250,0	280,0	320,0	—	—		

Supplementary information:

***) Material group IIIb is allowed if the working voltage does not exceed 50 V**
****) B = Basic insulation, S = Supplementary insulation, R = Reinforced insulation**

29.2	**TABLE: Creepage distances, functional insulation**	P

IEC/EN 60335-2-103

Clause	Requirement + Test	Result - Remark	Verdict

Working voltage (V)	**Creepage distance (mm) Pollution degree**							
	1	**2**			**3**			
		Material group			**Material group**			
		I	**II**	**IIIa/IIIb**	**I**	**II**	**IIIa/IIIb***	**Verdict / Remark**
≤10	0,08	0,4	0,4	0,4	1,0	1,0	1,0	
50	0,16	0,56	0,8	1,1	1,4	1,6	1,8	
125	0,25	0,71	1,0	1,4	1,8	2,0	2,2	
250	0,42	1,0	1,4	**2,0**	2,5	2,8	3,2	P
400	0,75	1,6	2,2	3,2	4,0	4,5	5,0	
500	1,0	2,0	2,8	4,0	5,0	5,6	6,3	
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	

Supplementary information:

***) Material group IIIb is allowed if the working voltage does not exceed 50 V**

30	**TABLE: Resistance to heat and fire**																			
Object/ part No.	**Manufacturer/ trademark**	**Type/ model**	**Ball pressure test °C**				**Glow wire test (GWT) °C**						**Glow-wire flammability index (GWFI) °C**				**Glow- wire ignition temp. (GWIT) °C**		**Needle-flame test (NFT)**	**Verdict**
			75	**125**	**cl. 11 +40**	**cl. 19 +25**	**550**	**650**		**750**		**850**	**550**	**650**	**750**	**850**	**675**	**775**		
								te	**ti**	**te**	**ti**									
Enclosure	ACM	orange	Ok										Ok							
Enclosure	ACM	black	Ok												Ok[a]					
Connector	ACM	whyte		Ok											Ok					
Enclosure	ACM	red	ok										ok							

Supplementary information:

1) .....**Parts of material classified at least HB40 or if relevant HBF**

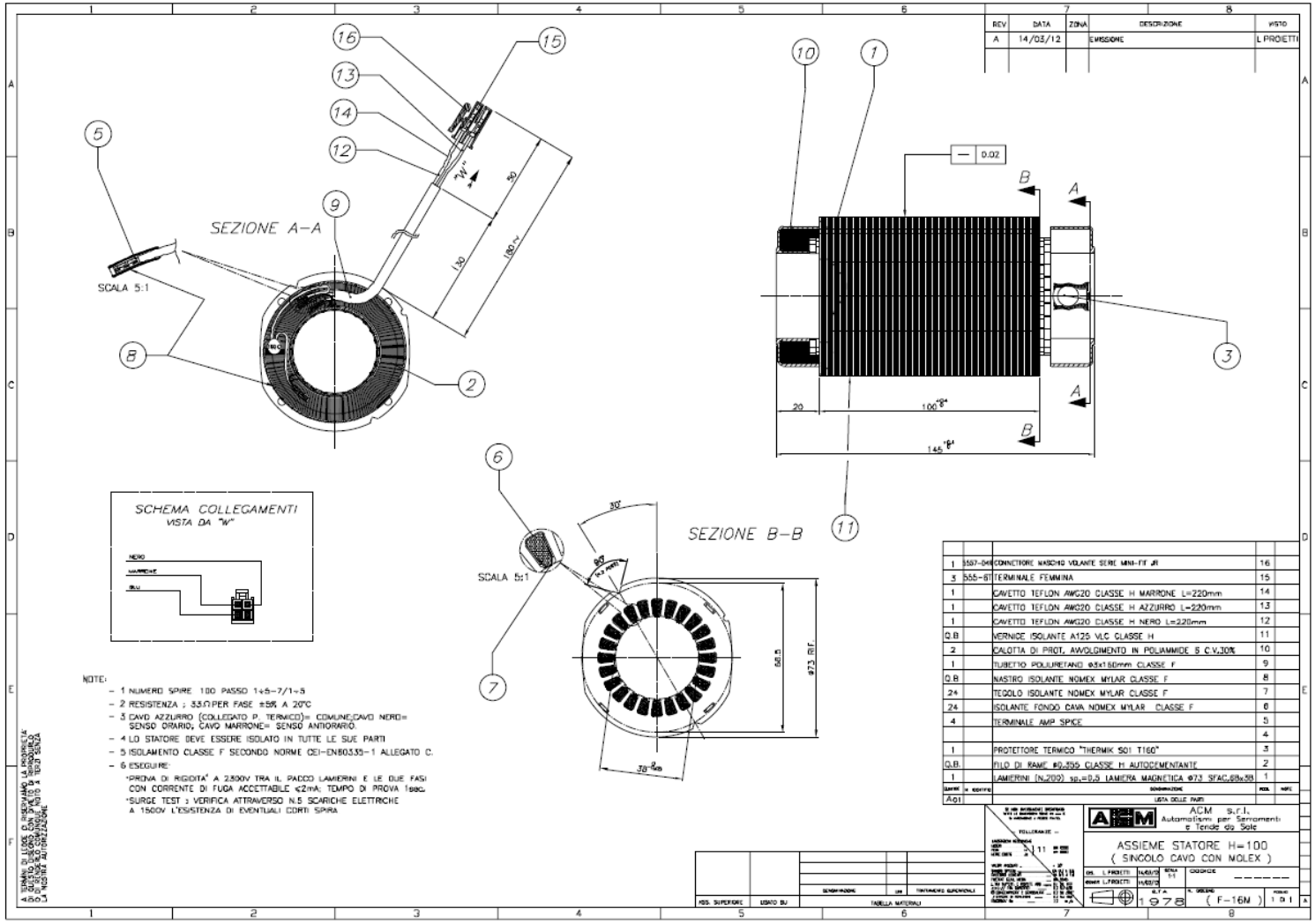
[2] Parts of material classified as V-0 or V-1

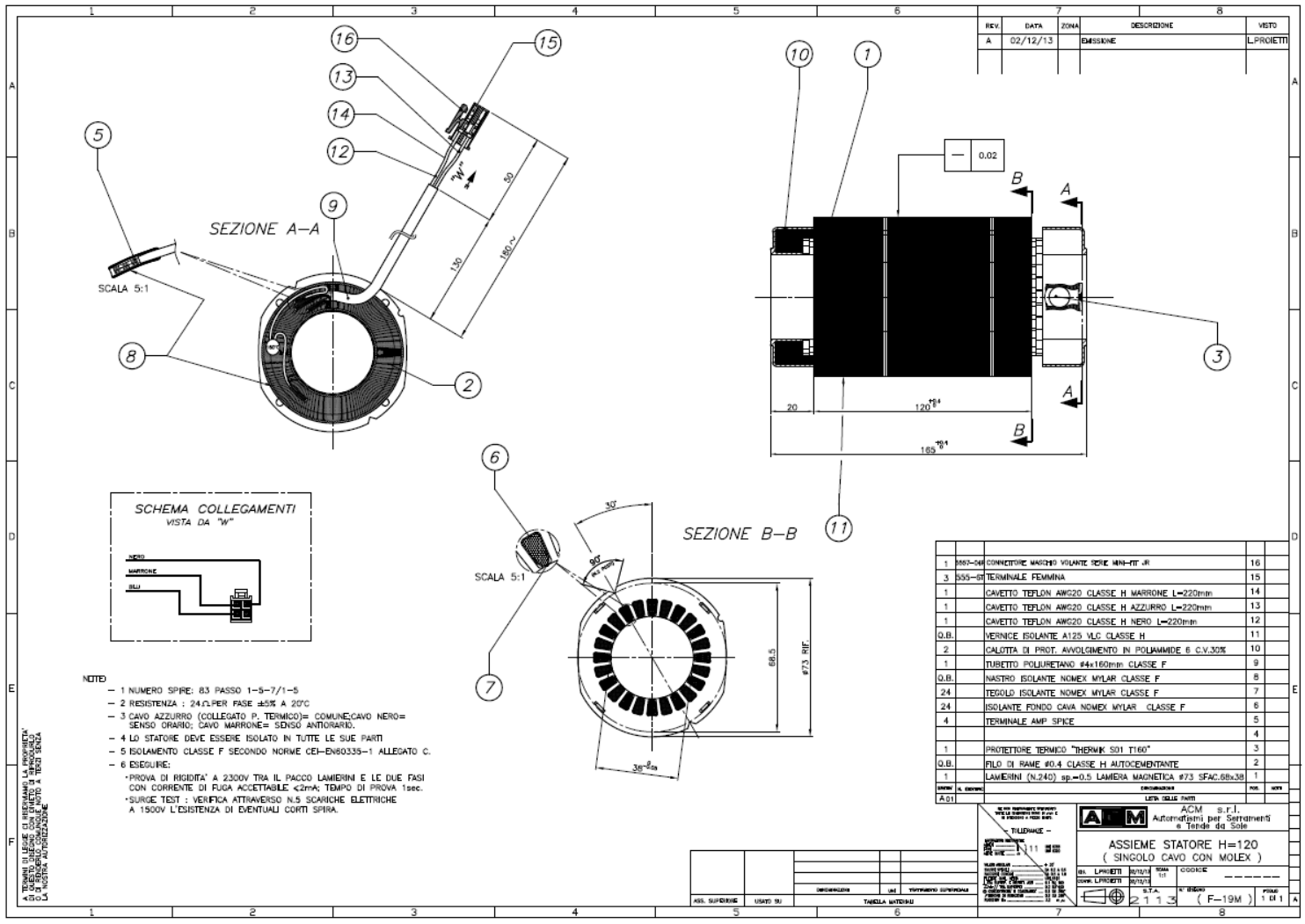
[3] Flame persisting longer than 2 s (= t_e – t_i) need only be reported for unattended appliances

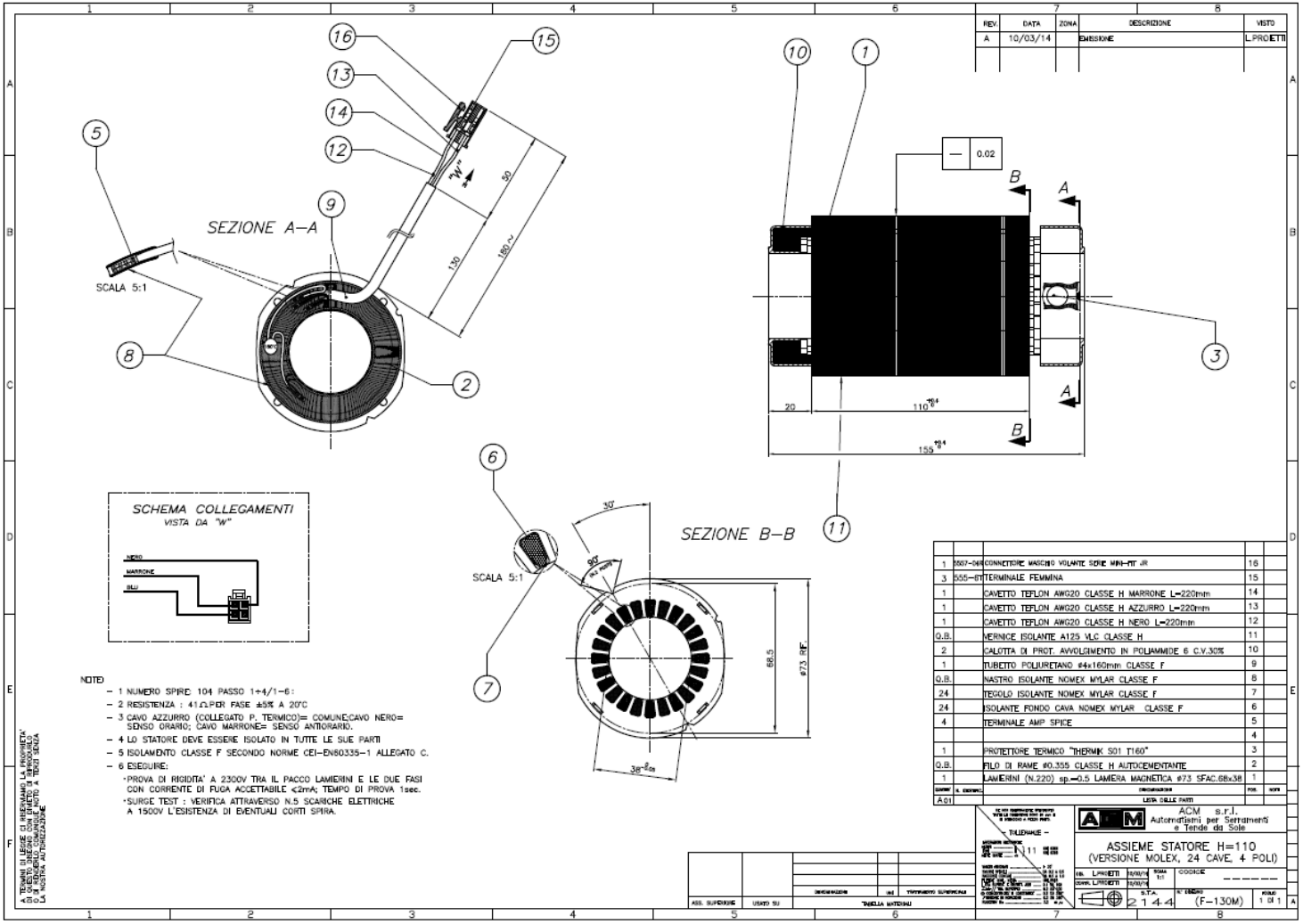
[4] Surrounding parts subjected to the needle-flame test of annex E

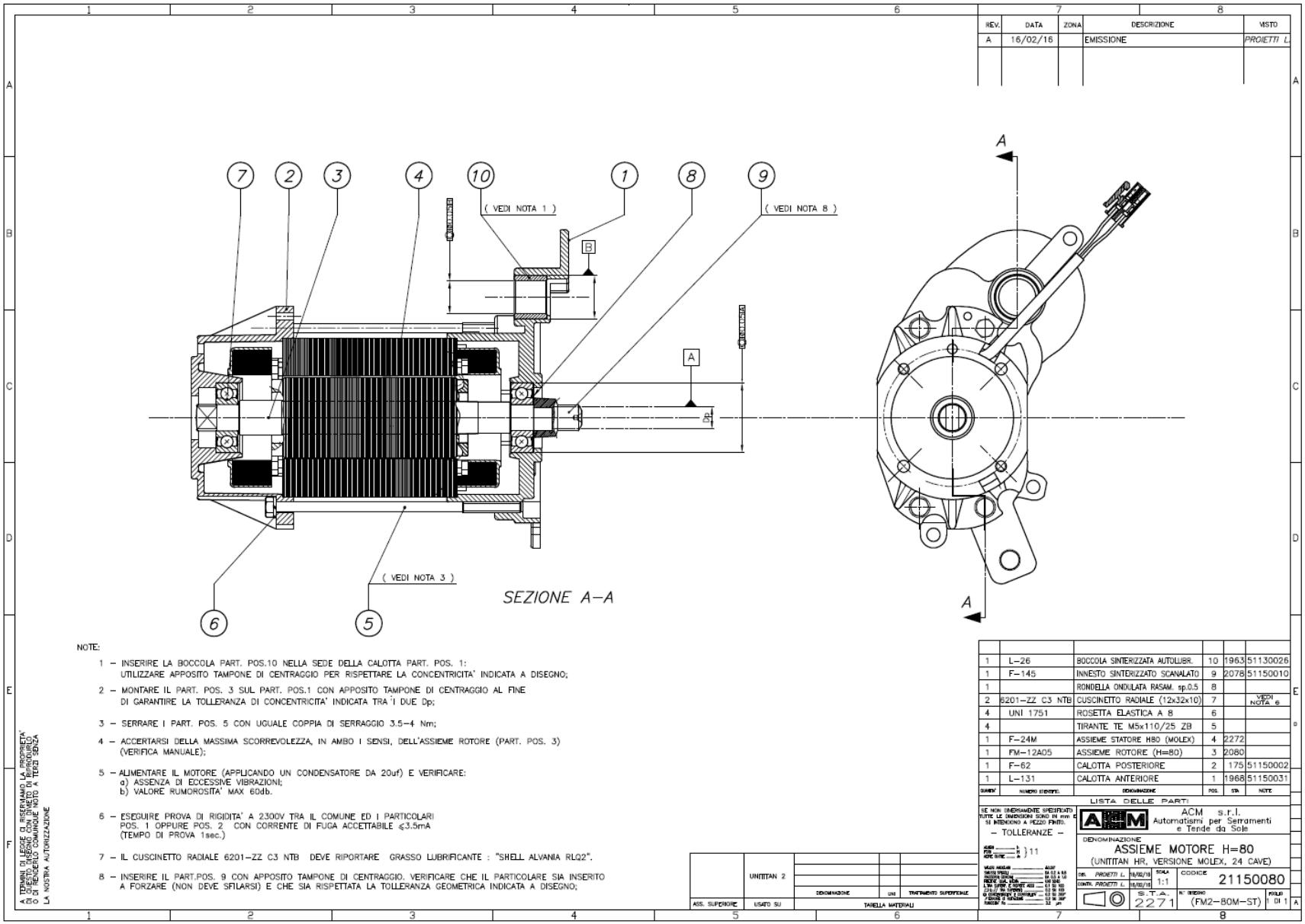
[5] Base material classified as V-0 or if relevant VTM-0

[6] The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not applicable for attended appliancesA) less than 3 mm


SEZIONE A–A
SCALA 5:1
SEZIONE B–B
SCALA 5:1
SCHEMA COLLEGAMENTI
VISTA DA "W"
NERO
MARRONE
BLU
NOTE:
– 1 NUMERO SPIRE 100 PASSO 1+5–7/1–5
– 2 RESISTENZA : 53Ω PER FASE ±5% A 20°C
– 3 CAVO AZZURRO (COLLEGATO P. TERMICO)= COMUNE,CAVO NERO= SENSO ORARIO; CAVO MARRONE= SENSO ANTIORARIO.
– 4 LO STATORE DEVE ESSERE ISOLATO IN TUTTE LE SUE PARTI
– 5 ISOLAMENTO CLASSE F SECONDO NORME CEI-EN60335-1 ALLEGATO C.
– 6 ESEGUIRE:
"PROVA DI RIGIDITA" A 2.500V TRA IL PACCO LAMIERINI E LE DUE FASI CON CORRENTE DI FUGA ACCETTABILE <2mA; TEMPO DI PROVA 1sec.
"SURGE TEST : VERIFICA ATTRAVERSO N.5 SCARICHE ELETTRICHE A 1500V L'ESISTENZA DI EVENTUALI CORTI SPIRA
REV DATA ZONA DESCRIZIONE VISTO
A 14/03/12 EMISSIONE L.PROIETTI
1 557-040 CONNETTORE MASCHIO VOLANTE SERIE MINI-FIT JR 16
3 555-61 TERMINALE FEMMINA 15
1 CAVETTO TEFLON AWG20 CLASSE H MARRONE L=220mm 14
1 CAVETTO TEFLON AWG20 CLASSE H AZZURRO L=220mm 13
1 CAVETTO TEFLON AWG20 CLASSE H NERO L=220mm 12
Q.B VERNICE ISOLANTE A125 VLC CLASSE H 11
2 CALOTTA DI PROT. AVVOLGIMENTO IN POLIAMMIDE 5 C.V.,30% 10
1 TUBETTO POLIURETANO Ø3x160mm CLASSE F 9
Q.B NASTRO ISOLANTE NOMEX MYLAR CLASSE F 8
24 TEGOLO ISOLANTE NOMEX MYLAR CLASSE F 7
24 ISOLANTE FONDO CAVA NOMEX MYLAR CLASSE F 6
4 TERMINALE AMP SPICE 5
4
1 PROTETTORE TERMICO "THERMIK S01 T160" 3
Q.B. FILO DI RAME Ø0,355 CLASSE H AUTOCEMENTANTE 2
1 LAMIERINI (N.200) sp.=0,5 LAMIERA MAGNETICA Ø73 SFAC,Ø8x38 1
LISTA DELLE PARTI
ACM s.r.l. Automatismi per Serramenti e Tende da Sole
ASSIEME STATORE H=100
(SINGOLO CAVO CON MOLEX)
1978
(F-16N)


SEZIONE A–A
SCALA 5:1
SCHEMA COLLEGAMENTI
VISTA DA "W"
NERO
MARRONE
BLU
SEZIONE B–B
SCALA 5:1
NOTE
– 1 NUMERO SPIRE: 83 PASSO 1–5–7/1–5
– 2 RESISTENZA : 24Ω PER FASE ±5% A 20°C
– 3 CAVO AZZURRO (COLLEGATO P. TERMICO)= COMUNE;CAVO NERO= SENSO ORARIO; CAVO MARRONE= SENSO ANTIORARIO.
– 4 LO STATORE DEVE ESSERE ISOLATO IN TUTTE LE SUE PARTI
– 5 ISOLAMENTO CLASSE F SECONDO NORME CEI–EN60335–1 ALLEGATO C.
– 6 ESEGUIRE:
•PROVA DI RIGIDITA' A 2300V TRA IL PACCO LAMIERINI E LE DUE FASI CON CORRENTE DI FUGA ACCETTABILE <2mA; TEMPO DI PROVA 1sec.
•SURGE TEST : VERIFICA ATTRAVERSO N.5 SCARICHE ELETTRICHE A 1500V L'ESISTENZA DI EVENTUALI CORTI SPIRA.
REV. DATA ZONA DESCRIZIONE VISTO
A 02/12/13 EMISSIONE L.PROIETTI
1 3557–548 CONNETTORE MASCHIO VOLANTE SERIE MINI–FIT JR 16
3 5555–01 TERMINALE FEMMINA 15
1 CAVETTO TEFLON AWG20 CLASSE H MARRONE L=220mm 14
1 CAVETTO TEFLON AWG20 CLASSE H AZZURRO L=220mm 13
1 CAVETTO TEFLON AWG20 CLASSE H NERO L=220mm 12
Q.B. VERNICE ISOLANTE A125 VLC CLASSE H 11
2 CALOTTA DI PROT. AVVOLGIMENTO IN POLIAMMIDE 6 C.V.30% 10
1 TUBETTO POLIURETANO #4x160mm CLASSE F 9
Q.B. NASTRO ISOLANTE NOMEX MYLAR CLASSE F 8
24 TEGOLO ISOLANTE NOMEX MYLAR CLASSE F 7
24 ISOLANTE FONDO CAVA NOMEX MYLAR CLASSE F 6
4 TERMINALE AMP SPICE 5
4
1 PROTETTORE TERMICO "THERMIK S01 T160" 3
Q.B. FILO DI RAME #0.4 CLASSE H AUTOCEMENTANTE 2
1 LAMIERINI (N.240) sp.=0.5 LAMIERA MAGNETICA #73 SFAC.68x38 1
A01 LISTA DELLE PARTI
ACM s.r.l. Automatismi per Serramenti e Tende da Sole
ASSIEME STATORE H=120
(SINGOLO CAVO CON MOLEX)
L.PROIETTI 30/01/13
CODICE
S.T.A. 2113
(F–19M)
FOGLIO 1 DI 1


SEZIONE A–A
SCALA 5:1
SEZIONE B–B
SCALA 5:1
SCHEMA COLLEGAMENTI
VISTA DA "W"
NERO
MARRONE
BLU
NOTE
– 1 NUMERO SPIRE: 104 PASSO 1÷4/1–6:
– 2 RESISTENZA : 41Ω PER FASE ±5% A 20°C
– 3 CAVO AZZURRO (COLLEGATO P. TERMICO)= COMUNE;CAVO NERO= SENSO ORARIO; CAVO MARRONE= SENSO ANTIORARIO.
– 4 LO STATORE DEVE ESSERE ISOLATO IN TUTTE LE SUE PARTI
– 5 ISOLAMENTO CLASSE F SECONDO NORME CEI–EN60335–1 ALLEGATO C.
– 6 ESEGUIRE:
•PROVA DI RIGIDITA' A 2300V TRA IL PACCO LAMIERINI E LE DUE FASI CON CORRENTE DI FUGA ACCETTABILE <2mA; TEMPO DI PROVA 1sec.
•SURGE TEST : VERIFICA ATTRAVERSO N.5 SCARICHE ELETTRICHE A 1500V L'ESISTENZA DI EVENTUALI CORTI SPIRA.
REV. DATA ZONA DESCRIZIONE VISTO
A 10/03/14 EMISSIONE L.PROIETTI
1 CONNETTORE MASCHIO VOLANTE SERIE MINI–FIT JR 16
3 TERMINALE FEMMINA 15
1 CAVETTO TEFLON AWG20 CLASSE H MARRONE L=220mm 14
1 CAVETTO TEFLON AWG20 CLASSE H AZZURRO L=220mm 13
1 CAVETTO TEFLON AWG20 CLASSE H NERO L=220mm 12
Q.B. VERNICE ISOLANTE A125 VLC CLASSE H 11
2 CALOTTA DI PROT. AVVOLGIMENTO IN POLIAMMIDE 6 C.V.30% 10
1 TUBETTO POLIURETANO ø4x160mm CLASSE F 9
Q.B. NASTRO ISOLANTE NOMEX MYLAR CLASSE F 8
24 TEGOLO ISOLANTE NOMEX MYLAR CLASSE F 7
24 ISOLANTE FONDO CAVA NOMEX MYLAR CLASSE F 6
4 TERMINALE AMP SPICE 5
4
1 PROTETTORE TERMICO "THERMIK S01 T160" 3
Q.B. FILO DI RAME ø0.355 CLASSE H AUTOCEMENTANTE 2
1 LAMIERINI (N.220) sp.=0.5 LAMIERA MAGNETICA ø73 SFAC.68x38 1
A01 LISTA DELLE PARTI
ACM s.r.l.
Automatismi per Serramenti e Tende da Sole
ASSIEME STATORE H=110
(VERSIONE MOLEX, 24 CAVE, 4 POLI)
(F–130M)



REV.	DATA	ZONA	DESCRIZIONE	VISTO
A	16/02/16		EMISSIONE	PROIETTI L.

NOTE:

1 – INSERIRE LA BOCCOLA PART. POS.10 NELLA SEDE DELLA CALOTTA PART. POS. 1: UTILIZZARE APPOSITO TAMPONE DI CENTRAGGIO PER RISPETTARE LA CONCENTRICITA' INDICATA A DISEGNO;

2 – MONTARE IL PART. POS. 3 SUL PART. POS.1 CON APPOSITO TAMPONE DI CENTRAGGIO AL FINE DI GARANTIRE LA TOLLERANZA DI CONCENTRICITA' INDICATA TRA I DUE Dp;

3 – SERRARE I PART. POS. 5 CON UGUALE COPPIA DI SERRAGGIO 3.5÷4 Nm;

4 – ACCERTARSI DELLA MASSIMA SCORREVOLEZZA, IN AMBO I SENSI, DELL'ASSIEME ROTORE (PART. POS. 3) (VERIFICA MANUALE);

5 – ALIMENTARE IL MOTORE (APPLICANDO UN CONDENSATORE DA 20uf) E VERIFICARE:
a) ASSENZA DI ECCESSIVE VIBRAZIONI;
b) VALORE RUMOROSITA' MAX 60db.

6 – ESEGUIRE PROVA DI RIGIDITA' A 2300V TRA IL COMUNE ED I PARTICOLARI POS. 1 OPPURE POS. 2 CON CORRENTE DI FUGA ACCETTABILE ≤3.5mA (TEMPO DI PROVA 1sec.)

7 – IL CUSCINETTO RADIALE 6201–ZZ C3 NTB DEVE RIPORTARE GRASSO LUBRIFICANTE : "SHELL ALVANIA RLQ2".

8 – INSERIRE IL PART.POS. 9 CON APPOSITO TAMPONE DI CENTRAGGIO. VERIFICARE CHE IL PARTICOLARE SIA INSERITO A FORZARE (NON DEVE SFILARSI) E CHE SIA RISPETTATA LA TOLLERANZA GEOMETRICA INDICATA A DISEGNO;

1	L–26	BOCCOLA SINTERIZZATA AUTOLUBR.	10	1963	51130026
1	F–145	INNESTO SINTERIZZATO SCANALATO	9	2078	51150010
1		RONDELLA ONDULATA RASAM. sp.0,5	8		
2	6201–ZZ C3 NTB	CUSCINETTO RADIALE (12x32x10)	7		VEDI NOTA 6
4	UNI 1751	ROSETTA ELASTICA A 8	6		
4		TIRANTE TE M5x110/25 ZB	5		
1	F–24M	ASSIEME STATORE H80 (MOLEX)	4	2272	
1	FM–12A05	ASSIEME ROTORE (H=80)	3	2080	
1	F–62	CALOTTA POSTERIORE	2	175	51150002
1	L–131	CALOTTA ANTERIORE	1	1968	51150031
QUANTITY	NUMERO DISEGNO	DENOMINAZIONE	POS.	STA	NOTE

LISTA DELLE PARTI

SE NON DIVERSAMENTE SPECIFICATO TUTTE LE DIMENSIONI SONO IN mm E SI INTENDONO A PEZZO FINITO.
– TOLLERANZE –

ACM s.r.l.
Automatismi per Serramenti e Tende da Sole

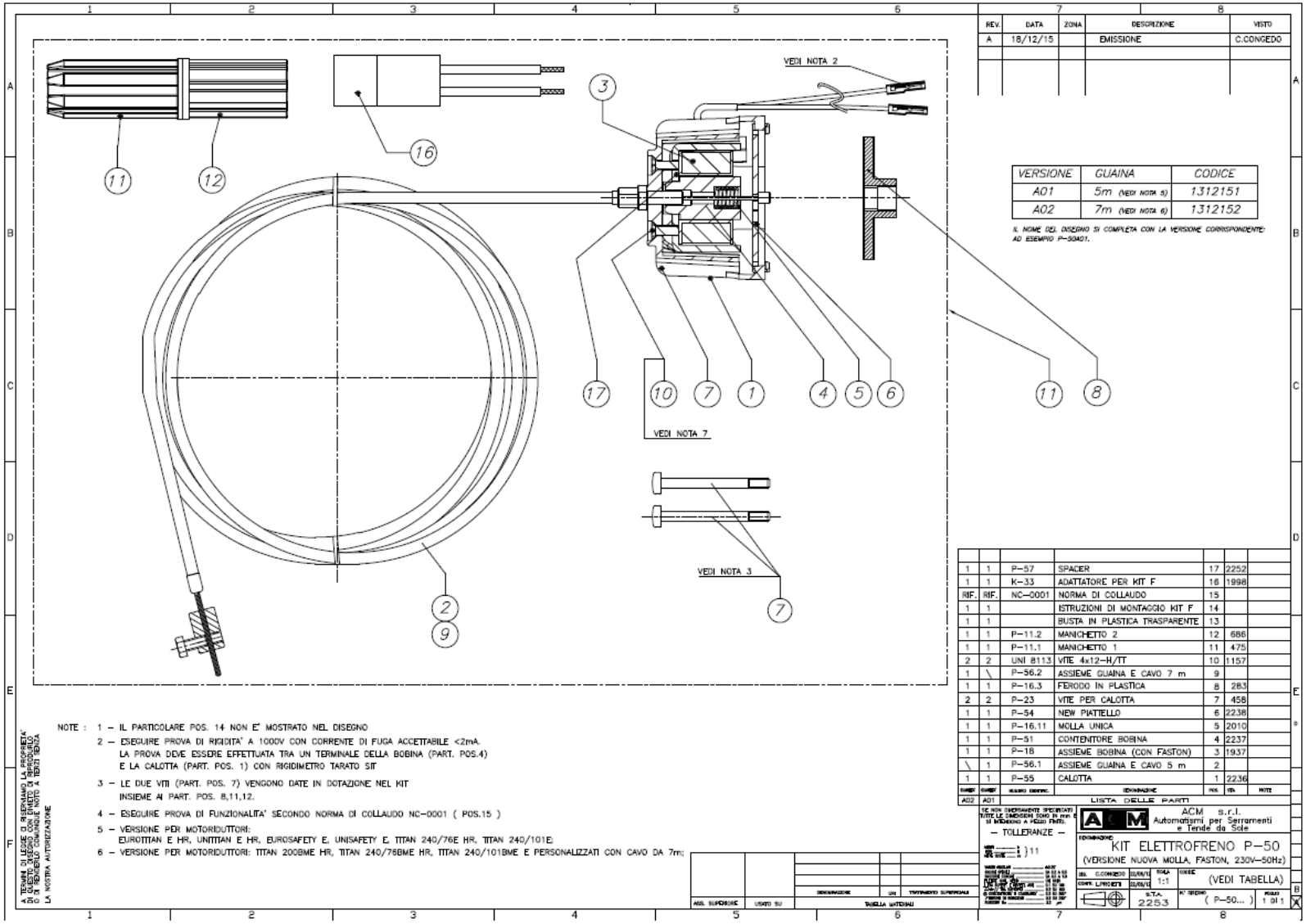
DENOMINAZIONE
ASSIEME MOTORE H=80
(UNITITAN HR, VERSIONE MOLEX, 24 CAVE)

DIS. PROIETTI L. 16/02/16 | SCALA 1:1 | CODICE 21150080
CONTR. PROIETTI L. 16/02/16 | S.T.A. 2271 | N° DISEGNO (FM2–80M–ST) | FOGLIO 1 DI 1

UNITITAN 2

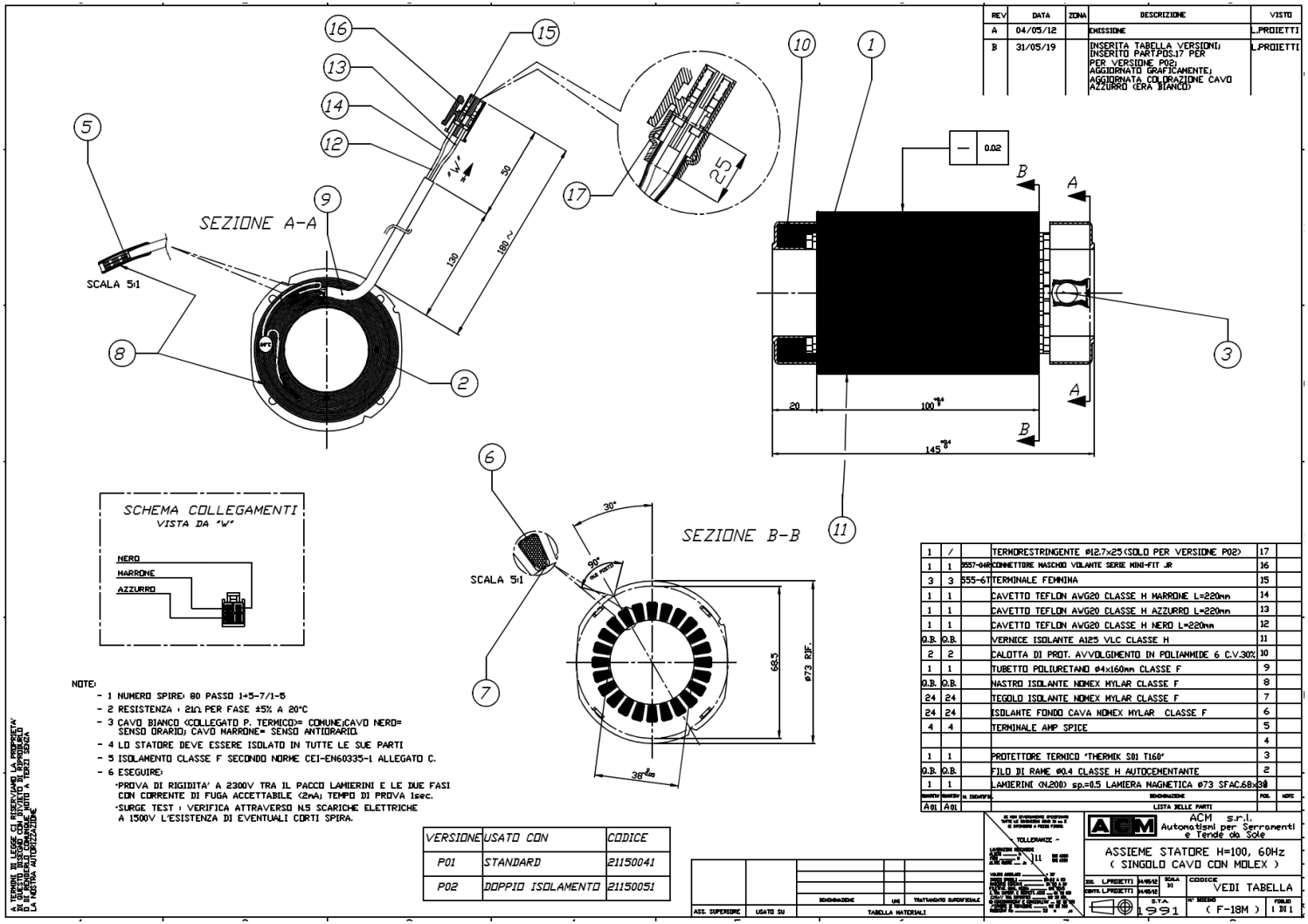
ASS. SUPERIORE	USATO SU	DENOMINAZIONE	UNI	TRATTAMENTO SUPERFICIALE
		TABELLA MATERIALI		

A TERMINI DI LEGGE CI RISERVIAMO LA PROPRIETA' DI QUESTO DISEGNO CON DIVIETO DI RIPRODURLO O DI CEDERLO COMUNQUE NOTO A TERZI SENZA LA NOSTRA AUTORIZZAZIONE


VEDI NOTA 2
VEDI NOTA 7
VEDI NOTA 3
NOTE : 1 – IL PARTICOLARE POS. 14 NON E' MOSTRATO NEL DISEGNO
2 – ESEGUIRE PROVA DI RIGIDITA' A 1000V CON CORRENTE DI FUGA ACCETTABILE <2mA. LA PROVA DEVE ESSERE EFFETTUATA TRA UN TERMINALE DELLA BOBINA (PART. POS.4) E LA CALOTTA (PART. POS. 1) CON RIGIDIMETRO TARATO SIT
3 – LE DUE VITI (PART. POS. 7) VENGONO DATE IN DOTAZIONE NEL KIT INSIEME AI PART. POS. 8,11,12.
4 – ESEGUIRE PROVA DI FUNZIONALITA' SECONDO NORMA DI COLLAUDO NC–0001 (POS.15)
5 – VERSIONE PER MOTORIDUTTORI: EUROTITAN E HR, UNITITAN E HR, EUROSAFETY E, UNISAFETY E, TITAN 240/76E HR, TITAN 240/101E;
6 – VERSIONE PER MOTORIDUTTORI: TITAN 200BME HR, TITAN 240/76BME HR, TITAN 240/101BME E PERSONALIZZATI CON CAVO DA 7m;
TUTTI I DIRITTI DI LEGGE DI RISERVANO LA PROPRIETA' DI QUESTO DISEGNO CON DIVIETO DI RIPRODURLO O DI RENDERLO COMUNQUE NOTO A TERZI SENZA LA NOSTRA AUTORIZZAZIONE
REV. DATA ZONA DESCRIZIONE VISTO
A 18/12/15 EMISSIONE C.CONGEDO
VERSIONE GUAINA CODICE
A01 5m (VEDI NOTA 5) 1312151
A02 7m (VEDI NOTA 6) 1312152
IL NOME DEL DISEGNO SI COMPLETA CON LA VERSIONE CORRISPONDENTE: AD ESEMPIO P–50A01.
1 1 P–57 SPACER 17 2252
1 1 K–33 ADATTATORE PER KIT F 16 1998
RIF. RIF. NC–0001 NORMA DI COLLAUDO 15
1 1 ISTRUZIONI DI MONTAGGIO KIT F 14
1 1 BUSTA IN PLASTICA TRASPARENTE 13
1 1 P–11.2 MANICHETTO 2 12 686
1 1 P–11.1 MANICHETTO 1 11 475
2 2 UNI 8113 VITE 4x12–H/TT 10 1157
1 \ P–56.2 ASSIEME GUAINA E CAVO 7 m 9
1 1 P–16.3 FERODO IN PLASTICA 8 283
2 2 P–23 VITE PER CALOTTA 7 458
1 1 P–54 NEW PIATTELLO 6 2238
1 1 P–16.11 MOLLA UNICA 5 2010
1 1 P–51 CONTENITORE BOBINA 4 2237
1 1 P–18 ASSIEME BOBINA (CON FASTON) 3 1937
\ 1 P–56.1 ASSIEME GUAINA E CAVO 5 m 2
1 1 P–55 CALOTTA 1 2236
LISTA DELLE PARTI
– TOLLERANZE –
ACM s.r.l. Automatismi per Serramenti e Tende da Sole
KIT ELETTROFRENO P–50
(VERSIONE NUOVA MOLLA, FASTON, 230V–50Hz)
(VEDI TABELLA)
S.T.A. 2253
(P–50...)

Brake

Motor type F 60 Hz

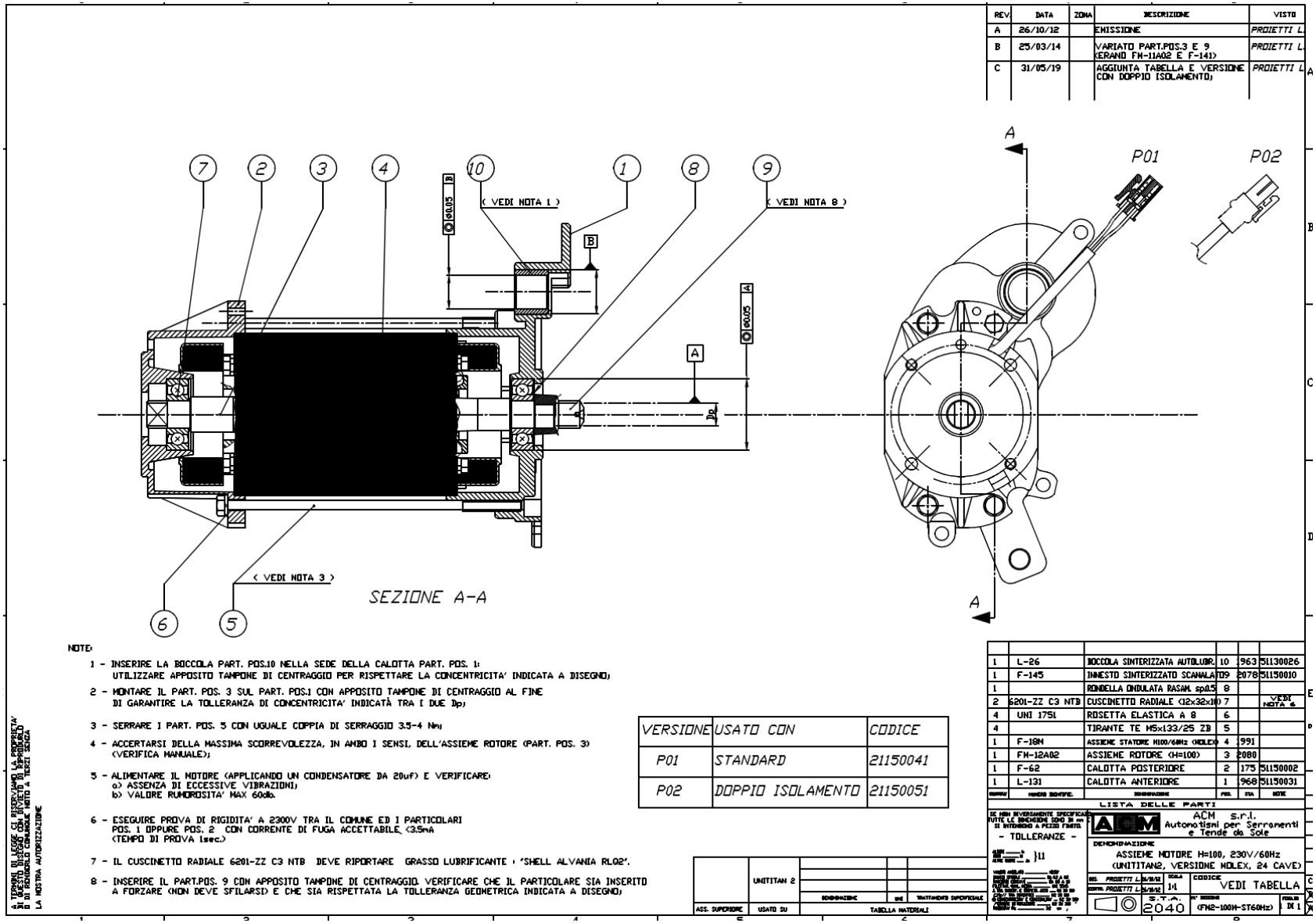


REV	DATA	ZONA	DESCRIZIONE	VISTO
A	04/05/12		EMISSIONE	L.PROIETTI
B	31/05/19		INSERITA TABELLA VERSIONI; INSERITO PART.POS.17 PER PER VERSIONE P02; AGGIORNATO GRAFICAMENTE; AGGIORNATA COLORAZIONE CAVO AZZURRO (ERA BIANCO)	L.PROIETTI

1	/		TERMORESTRINGENTE ø12.7x25 (SOLO PER VERSIONE P02)	17
1	1	5557-04R	CONNETTORE MASCHIO VOLANTE SERIE MINI-FIT JR	16
3	3	5556-T	TERMINALE FEMMINA	15
1	1		CAVETTO TEFLON AWG20 CLASSE H MARRONE L=220mm	14
1	1		CAVETTO TEFLON AWG20 CLASSE H AZZURRO L=220mm	13
1	1		CAVETTO TEFLON AWG20 CLASSE H NERO L=220mm	12
Q.B.	Q.B.		VERNICE ISOLANTE A125 VLC CLASSE H	11
2	2		CALOTTA DI PROT. AVVOLGIMENTO IN POLIAMMIDE 6 C.V.30%	10
1	1		TUBETTO POLIURETANO ø4x160mm CLASSE F	9
Q.B.	Q.B.		NASTRO ISOLANTE NOMEX MYLAR CLASSE F	8
24	24		TEGOLO ISOLANTE NOMEX MYLAR CLASSE F	7
24	24		ISOLANTE FONDO CAVA NOMEX MYLAR CLASSE F	6
4	4		TERMINALE AMP SPICE	5
				4
1	1		PROTETTORE TERMICO "THERMIK S01 T160"	3
Q.B.	Q.B.		FILO DI RAME ø0.4 CLASSE H AUTOCEMENTANTE	2
1	1		LAMIERINI (N.200) sp.=0.5 LAMIERA MAGNETICA ø73 SFAC.68x38	1
QUANTITÀ	NUMERO	N. INDIVIDUALE	DENOMINAZIONE	POS.	NOTE
A01	A01		LISTA DELLE PARTI		

VERSIONE	USATO CON	CODICE
P01	STANDARD	21150041
P02	DOPPIO ISOLAMENTO	21150051

TRF No. IEC60335_2-103



REV	DATA	ZONA	DESCRIZIONE	VISTO
A	26/10/12		EMISSIONE	PROIETTI L.
B	25/03/14		VARIATO PART.POS.3 E 9 (ERANO FM-11A02 E F-141)	PROIETTI L.
C	31/05/19		AGGIUNTA TABELLA E VERSIONE CON DOPPIO ISOLAMENTO;	PROIETTI L.

NOTE:

1 - INSERIRE LA BOCCOLA PART. POS.10 NELLA SEDE DELLA CALOTTA PART. POS. 1:
UTILIZZARE APPOSITO TAMPONE DI CENTRAGGIO PER RISPETTARE LA CONCENTRICITA' INDICATA A DISEGNO;

2 - MONTARE IL PART. POS. 3 SUL PART. POS.1 CON APPOSITO TAMPONE DI CENTRAGGIO AL FINE
DI GARANTIRE LA TOLLERANZA DI CONCENTRICITA' INDICATÀ TRA I DUE Ø$_p$;

3 - SERRARE I PART. POS. 5 CON UGUALE COPPIA DI SERRAGGIO 3.5÷4 Nm;

4 - ACCERTARSI DELLA MASSIMA SCORREVOLEZZA, IN AMBO I SENSI, DELL'ASSIEME ROTORE (PART. POS. 3)
(VERIFICA MANUALE);

5 - ALIMENTARE IL MOTORE (APPLICANDO UN CONDENSATORE DA 20uF) E VERIFICARE:
a) ASSENZA DI ECCESSIVE VIBRAZIONI;
b) VALORE RUMOROSITA' MAX 60db.

6 - ESEGUIRE PROVA DI RIGIDITA' A 2300V TRA IL COMUNE ED I PARTICOLARI
POS. 1 OPPURE POS. 2 CON CORRENTE DI FUGA ACCETTABILE <3.5mA
(TEMPO DI PROVA 1sec.)

7 - IL CUSCINETTO RADIALE 6201-ZZ C3 NTB DEVE RIPORTARE GRASSO LUBRIFICANTE : 'SHELL ALVANIA RL02'.

8 - INSERIRE IL PART.POS. 9 CON APPOSITO TAMPONE DI CENTRAGGIO. VERIFICARE CHE IL PARTICOLARE SIA INSERITO
A FORZARE (NON DEVE SFILARSI) E CHE SIA RISPETTATA LA TOLLERANZA GEOMETRICA INDICATA A DISEGNO;

VERSIONE	USATO CON	CODICE
P01	STANDARD	21150041
P02	DOPPIO ISOLAMENTO	21150051

1	L-26	BOCCOLA SINTERIZZATA AUTOLUBR.	10	963	51130026
1	F-145	INNESTO SINTERIZZATO SCANALATO	09	2078	51150010
1		RONDELLA ONDULATA RASAM. sp0.5	8		
2	6201-ZZ C3 NTB	CUSCINETTO RADIALE (12x32x10)	7		VEDI NOTA 6
4	UNI 1751	ROSETTA ELASTICA A 8	6		
4		TIRANTE TE M5x133/25 ZB	5		
1	F-18M	ASSIEME STATORE H100/60Hz (MOLEX)	4	991	
1	FM-12A02	ASSIEME ROTORE (H=100)	3	2080	
1	F-62	CALOTTA POSTERIORE	2	175	51150002
1	L-131	CALOTTA ANTERIORE	1	968	51150031
NUMERO	NUMERO DISEGNO	DENOMINAZIONE	POS.	STA	NOTE

LISTA DELLE PARTI

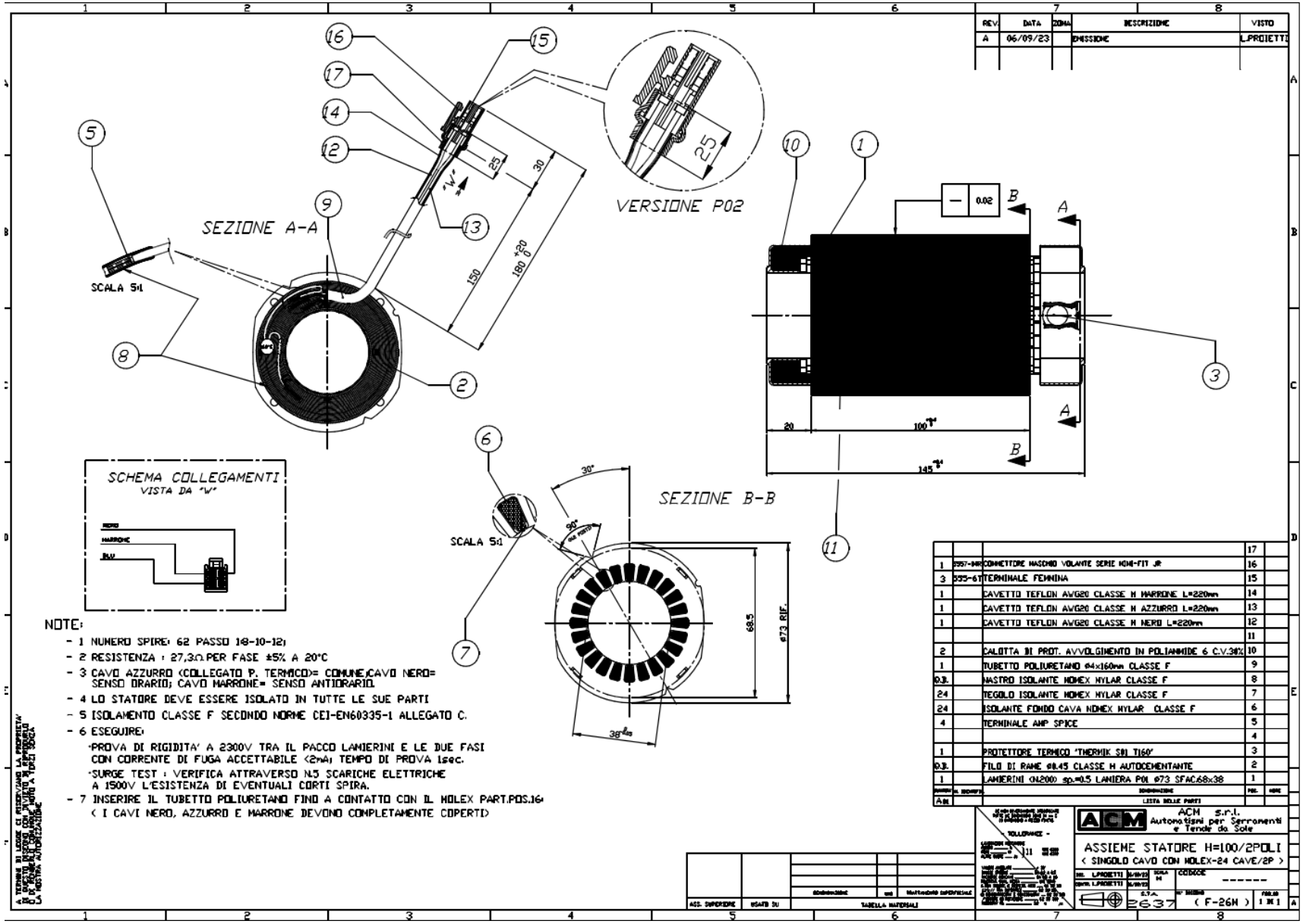
ACM s.r.l. Automatismi per Serramenti e Tende da Sole

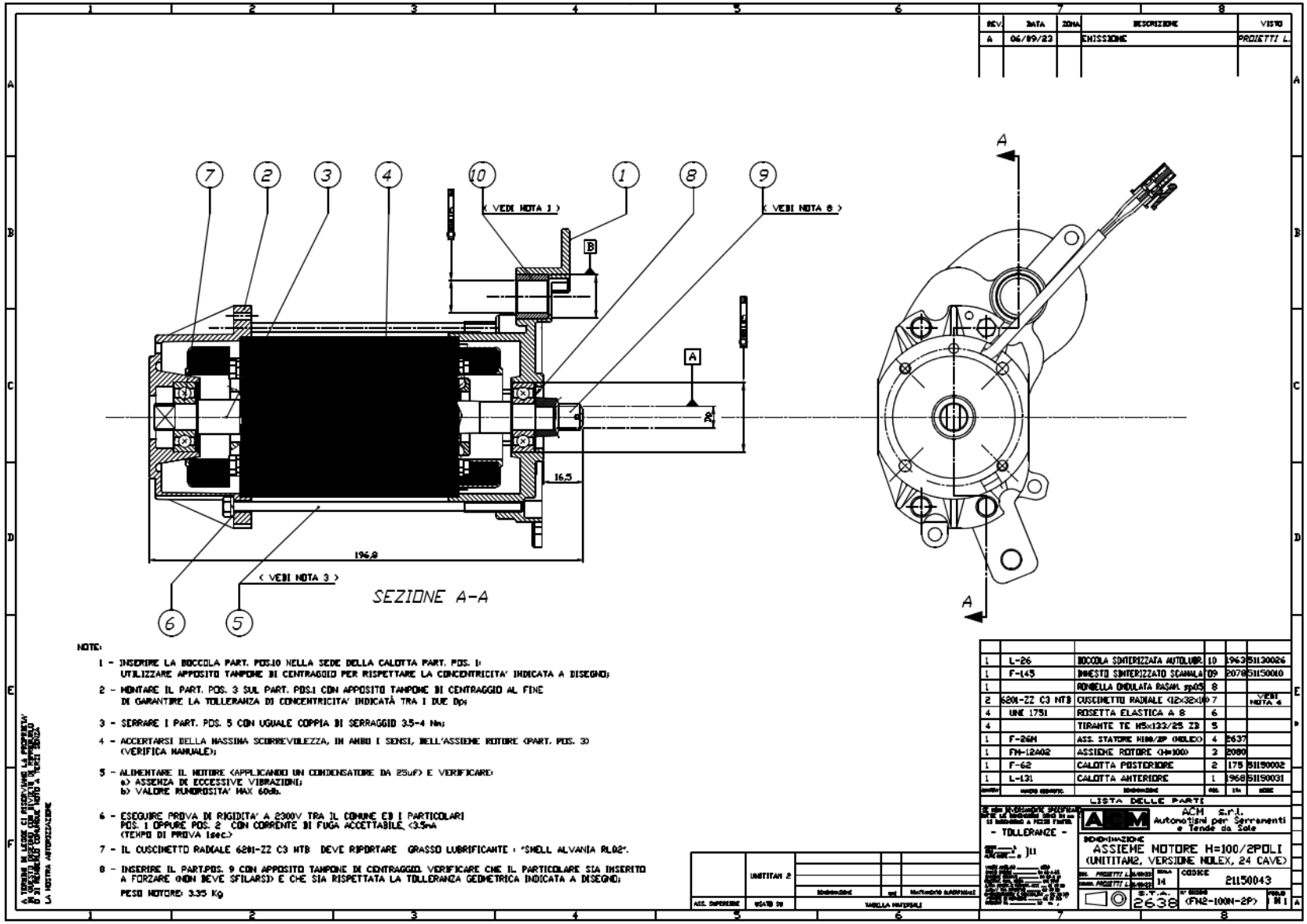
DENOMINAZIONE: ASSIEME MOTORE H=100, 230V/60Hz (UNITITAN2, VERSIONE MOLEX, 24 CAVE)

CODICE: VEDI TABELLA

S.T.A. 2040 (FM2-100H-ST60Hz) FOGLIO 1 DI 1

UNITITAN 2 | USATO SU | ASS. SUPERIORE | TABELLA MATERIALI


SEZIONE A-A
SCALA 5:1
VERSIONE P02
SCHEMA COLLEGAMENTI
VISTA DA "W"
SEZIONE B-B
SCALA 5:1
NOTE:
- 1 NUMERO SPIRE: 62 PASSO 18-10-12;
- 2 RESISTENZA : 27,3Ω PER FASE ±5% A 20°C
- 3 CAVO AZZURRO (COLLEGATO P. TERMICO)= COMUNE;CAVO NERO= SENSO ORARIO; CAVO MARRONE= SENSO ANTIORARIO.
- 4 LO STATORE DEVE ESSERE ISOLATO IN TUTTE LE SUE PARTI
- 5 ISOLAMENTO CLASSE F SECONDO NORME CEI-EN60335-1 ALLEGATO C.
- 6 ESEGUIRE:
·PROVA DI RIGIDITA' A 2300V TRA IL PACCO LAMIERINI E LE DUE FASI CON CORRENTE DI FUGA ACCETTABILE <2mA; TEMPO DI PROVA 1sec.
·SURGE TEST : VERIFICA ATTRAVERSO N.5 SCARICHE ELETTRICHE A 1500V L'ESISTENZA DI EVENTUALI CORTI SPIRA.
- 7 INSERIRE IL TUBETTO POLIURETANO FINO A CONTATTO CON IL MOLEX PART.POS.16
(I CAVI NERO, AZZURRO E MARRONE DEVONO COMPLETAMENTE COPERTI)
ACM s.r.l.
Automatismi per Serramenti e Tende da Sole
ASSIEME STATORE H=100/2POLI
(SINGOLO CAVO CON MOLEX-24 CAVE/2P)
(F-26N)

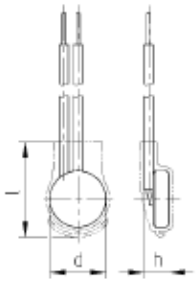

SEZIONE A-A
(VEDI NOTA 1)
(VEDI NOTA 8)
(VEDI NOTA 3)
16,5
196,8
NOTE:
1 - INSERIRE LA BOCCOLA PART. POS.10 NELLA SEDE DELLA CALOTTA PART. POS. 1; UTILIZZARE APPOSITO TAMPONE DI CENTRAGGIO PER RISPETTARE LA CONCENTRICITA' INDICATA A DISEGNO;
2 - MONTARE IL PART. POS. 3 SUL PART. POS.1 CON APPOSITO TAMPONE DI CENTRAGGIO AL FINE DI GARANTIRE LA TOLLERANZA DI CONCENTRICITA' INDICATA TRA I DUE Dp;
3 - SERRARE I PART. POS. 5 CON UGUALE COPPIA DI SERRAGGIO 3.5÷4 Nm;
4 - ACCERTARSI DELLA MASSIMA SCORREVOLEZZA, IN AMBO I SENSI, DELL'ASSIEME ROTORE (PART. POS. 3) (VERIFICA MANUALE);
5 - ALIMENTARE IL MOTORE (APPLICANDO UN CONDENSATORE DA 25uF) E VERIFICARE: a) ASSENZA DI ECCESSIVE VIBRAZIONI; b) VALORE RUMOROSITA' MAX 60db.
6 - ESEGUIRE PROVA DI RIGIDITA' A 2300V TRA IL COMUNE ED I PARTICOLARI POS. 1 OPPURE POS. 2 CON CORRENTE DI FUGA ACCETTABILE <3.5mA (TEMPO DI PROVA 1sec.)
7 - IL CUSCINETTO RADIALE 6201-2Z C3 HTB DEVE RIPORTARE GRASSO LUBRIFICANTE : "SHELL ALVANIA RL02".
8 - INSERIRE IL PART.POS. 9 CON APPOSITO TAMPONE DI CENTRAGGIO. VERIFICARE CHE IL PARTICOLARE SIA INSERITO A FORZARE (NON DEVE SFILARSI) E CHE SIA RISPETTATA LA TOLLERANZA GEOMETRICA INDICATA A DISEGNO;
PESO MOTORE: 3.35 Kg
REV. A | DATA 06/09/23 | DESCRIZIONE EMISSIONE | VISTO PROGETTI L.
1 L-26 BOCCOLA SINTERIZZATA AUTOLUBR. 10 1963 51130026
1 F-145 INNESTO SINTERIZZATO SCANALA 09 2078 51150040
1 RONDELLA ONDULATA RASAM. sp.05 8
2 6201-2Z C3 HTB CUSCINETTO RADIALE (12x32x10) 7 VEDI NOTA 6
4 UNE 1751 ROSETTA ELASTICA A 8 6
4 TIRANTE TE M5x133/25 ZB 5
1 F-26M ASS. STATORE H100/2P (MOLDED) 4 2637
1 FM-12402 ASSIEME ROTORE (H=100) 3 2080
1 F-62 CALOTTA POSTERIORE 2 175 51150002
1 L-131 CALOTTA ANTERIORE 1 1968 51150031
LISTA DELLE PARTI
- TOLLERANZE -
ACM S.r.l. Automatismi per Serramenti e Tende da Sole
DENOMINAZIONE ASSIEME MOTORE H=100/2POLI (UNITITAN2, VERSIONE NOLEX, 24 CAVE)
CODICE 21150043
S.T.A. 2638 (FM2-100N-2P)
UNITITAN 2
TABELLA MATERIALI

Technical Data Type S01

The listed products are an extract from our standard range. Other versions and customised manufacturing are available upon request.

S01

Type: Normally closed; resets automatically; with connector cables; with or without epoxy; insulation: Mylar®-Nomex®



Diameter d	9,4 mm
Installation height h	from 4,7 mm
Length of the insulation cap l	15,0 mm

Nominal switching temperature (NST) in 5 °C increments		60 °C - 200 °C
Tolerance (standard)		±2,5 K / ±5 K
Reverse switch temperature (RST) below NST (defined RST is possible at the customer's request)	UL VDE	-35 K ±15 K ≥ 35 °C
Installation height		from 4,7 mm
Diameter		9,4 mm
Length of the insulation cap		15,0 mm
Resistance to impregnation *		suitable
Suitable for installation in protection class		I + II
Pressure resistance to the switch housing *		450 N
Standard connection		Lead wire 0,25 mm² / AWG22
Available approvals (please state)		IEC; ENEC; VDE; UL; CSA; CQC; CMJ
Operational voltage range AC/DC		up until 500 V AC / 14 V DC
Rated voltage AC		250 V (VDE) 277 V (UL)
Rated current AC cos φ = 1.0/cycles		2,5 A / 10.000
Rated current AC cos φ = 0.6/cycles		1,6 A / 10.000
Max. switching current AC cos φ = 1.0/cycles		6,3 A / 3.000 7,5 A / 300
Rated current AC cos φ = 0.4/cycles		1,8 A / 10.000
Max. switching current AC cos φ = 0.4/cycles		7,2 A / 1.000
Rated voltage DC		12 V
Max. switching current DC/cycles		40,0 A / 10.000
High voltage resistance		2,0 kV
Total bounce time		< 1 ms
Contact resistance (according to MIL-STD. R5757)		≤ 50 mΩ
Vibration resistance at 10 ... 60 Hz		100 m/s²

Ordering example:

S01 - 125. 05 0100/ 0100

- Type / version
- NST [°C]
- Tolerance [K]
- Lead lengths [mm] — L_1 L_2

Marking example:

- Trade mark — **thermik**
- Type / version — **01**
- NST [°C] . Tolerance [K] — **125.05**

More varieties of the type series 01:

• *01 – without cables; without insulation; for clip contact; minimum batch sizes*	*www.thermik.de/data/01*
• *L01 – with connector cables; with epoxy; fully insulated in a screw on housing*	*www.thermik.de/data/L01*
• *F01 – with connector cables; with epoxy; fully insulated in a Nomex® cap*	*www.thermik.de/data/F01*
• *N01 – with a connection wire; partially insulated in a plastic cap*	*www.thermik.de/data/N01*
• *C01 – with connector cables; with or without epoxy; without insulation*	*www.thermik.de/data/C01*
• *C01 Pin – with pins; with epoxy; without insulation*	*www.thermik.de/data/C01-Pin*
• *B01 – with connector cables; with epoxy; fully insulated in a Ryton® cap*	*www.thermik.de/data/B01*
• *S01HT – high temperature model; with connector cables; insulation: PTFE*	*www.thermik.de/data/S01HT*
• *C01HT – high temperature model; without insulation*	*www.thermik.de/data/C01HT*