

Safety requirements for electrical equipment for measurement, control, and laboratory use —

Part 3-020: Conformity verification report for IEC 61010-2-020:1992, Particular requirements for laboratory centrifuges

ICS 03.120.20; 71.040.20

National foreword

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The UK participation in its preparation was entrusted to Technical Committee EPL/66, Safety requirements for electrical equipment for measurement, control, and laboratory use, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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Summary of pages

This document comprises a front cover, an inside front cover, the IEC title page, pages 2 to 70, an inside back cover and a back cover.

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**Safety requirements for electrical equipment
for measurement, control, and laboratory use –**

Part 3-020:

**Conformity verification report for IEC 61010-2-020:1992
Particular requirements for laboratory centrifuges**

*Règles de sécurité pour appareils électriques
de mesurage, de régulation et de laboratoire –*

Partie 3-020:

*Rapport de vérification de la conformité de la CEI 61010-2-020:1992
Prescriptions particulières pour centrifugeuses de laboratoire*



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE –

Part 3-020: Conformity verification report for IEC 61010-2-020:1992, Particular requirements for laboratory centrifuges

FOREWORD

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IEC 61010-3-020, which is a technical report, has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
66/187/CDV	66/211/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This report is a Technical Report and is of a purely informative nature and is therefore by itself not to be regarded as an International Standard. It is for use by testhouses and other users to assist them with determining and recording verification of conformity of the equipment under test with the requirements of:

IEC 61010-2-020:1992 + amendment 1:1996

The protocol for completion of this report is contained in publication IEC 61010-3:1997.

The IEC sells read-only PDF files as a general rule. In the present instance, and quite exceptionally, to enable the user to fill in the forms, a revisable file is included in a pocket affixed to the back cover of this publication.

This publication can also be downloaded from the Web as a PDF file. There is, however, at the end of the document, a revisable file containing the forms. Please use the zip/unzip function.

Conformity Verification Report IEC 61010-2-020 Safety requirements for electrical equipment for measurement, control and laboratory use: Part 2-020: Particular requirements for laboratory centrifuges (including amendment 1:1996)	
Report reference No : Compiled by (+ signature)..... : Approved by (+ signature)..... : Date of issue :	
Testing organization..... : Address..... : Testing location..... :	
Applicant : Address..... :	
Standard : Copyright blank test report..... :	IEC 61010-1:1990 + amendment 1:1992 + amendment 2:1995 IEC 61010-2-020:1993 + amendment 1:1996 This report has been prepared by IEC TC 66, which retains responsibility for any changes or corrections required.
Test procedure..... : Procedure deviation..... : Non-standard test method :	
Type of item tested : Laboratory Trademark..... : Model/type reference : Manufacturer..... : Rating..... :	
Copy of rating plate:	

Description of equipment function:

INSTALLATION/OVERVOLTAGE CATEGORY:

POLLUTION DEGREE:

Environmental rating: ☐ Standard ☐ Other (specify):

Equipment mobility: ☐ Portable ☐ Floorstanding ☐ Fixed
☐ Built in ☐ Benchmounted ☐ Other (specify):

Connection to mains supply: ☐ Permanent ☐ Detachable ☐ Non detachable ☐ None

Operating conditions: ☐ Continuous ☐ Short-time ☐ Intermittent

Overall size of the equipment (Length × Width × Height):

Mass of the equipment (kg):

Marked degree of protection to IEC 60529: IP ____

Accessories and detachable parts included in the evaluation:

Options:

NOTE – "(see form A.X)" refers to a form appended to the report.

Table 1 – Documents attached to this report

[illegible]

Table 2 – Test equipment list

Item	Type	Equipment No.	Calibration date		Comments
			Last ¹⁾	Due	

¹⁾ or interval between calibrations.

Table 3 – List of components relied on for safety

Unique component reference or location (including drawing reference if required)	Application/Function	Manufacturer and part number (note 1)	RATING (note 2)	Licence number, file number or other documentary evidence of acceptance
NOTE 1 – List all manufacturers concerned. NOTE 2 – Electrical, mechanical, flammability, etc.				

Clause Subclause	Requirement	Result	Comments
5	Marking and documentation		
5.1.1	General Required equipment markings are: a) visible: – from the exterior - or – after removing a cover - or – opening a door - or – after removal from a rack or panel b) not put on parts which can be removed by an OPERATOR c) letter symbols (IEC 60027) used d) graphic symbols used (IEC 61010-1, Table 1)		
5.1.2	Identification Equipment is identified by: – manufacturer's name or registered trade mark – unique production batch identification		
5.1.3	Mains supply Equipment is marked as follows: a) nature of supply: – a.c. RATED mains frequency or range of frequencies – d.c. with symbol 1 b) RATED supply voltage(s) or range c) – maximum RATED power (W or VA) or input current If more than one voltage range: – separate values marked - or – values differ by less than 20 % (see Form A.3)		
F			

Clause Subclause	Requirement	Result	Comments
5.1.4	d) OPERATOR – set for different RATED supply voltages:		
	– indicates the equipment set voltage		
	– PORTABLE EQUIPMENT indication is visible from the exterior		
	– changing the setting changes the indication		
	e) Accessory mains socket-outlets accepting standard mains plugs are marked:		
	– with the voltage if it is different from the mains supply voltage		
	– for use only with specific equipment		
	If not marked for specific equipment it is marked with:		
	– the maximum RATED current or power, and maximum permitted leakage current		
	or		
	– symbol 14 with full details in the documentation		
	F The measured value not more than 110 % (see Form A.3)		
	Fuses		
	OPERATOR replaceable fuse marking (see also 5.4.5)		
5.1.5	Measuring circuit TERMINALS		
	RATED maximum working voltage or current marked		
	Unless clear indication that below limits:		
	– maximum RATED voltage to earth is marked		
	or		
	– for specific connection only, and means for identifying provided		
	– is adjacent to TERMINALS		
	or		
	– if insufficient space:		
	– on the RATING plate or scale plate		
	or		
	– if the TERMINAL is marked with symbol 14		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
5.1.6	INSTALLATION CATEGORY marked		
	TERMINALS permanently connected and not ACCESSIBLE		
	TERMINALS and operating devices		
	Where necessary for safety, indication of purpose of TERMINALS, connectors, controls and indicators		
	Mains supply TERMINALS identified		
	Power supply switch on or off position marked if used as disconnecting device		
	TERMINAL marking:		
	a) FUNCTIONAL EARTH TERMINALS		
	b) PROTECTIVE CONDUCTOR TERMINALS:		
	– symbol 6 is placed close to or on the TERMINAL		
5.1.7	or		
	– part of the appliance inlet		
	c) TERMINALS of measuring and control circuits		
5.1.8	d) TERMINALS supplied from the interior		
	e) ACCESSIBLE FUNCTIONAL EARTH TERMINALS		
	Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION		
5.1.8	Protected throughout (symbol 11 used)		
	Only partially protected (symbol 11 not used)		
	Battery charging		
5.1.101	Equipment with means to charge rechargeable batteries is marked:		
	– to warn against the charging of non-rechargeable batteries		
	– to indicate the type of rechargeable battery used		
	ROTORS and accessories		
	OPERATOR replaceable ROTORS and (their) subassemblies are marked with:		
	– manufacturer's identification		
	– part identification		

Clause Subclause	Requirement	Result	Comments
5.2	Warning markings – visible when ready for NORMAL USE – if necessary marked with symbol 14 – are near or on applicable parts – statement to isolate or disconnect – advice how to avoid contact with ACCESSIBLE HAZARDOUS LIVE parts – TERMINAL voltage exceeding 1 kV (symbol 12) – easily touched high temperature parts (symbol 13)		
5.3	Durability of markings The required markings remain clear and legible in NORMAL USE (see Form A.4)		
5.4	Documentation		
5.4.1	General Equipment is accompanied by documentation which includes: – technical specification – instructions for use – name and address of manufacturer or supplier Definition of INSTALLATION CATEGORY Warning statements and a clear explanation of warning symbols: – provided in the documentation - or – information is marked on the equipment		
5.4.2	Equipment RATINGS Documentation includes: – supply voltage or voltage range – frequency or frequency range – power or current RATING		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
5.4.3	– a description of all input and output connections		
	– RATING of insulation of external circuits, when such circuits are nowhere ACCESSIBLE		
	– statement of the range of environmental conditions		
	– list of ROTORS and accessories		
	– rotational frequencies		
	– restriction markings		
	– density, volume limits and derating		
	Equipment installation		
	Documentation includes instructions for:		
	– assembly, location and mounting		
	– CLEARANCE ENVELOPE area		
	– total weight		
	– site preparation		
	– levelling		
	– means of securing		
	– protective earthing		
	– connections to supply		
	– ventilation requirements		
	– special services		
	– maximum sound power level		
	– instructions about sound pressure		
	– emergency switch		
	Additional for permanently connected equipment:		
	– supply wiring		
	– any external switch or circuit-breaker (including location)		
	– any external overcurrent protection		

Clause Subclause	Requirement	Result	Comments
5.4.4	Equipment operation		
	Instructions for use include: – identification of operating controls – positioning for disconnection – interconnection – specification of intermittent operation limits – explanation of symbols used – replacement of consumable materials – loading and balancing – ROTOR changing procedure – requirement for an OPERATOR to be present – necessary safeguards for personnel – instructions for use of BIOSEALS, etc. A warning against use in a manner not specified by the manufacturer		
5.4.4.101	Hazardous substances		
	Precautions to be observed: – toxic materials – radioactive materials – micro-organism contamination – containers – multiple protection levels Materials prohibited: – flammable or explosive – materials which chemically react vigorously		

Clause Subclause	Requirement	Result	Comments
5.4.5	Equipment maintenance Instructions include: – sufficient preventive maintenance and inspection information – replacement of hoses, etc. – Includes: a) inspection: – fixing means – mounting surfaces b) safeguards during cleaning c) inspection of the PROTECTIVE CASING d) ROTOR ASSEMBLY: – inspection – safety considerations e) continuity of the protective earth f) inspection of BIOSEALS and other biosafety components: – importance of regular maintenance of BIOSEALS, etc. – specific battery type – any manufacturer specified parts – RATING and characteristics of fuses		
5.4.5.101	Cleaning and decontamination Documentation indicates: – user responsibility for decontamination – recommendations for cleaning and decontamination/generic names Withstands steam sterilization See Table 1A of IEC 61010-2-020 Wording in quotes appears in the documentation		

Clause Subclause	Requirement	Result	Comments
5.4.101	Not used		
5.4.102	Not used		
5.4.103	Effects of chemicals and environmental influences		
	Documentation identifies damage		
6	Protection against electric shock (see Form A.5)		
6.1	General		
	Conformity is checked by the determination of 6.2 and 6.3 followed by the tests of 6.4 to 6.12		
6.1.1	Exceptions		
	F Capacitance test (see Forms A.6 and A.7)		
6.2	Determination of ACCESSIBLE parts (see Form A.6)		
6.3	Permissible limits for ACCESSIBLE parts		
6.3.1	Values in NORMAL CONDITION (see Form A.7)		
6.3.2	Values in SINGLE FAULT CONDITION (see Form A.8)		
6.4	Protection in NORMAL CONDITION (see 6.8 and 8.1)		
6.5	Protection in SINGLE FAULT CONDITION		
	Additional protection is provided by:		
	– one or more of 6.5.1 to 6.5.3		
	or		
	– automatic disconnection of the supply		
6.5.1	Protective earthing		
	ACCESSIBLE conductive parts:		
	– bonded to the protective conductor terminal		
	or		
	– separated by screen or BARRIER from parts which are HAZARDOUS LIVE		
	(For indirect bonding of measurement and test equipment see 6.5.1.4)		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
6.5.1.1	PROTECTIVE BONDING PROTECTIVE BONDING consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses		
6.5.1.2	F Bonding impedance of plug-connected equipment (see Form A.9)		
6.5.1.3	F Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT (see Form A.9)		
6.5.1.4	F Indirect bonding for measuring and test equipment (see Form A.9)		
6.5.2	DOUBLE INSULATION AND REINFORCED INSULATION (see 6.7, 6.8 and 6.9.2)		
6.5.3	F PROTECTIVE IMPEDANCE (see Form A.10) Components wires and connections are RATED as required		
6.5.4	Built-in panel meters If after building-in, the requirements of 6.5.1 to 6.5.3 are not met: – panel meter: – has no ACCESSIBLE conductive parts – has BASIC INSULATION of ACCESSIBLE surfaces – has DOUBLE/REINFORCED INSULATION of ACCESSIBLE surface of parts intended to be grasped		
6.6	External circuits		
6.6.1	F Separation of internal circuits (see lists in Forms A.1 and A.5) If the other internal circuit exceeds the values of 6.3.2 in NORMAL CONDITION and only BASIC INSULATION: a) short-circuit could not make external circuit HAZARDOUS LIVE		

Clause Subclause	Requirement	Result	Comments
6.6.2	b) manufacturer's instructions include:		
	– a statement that the TERMINAL for external circuits is for use only with equipment which has no live parts which are ACCESSIBLE		
	– the RATING of the insulation required for external circuits		
	– the connection to be used at the remote end of external circuits		
	– the type of equipment which may be connected to the TERMINAL		
	TERMINALS for external circuits		
	ACCESSIBLE TERMINALS are not HAZARDOUS LIVE except as permitted by 6.1.1		
	The following TERMINALS are not HAZARDOUS LIVE:		
	– PROTECTIVE CONDUCTOR TERMINALS		
	– FUNCTIONAL EARTH TERMINALS		
6.6.3	– headphone TERMINALS		
	TERMINALS which receive a charge from an internal capacitor (see Form A.7)		
	High-voltage TERMINALS energized from the interior are:		
	– not accessible		
	or		
	– marked		
	Circuits with TERMINALS which are HAZARDOUS LIVE		
	These circuits:		
	– are not connected to ACCESSIBLE conductive parts		
	or		
6.7	– are connected to ACCESSIBLE conductive parts, but are not mains circuits and have one TERMINAL contact at earth potential		
	No ACCESSIBLE conductive parts are HAZARDOUS LIVE		
	CLEARANCES and CREEPAGE DISTANCES		
	F (see annex D of IEC 61010-1 and Form A.11)		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
6.8	Dielectric strength tests (see annex E of IEC 61010-1 and Form A.12)		
	Protection against the spread of fire (see 9.1)		
6.9	Constructional requirements for protection against electric shock		
6.9.1	General In circuits exceeding the values of 6.3.2: – security of wiring connections – screws securing removable covers – accidental loosening		
6.9.2	ENCLOSURES of equipment with DOUBLE INSULATION OR REINFORCED INSULATION ENCLOSURE surrounds all metal parts except for small metal parts which are separated ENCLOSURES or parts made of insulating material Protection for metal ENCLOSURES or parts by: – PROTECTIVE IMPEDANCE or – an insulating coating or BARRIER on the inside or – CLEARANCES and CREEPAGE DISTANCES cannot be reduced by loosening of parts or wires		
6.9.3	Equipment using PROTECTIVE BONDING a) OPERATOR removable parts b) Movable conductive connections c) Exterior metal braids of cables d) Mains passed through the equipment e) Protective earthing conductors green/yellow Exceptions: – earthing braids – internal protective conductors		
	f) Equipment using PROTECTIVE BONDING		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
6.9.4	Over-range indication		
	Unambiguous		
6.10	Connection to mains supply source and connections between parts of equipment		
6.10.1	Mains supply cords		
	RATED for maximum equipment current (see 5.1.3 c))		
	Cable conforms to IEC 60227, or IEC 60245 or is a certified cord		
	Heat resistant if likely to contact hot parts		
	Temperature RATING (cord and inlet)		
	Green/yellow used only for connection to PROTECTIVE CONDUCTOR TERMINALS		
	Detachable cords with IEC 60320 mains connectors:		
	– conform to IEC 60799		
	or		
	– have the current RATING of the mains connector		
6.10.2	Fitting of non-detachable mains supply cords		
6.10.2.1	Cord entry		
	Non-detachable cord protection:		
	– inlet smoothly rounded with radius $\geq 1,5 D$		
	or		
	– insulated cord guard protruding $\geq 5 D$		
6.10.2.2	Cord anchorage		
	The protective earth conductor is the last to take the strain		
	Cord anchorages:		
	– the cord is not clamped by direct pressure from a screw		
	– knots are not used		

Result: P = Pass F = Fail NA = Not Applicable