Prüfbericht-Nr.: *Test report no.:*	**CN21N4EW 001 Part I of II**	**Auftrags-Nr.:** *Order no.*:	244326771	
Kunden-Referenz-Nr.: *Client reference no.:*	**2166539**	**Auftragsdatum:** *Order date:*	22.04.2021	
Auftraggeber: *Client:*	Taizhou Bison Machinery Co., Ltd. / Room 201,NO.155 WEST TAIHE ROAD, JIAOJIANG, TAIZHOU CITY, 318000 Zhejiang P.R. China			
Prüfgegenstand: *Test item:*	Gasoline Engine Generator			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	Refer to page 2 of Part I			
Auftrags-Inhalt: *Order content*:	Type tests			
Prüfgrundlage: *Test specification:*	EN ISO 8528-13:2016			

Wareneingangsdatum: *Date of sample receipt:*	N/A
Prüfmuster-Nr.: *Test sample no:*	Refer to page 2 of Part I
Prüfzeitraum: *Testing period:*	14.09.2021 - 18.09.2021
Ort der Prüfung: *Place of testing:*	As Client
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shanghai) Co., Ltd
Prüfergebnis*: *Test result*:*	Pass

geprüft von: *tested by:*	Jie Xiong	**genehmigt von:** *authorized by:*	Xinling Liu
Datum: *Date: 2021.12.20*	Jie Xiong	**Ausstellungsdatum:** *Issue date: 2021.12.20*	Xinling Liu
Stellung */ Position:*	Project Engineer	**Stellung** */ Position:*	Technical Certifier

Sonstiges */ Other:* This report is only valid in its full version: Part I of II and Part II of II.
Attachment 1: Testing equipment list.

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Description of the machine

The presented machines are Gasoline Engine Generators:

All models with E mean electrical starter provided, details as below:

Type	Series No.	Generator		Engine
		Rated Voltage	Rated Output	Engine/ Displacement (cc)
BS2500	BS2500-2021080006	AC230V, 8.7A, 50Hz DC12V, 8.3A	2000W Max. : 2200W	BS168F-1/ 196
BS2500E	BS2500E-2021080001			
BS3500	BS3500-2021080007	AC230V, 12.2A, 50Hz; DC12V, 8.3A	2800W Max. : 3000W	BS170F/ 210
BS3500E	BS3500E-2021080002			
BS6500	BS6500-2021080008	AC230V, 21.7A, 50 Hz; DC12V, 8.3A	5000W Max. : 5500W	BS188F/ 390
BS6500E	BS6500E-2021080003			
BS7500	BS7500-2021080009	AC230V, 26.1A, 50 Hz; DC12V, 8.3A	6000W Max. : 6500W	BS190F/ 420
BS7500E	BS7500E-2021080004			
BS8500	BS8500-2021080010	AC230V, 30.4A, 50 Hz; DC12V, 8.3A	7000W Max. : 7400W	BS192F/ 440
BS8500E	BS8500E-2021080005			

Remark:

The measurement uncertainly of the measurement procedures listed in this test report does not include the compliance of the respective limit values / operating conditions.

Unless otherwise agreed with the customer, a conformity assessment is always carried out based on the applied standards.

At the customer´s request, the statement on the conformity of the product tested in this test report is carried out according to the criteria / requirements of the applied standards.

Evaluation conditions deviating from these are documented separately in the respective chapters.

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Clause	Requirement	Remarks - Results	Verdict
1	**Scope**	The generating set is included in the scope of this standard.	-
2	**Normative references**	Informative paragraph.	-
3	**Terms and definitions**	Informative paragraph.	-
4	**General**	-	P
	If the installation of a generating set can create hazards in addition to those covered by this part of ISO 8528, the safety requirements and/or protective measures related to these additional hazards are the responsibilities of the installer, if necessary with the agreement of the manufacturer of the generating set. The installer will be responsible for ensuring compliance for the additional hazards arising because of the installation.	No hazard is foreseeable during installation.	P
5	**Hazards**	-	-
	The hazards relevant to RIC engine driven generating sets that shall be considered in order to prevent personal injury are listed in Annex A.	Considered.	P
6	**Safety requirements and tests**	Refer to sub-clauses below.	P
6.1	General	-	P
	Machinery shall comply with the safety requirements and/or protective measures of this Clause. In addition, the machine shall be designed according to the principles of ISO 12100 for relevant but not significant hazards, which are not dealt with by this part of ISO 8528	Considered.	P
6.2	Starting system	Refer to sub-clauses below.	P
6.2.1	Requirements	-	P
	Starting systems can be triggered manually or automatically. Electrical starting systems normally operate at voltages of 24 V or below. Electrical starting systems above 24 V are not dealt with in this part of ISO 8528 and the installer of the engine shall ensure safe operation after connecting the engine to the driven machinery. For engines with compressed air starting, the starting pneumatic system shall comply with the installation requirements and with the operation and safety information specified in the manuals provided by the starting system components suppliers.	Starting system is triggered manually: Electrical starter provided for models with electrical starting system, including models BS2500E, BS3500E, BS6500E, BS7500E and BS8500E Recoil starter provided for all models;	P
	Crank handle starting systems shall meet the requirements specified in ISO 11102-1 and ISO 11102-2. In addition, the following requirements apply: — starting handles shall have sufficient clearance from the mounting surface to ensure safe turning; — diesel engines with a manual starter shall have a decompression facility which shall not be required to be hand-held during cranking.	Recoil starter provided for all models and electrical starter provided for models with electrical starting system, see above.	N/A
	The only permissible hand starting systems are crank handle (as defined above) and recoil starting devices as described in ISO 14314. The marking required in ISO 14314:2004, 7.3 shall not apply.	Considered.	P

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Clause	Requirement	Remarks - Results	Verdict
6.2.2	Verification	-	P
	Compliance with the requirements shall be verified by inspection and testing of the starting systems.	Fulfill the requirements.	P
6.3	Stopping	Refer to sub-clauses below.	P
6.3.1	Requirements	Refer to sub-clauses below.	P
6.3.1.1	Normal stopping	-	P
	All generating sets shall have a normal stopping device which can be manually or automatically actuated. Stopping controls shall remain in the stop position when operated. This shall operate by a device ensuring the cutting off of the fuel or the ignition (for spark ignition engines) supply. This device should include an air supply cut-off.	Manually normal stop is provided, turning the key switch to “OFF” position for models (BS2500E, BS3500E, BS6500E, BS7500E and BS8500E) with electrical starter while push the power switch to “OFF” position for models without electrical starter. The stopping control can remain in the stop position when operated.	P
6.3.1.2	Stopping in case of failure	-	N/A
	Generating sets except low power generating sets shall be provided with an automatically actuated stopping device in case of failure. This device shall monitor one or more signals of the generating set and if these signals are out of the allowable range it shall trigger the automatic stop. The main signals used to actuate automatic stopping may include, but not be limited to, the following	The inspected machines are low power generating sets.	N/A
	a) for the RIC engine 1) overspeed, 2) low lubricating oil pressure, 3) high coolant temperature, and 4) low coolant level; b) for the generator 1) excessive overvoltage, and 2) overload. These signals or other measures used to actuate automatic stopping shall be specified depending on the application.	a) For the spark ignition engine: - Speed is mechanical limited; b) Overload protection is provided by circuit breaker and fuse.	N/A
6.3.2	Verification	-	P
	Normal stopping shall be verified by inspection and testing of the stopping device in manual and in automatic modes (if provided in the application). Automatic stopping in case of failure shall be verified by testing the action of typical failure modes in operating conditions (an appropriate method shall be used to create typical failure conditions, e.g. manual triggering, short-circuiting of contacts).	Normal stop has been verified, function normally. Short-circuit test has been conducted simulating case of short-circuiting, refer to attached table of this report.	P
6.4	Emergency stopping	Refer to sub-clauses below.	N/A
6.4.1	Requirements	-	N/A

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Clause	Requirement	Remarks - Results	Verdict
	Emergency stopping devices are required for remote controlled generating sets and generating sets with an enclosure or container accessible by persons. In accordance with the risk assessment in ISO 12100:2010, 6.3.5.2, an emergency stopping device is not required for low power generating sets, as it shall not lessen the risk by reducing the stopping time. Emergency stopping devices shall be actuated manually. As for normal stopping, emergency stopping shall operate by a device ensuring the cutting off of the fuel supply or ignition (for spark ignition engines). This device should include an air supply cut-off.	Emergency stopping is not required for low power generating set.	N/A
	Emergency stopping devices shall also meet the requirements of ISO 13850, category 0, and the reset shall not initiate a restart or any hazardous conditions. Manually actuated emergency stopping devices shall be located inside and outside the enclosure or container in which a generating set is located and which is accessible for personnel to carry out maintenance or control operations when generating sets are in operation	See above.	N/A
6.4.2	Verification	-	N/A
	Emergency stopping devices shall be verified by inspection and testing in operating conditions	Refer to 6.4.1.	N/A
6.5	Control devices	Refer to sub-clauses below.	P
6.5.1	Design, safety and mechanical strength	Refer to sub-clauses below.	P
6.5.1.1	Requirements	-	P
	Control devices for the RIC engine of the generating set shall meet the following requirements: — hand controls shall be designed to withstand 1,2× the maximum actuating forces given in Table 1; Table 1 — Clearance between controls Operation by / Spacing (mm) / Maximum actuating (N) Fingertip / 10 / 10 Finger grasp — toggles / 20 / 50 — knobs / 20 / 50 Hand — upward / 50 / 400 — fore-aft / 50 / 300 — for handles, knobs, grips, levers and similar devices, requirements and tests shall be in accordance with IEC 60335-1:2013, 22.12; — controls shall act positively and smoothly and without delay or unexpected action and be in accordance with ISO 2261; — the surface temperature of the controls that shall be manually actuated while the engine is running shall be within the following limits in accordance with ISO 13732-1 for a contact time of 10 s, — 55 °C for metallic surfaces, and — 70 °C for non metallic surfaces; — sharp edges or corners on, or adjacent to manual controls shall be removed. Edges shall have a chamfer of at least 0,5 mm	Adequate spacing is provided for the hand controls and they are capable of withstanding 1.2 times the maximum actuating force according to Table 1, and the testing pulling force according to IEC 60335-1:2013, 22.12. Temperature of controls <55 ℃. See attached table 1 No sharp edges or corners adjacent to manual controls.	P

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Clause	Requirement	Remarks - Results	Verdict
6.5.1.2	Verification	-	P
	Control devices of the RIC engine shall be verified by inspection and testing. Control devices of the generating sets shall be verified in accordance with IEC 60204-1:2009, 10.1 and 10.2. For surface temperature measurement of the control devices (RIC engines and generating sets), the following method shall be conducted: a) the generating set shall be operated at its rated power until the surface temperatures stabilize; b) the test shall be conducted in a well-ventilated location not directly exposed to sunshine; c) if the test is conducted at an ambient temperature outside of the nominal (20 ± 3) °C the reported temperatures shall be corrected by the Formula (1): Corrected temperature (°C) = reported temperature (°C) − ambient temperature (°C)+20°C (1)	Fulfill the requirements.	P
6.5.2	Identification	See below	P
6.5.2.1	Requirements	See below	P
	The controls devices of the RIC engines shall be identified according to the function they perform or their function shall be explained in the operating manual. They shall be identified according to IEC 61310-2. Colour coding shall be according IEC 60073. The marking on the engine controls shall be legible throughout the engine life. Identification should preferably be by symbols according to ISO 7000 or ISO 8999 or, if there are no suitable symbols, by words placed on the control or adjacent to it. Design, location and marking principles shall be in accordance with IEC 61310-1. Emergency shut-off control handles or buttons shall be prominently located and shaped as well as being coloured red, in order to be identified among the other controls. The control devices on electrical equipment shall comply with the requirements of IEC 60204-1:2009, 10.1 and 10.2 with the exception as given in Table B.1.	Relevant symbols according to IEC 61310-2 , IEC 60073 and ISO 7000 are provided on the generating set. Fulfill the requirements in 10.2 of EN 60204-1.	P
6.5.2.2	Verification	-	P
	Compliance with the requirements shall be verified by inspection.	Fulfill the requirements.	P
6.5.3	Accessibility	Refer to sub-clauses below.	P
6.5.3.1	Requirements	-	P
	Controls should preferably be grouped. Controls should be located within reach of the operator. Access shall be provided according to ISO 15534-2. The spacing between controls shall be sufficient to allow operation without unintentional actuation of adjacent controls. For the minimum clearances between controls recommended for the given maximum actuating force, see Table 1.	Controls are easily accessible for the operator. Spacing between controls fulfills the requirements in Table 1.	P
6.5.3.2	Verification	-	P

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Clause	Requirement	Remarks - Results	Verdict
	Compliance with the requirements shall be verified by inspection and measurement	Fulfill the requirements.	P
6.6	Monitoring devices	Refer to sub-clauses below.	P
6.6.1	Requirements	Refer to sub-clauses below.	P
6.6.1.1	Instrument identification	-	P
	Monitoring instruments shall be identified on or adjacent to them, preferably by a symbol according to ISO 8999 or a descriptive wording for the system being monitored.	Indicator light for normal output and voltmeter are provided on the control panel. Relevant information is provided in user manual.	P
6.6.1.2	Instrument visibility	-	P
	Monitoring instruments should be visible to the operator. They shall be illuminated for night time or indoor operation so that they are legible from the operator's position where the application requires it.	The voltmeter and indicator light are visible and legible to the operator.	P
6.6.1.3	Instrument colour code	-	P
	Monitoring instruments and monitoring systems should preferably be colour coded according to IEC 60073. Red is recommended for malfunction or unsafe situation; green for a satisfactory situation or to indicate a system is operating. The instruments for the monitoring of the electrical equipment shall comply with IEC 60204-1:2009, 10.3	Refer to 6.1.1.1.	P
6.6.2	Verification	-	P
	Compliance with the requirements shall be verified by inspection	Fulfill the requirements.	P
6.7	Warning devices	Refer to sub-clauses below.	P
6.7.1	Requirements	-	P
	Warning devices, signs, markings and colours shall meet the requirements of ISO 11429	Warning signs fulfill the requirements.	P
6.7.2	Verification	-	P
	Compliance with the requirements shall be verified by inspection	Fulfill the requirements.	P
6.8	Guarding	Refer to sub-clauses below.	P
6.8.1	General	Refer to sub-clauses below.	P
6.8.1.1	Requirements	-	P
	The following clauses give the requirements for the common hazards related to guarding and any generating set or installation shall comply with these requirements. Guards shall be designed in accordance with ISO 14120. Fixing systems of fixed guards shall remain attached to the guards or to the generating set when the guards are removed. This requirement is limited to fixed guards that need to be removed during normal maintenance operations as described in instructions of use	All moving parts included in enclosure; No fixed guard needs to be removed during normal maintenance.	P

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Clause	Requirement	Remarks - Results	Verdict
	For fixed installed generating sets the need of guarding shall be agreed between generating set manufacturer and installer considering that persons shall be protected during operating and routine servicing. Because it is not possible to envisage the layout of fixed installation, the overall requirements for this situation are not dealt with in this part of ISO 8528. Therefore, for fixed installations, the need for additional guarding to protect persons during operation and routine servicing shall be established after discussion between the generating set manufacturer, user and installer. NOTE The provider of additional guarding for fixed installations that is outside the scope of this part of ISO 8528 is responsible for ensuring its suitability	No hazard is foreseeable during normal operation. Nevertheless the need for additional guarding to protect persons during operation and routine servicing shall be established after discussion between the generating set manufacturer, user and installer.	N/A
6.8.1.2	Verification	-	P
	Compliance with the requirements shall be verified by inspection	Fulfill the requirements.	P
6.8.2	Guarding against mechanical hazards	Refer to sub-clauses below.	P
6.8.2.1	Requirements	-	P
	Moving parts of generating sets, e.g. fan, belt, chains, etc. shall be so arranged or enclosed as to prevent direct involuntary access during normal use, i.e. during maintenance, monitoring or control operations described in the manual of use. If the guard is constructed of open-mesh material the openings shall be sized as follows: a) Guards that are less than 100 mm from a hazard shall meet the requirements of IEC 60034-5:2006, Clause 8, with the 12 mm test probe. b) Guards that are 100 mm or more from a hazard shall meet the opening requirements of ISO 13857:2008, Table 4.	Moving parts are adequately guarded.	P
6.8.2.2	Verification	-	P
	Compliance with the requirements shall be verified by measurement and if necessary by using a 12 mm test probe.	Fulfill the requirements.	P
6.8.3	Guarding against hot surfaces	Refer to sub-clauses below.	P
6.8.3.1	General	-	P
	The necessity to guard hot surfaces depends on its surface temperature, its location and if a person is likely to touch it. The temperature of the guards shall not exceed the threshold temperature. If this cannot be avoided, then display a warning	Hot surfaces are guarded appropriately and the temperature of the guard during normal operation is tested, some parts exceed the threshold value and warning marking indicating potential hot surfaces is provided.	P
6.8.3.2	Requirements for generating sets except low power generating sets	-	N/A

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Clause	Requirement	Remarks - Results	Verdict
	A risk assessment shall be carried out by the generating sets manufacturer to determine the surfaces with a burn hazard and identify appropriate protective measures in order to prevent accidental contact in normal conditions of use, i.e. during control, monitoring and maintenance operations described in the manual of use. At least the following areas shall be considered. a) The surfaces which can be reached when probed by the cones in accordance with Figure 1 and Figure 2 shall not have a temperature higher than the following: 1) 80 °C for metallic surfaces; 2) 94 °C for non metallic surfaces. b) The surfaces, except exhaust engine parts, which do not meet the requirements set in a) shall be guarded to meet a). When the guard does not permit the reduction of the temperature below the temperature limits, a warning marking shall be fixed on or near this guard to warn the generating sets user of the presence of a burn danger. c) Any engine exhaust surface more than 10 cm^2 which can be reached when probed by the cones, shall be equipped with a guard to limit the most severe burn risks by direct contact. The guard shall meet the requirements specified in a). When the guard does not permit the reduction of the temperature below the limits threshold, a warning marking shall be fixed on or near this guard to warn the generating sets user of the presence of a burn danger. d) An enclosure with access doors for maintenance or control operations shall not be considered as protection against contact with an engine exhaust.	Low power generating sets.	N/A
6.8.3.3	Verification for generating sets except low power generating sets	-	N/A
	a) The accessibility of the identified hot surfaces during control and monitoring operations shall be verified by applying the test cones in accordance with Figure 1 and Figure 2: 1) when the distance between the identified hot area and the nearest control is in excess of 100 mm, cone A as shown in Figure 1 shall be used; 2) for distances less than 100 mm between the identified hot area and the nearest control, cone B as shown in Figure 2 shall be used; 3) for cone A with the axis of the cone anywhere 0° and 180° to the horizontal and with the point of the cone in a downward to horizontal direction, move the cone towards the hot surface. The cone shall not be moved in an upwards direction. When moving the cone, determine if contact is made with the hot surface area(s) with the cone tip or conical surface of the cone; 4) Cone B shall be moved in any direction.	Low power generating sets.	N/A

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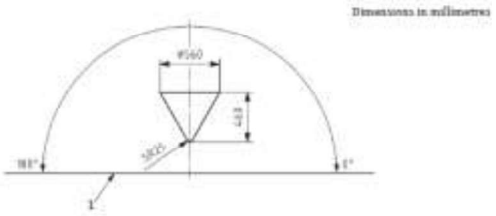
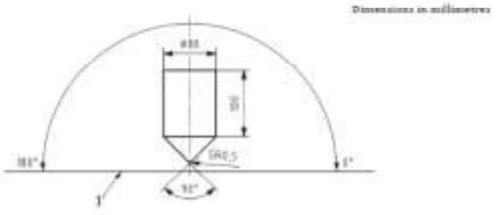
Clause	Requirement	Remarks - Results	Verdict
	b) For maintenance operations, the hot surfaces to be considered are those more than 10 cm^2 located at less than 300 mm of a maintenance or control point and/or of access path for operators. c) The generating set shall be operated at its rated power until the surface temperatures stabilize. d) The test shall be conducted in a well-ventilated location not directly exposed to sunshine. e) If the test is conducted at an ambient temperature outside of the nominal (20 ± 3) °C the reported temperatures shall be corrected by Formula (1): Corrected temperature (°C)= reported temperature(°C)−ambient temperature(°C)+20°C (1)  Figure 1 — Cone A  Figure 2 — Cone B	Low power generating sets.	N/A
6.8.3.4	Requirements for low power generating sets	-	P
	a) The accessible surfaces in the close proximity of controls shall not have a temperature higher than the following: 1) 80 °C for metallic surfaces; 2) 94 °C for non metallic surfaces. b) The carrying handles of generating sets and the accessible surfaces in their close proximity shall not have a temperature higher than the following: 1) 50 °C for metallic surfaces; 2) 70 °C for non metallic surfaces. c) The engine exhaust, with potential burn hazards during the operating, but also during cooling period following a generating sets stopping, shall be equipped with a guard to limit the most severe burn risks by accidental contact. The dimension of guard clearance shall ensure that such exhaust surface cannot be reached when being probed by test cones in accordance with Figure 1 and Figure 2. Any exhaust surface less than 10 cm2 does not need to be equipped with protection.	Temperature test has been conducted. Some parts exceed the threshold value and warning mark provided. See attached table 1.	P

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Clause	Requirement	Remarks - Results	Verdict
	Accessible engine exhaust components more than 10 cm^2 and their guards shall not have surface temperatures higher than 94 °C for non-metallic surfaces materials or 80 °C for metallic surfaces. When a guard does not permit the reduction of the temperature below the limits threshold, a warning marking shall be fixed, in addition, on or near this guard to warn the generating sets user of the presence of a burn danger. d) Accessible hot surface parts more than 10 cm^2 except for these services described in a), b) or c) with a temperature higher than 94°C for non-metallic surfaces or 80 °C for metallic surfaces, shall be located inside the frame contour and a warning marking shall be fixed, in addition, on or near the parts to warn the low power generating sets user of the presence of a burn danger. e) An enclosure with access doors for maintenance or control operations shall not be considered as protection against contact with an engine exhaust.	See above.	
6.8.3.5	Verification for low power generating sets	-	P
	a) The accessibility of the identified hot surfaces during control and monitoring operations shall be verified by applying the test cones in accordance with Figure 1 and Figure 2: 1) when the distance between the identified hot area and the nearest control is in excess of 100 mm, cone A as shown in Figure 1 shall be used; 2) for distances less than 100 mm between the identified hot area and the nearest control, cone B as shown in Figure 2 shall be used; 3) for cone A with the axis of the cone anywhere 0° and 180° to the horizontal and with the point of the cone in a downward to horizontal direction, move the cone towards the hot surface. The cone shall not be moved in an upwards direction. When moving the cone, determine if contact is made with the hot surface area(s) with the cone tip or conical surface of the cone; 4) Cone B shall be moved in any direction b) When the accessible hot surfaces are less than 10 cm2 they shall be verified in accordance with 6.8.3.1. 1) The surfaces temperatures shall be verified by measurement, 2) The generating set shall be operated at its rated power until the surface temperatures stabilize, 3) The test shall be conducted in a well-ventilated location not directly exposed to sunshine, 4) If the test is conducted at an ambient temperature outside of the nominal (20 ± 3) °C the reported temperatures shall be corrected by Formula (1): Corrected temperature (°C)= reported temperature(°C)−ambient temperature(°C)+20°C (1)	Fulfill the requirements. Refer to 6.8.3.4.	P

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Clause	Requirement	Remarks - Results	Verdict
	A guard shall be provided to prevent accidental contact with any engine exhaust component during normal operation; any hot surface smaller than 10 cm^2 does not require guarding. The determination of area for interrupted surfaces shall be made as follows. If a marked surface (with area A1) consists of multiple separate surfaces of which the sum of the areas (A2) exceeds 80 % of A1, then A1 shall be considered as one uninterrupted area (see Figure 3). Surfaces whose structure does not allow a ball with 2 mm diameter to penetrate more than 2 mm below highest parts of the structure shall be considered as part of A1 (see Figure 3). If a marked surface (with area A1) includes holes of which the sum of the areas (A3) is less than 20 % of the area of marked surface (A1) it shall be considered as one uninterrupted area (see Figure 4). The recorded area of the marked surface(s) shall not be larger than 10 cm^2	See above.	P
6.9	Stability for low power generating sets	Refer to sub-clauses below.	P
6.9.1	Not in operation	Refer to sub-clauses below.	P
6.9.1.1	Requirements	-	P
	Generating sets shall exhibit proof of suitable stability when not in operation Test shall be conducted with fuel filled to the maximum capacity specified in the manufacturer's instructions.	Stability is maintained with fuel filled to maximal capacity.	P
6.9.1.2	Verification	-	P
	Compliance shall be checked by placing the unit on a surface which is tilted 15° in all directions. The unit shall neither overturn nor spill fuel. Units with flaps or doors are tested both with the flaps and doors closed and then with them open. The unit shall satisfy requirements under the worst of conditions.	Fulfill the requirements.	P
6.9.2	In operation	-	P
6.9.2.1	Requirements	-	P
	Generating sets shall be suitable for operation on mounting surfaces inclined up to 4°.	Fulfill the requirements.	P
6.9.2.2	Verification	-	P
	Compliance is checked by operating the unit in four positions set at 90° intervals around the vertical axis on a rough concrete surface inclined up to 4°. The unit shall not change its position by more than 10 mm even after 30 min of operation at no-load and at rated power.	Fulfill the requirements.	P
6.10	Lighting	-	N/A
6.10.1	Requirements	-	N/A
	Except for low generating sets and if installed, the lighting of a generating set shall illuminate the control levers, monitoring devices and corresponding walkways with an intensity of at least 20 lux.	Low power generating set, No lighting is provided.	N/A
6.10.2	Verification	-	N/A

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Clause	Requirement	Remarks - Results	Verdict
	Compliance with the requirements shall be verified by measurement or technical documentation	Refer to 6.10.1.	N/A
6.11	Handling	Refer to sub-clauses below.	P
6.11.1	Requirements	-	P
	Generating sets above 140 kg shall have provisions for lifting attachments to attach lifting devices to lift the generating set or parts of it according to the manufacturers' instructions. The lifting attachments shall be designed to withstand at least 1,5 times the mass lifted by lifting attachments. The lifting attachments shall be located to allow at least 20 mm clearance between lifting rope or chain or belt and any generating set components, unless the components are designed to withstand the contact during a lifting operation without permanent deformation or damage to the rope, chain or belt. The access to the lifting attachments shall allow an easy attachment of the lifting hook or shackle. Lifting attachments shall be so located that lifting ropes, chains or belts converge over the centre of gravity (if no cross beam is used) when the generating set or its lifted component is in the normal position specified by the manufacturer. Generating sets below 140 kg intended for transportation by persons shall have carrying handles or an adequate frame design to transport it according to the manufacturers' manual The handles shall be designed to withstand at least 2,5 times the mass lifted divided by the number of carrying handles. NOTE Typically, generating sets are either designed with handles or use the frame for carrying purposes. Therefore, it is not possible to prescribe the exact number or layout of handles. As a basis for providing means of carrying the generating set it is considered that a 140 kg set should be provided with the means of carrying by 4 persons.	Lifting handles are provided for all models and can withstand 1.5 times the mass.	P
6.11.2	Verification	-	P
	Compliance with the requirements of 6.11.1 regarding the number and the location of the lifting attachments shall be verified by inspection. The strength of the lifting attachments to withstand the mass to be lifted shall be verified by testing or calculation.	Fulfill the requirements.	P
6.12	Mechanical strength	-	P
6.12.1	Requirements	-	P
	Low-power generating sets shall be designed in such a way as to be able to withstand robust handling within the framework of normal operation. All parts, damage to which may impair safety, shall have sufficient mechanical strength. The generating set shall satisfy the tests defined below.		

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Clause	Requirement	Remarks - Results	Verdict
	a) Subjected to impact using an impact tester. Blows are applied to the generating set by means of the spring-operated impact tester according to IEC 60068-2-75. The spring is adjusted in such a way as to cause the hammer to strike with an impact energy of 1, 0 J ± 0,05 J. The release mechanism springs are adjusted in such a way as to exert just sufficient pressure to keep the release jaws in the engaged position. The apparatus is cocked by pulling the cocking knob until the release jaws engage with the groove in the hammer shaft. Blows are applied by pushing the release cone against the sample in a direction perpendicular to the surface of the sample at the point to be tested. Pressure is slowly increased so that the cone moves back until it is in contact with the release bars, which then move to operate the release mechanism and allow the hammer to strike. The entire sample, under no-running conditions, is rigidly held and three blows are applied to every point of the enclosure which is likely to be weak. Blows are also applied to protective devices, handles, levers, knobs, etc b) Free-fall test. Before testing the generating set shall be in the usual carrying/transporting condition. It is dropped from a height of 20 cm on to a concrete floor. This test is performed once.	Impact test performed including voltage meter and free fall test are conducted. No hazard is foreseeable.	P
6.12.2	Verification	-	P
	After completing both tests, the sample shall exhibit no damage which would impair mechanical or electric safety	The samples exhibited no damage which could impair mechanical or electrical safety.	P
6.13	Fire protection	Refer to sub-clauses below.	P
6.13.1	General	-	P
	The design shall consider hazards from flammable liquids or gases with regard to routing of pipes, location of reservoir, leakage, filling and draining. The possibility of contact with energy sources that could result in a hazard should be minimized	Considered.	P
6.13.2	Requirements	-	P

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Clause	Requirement	Remarks - Results	Verdict
	For the RIC engine, the basic requirements of ISO 6826 shall be met. The orifices and the filling devices of the generating set shall meet the requirements of ISO 6826:1997, 6.2. The piping for flammable liquids shall meet the requirements of ISO 6826:1997, 7.3 and the draining valves the requirements of ISO 6826:1997, 7.6. For fuel tanks, the following additional requirements apply. Design requirements: — fuel tanks shall be designed as to ensure that no leaks develop under normal operating conditions; — filler necks in fuel tanks shall be arranged and designed in such a way as to ensure that fuel cans or other devices with spouts can be directly inserted and no fuel can come into contact with hot parts Strength requirements: — the tank shall be secured to withstand normal handling; — the tank shall be strong enough to withstand impact during normal handling or be protected from impact. For low power generating sets, the following additional temperature requirement applies. — Any parts of the generating set which are in direct contact with its supporting surface shall not exceed a temperature of 90 °C.	Fulfill the structure and strength requirements. Temperature of parts in contact with supporting surface was below 90°C. See attached table 1.	P
6.13.3	Verification	-	P
	Compliance with the requirements shall be verified by inspection and examination of the engine manufacturer documentation. For low power generating sets, compliance with the fuel tank strength requirements shall be satisfied by testing in accordance with 6.12.1 a). For low power generating sets, the temperature measurement shall be done in the same operating conditions as specified in 6.8.3.5.	Refer to 6.12.1 and 6.13.2.	P
6.14	Hoses, pipes and electrical harnesses of the RIC engine	Refer to sub-clauses below.	P
6.14.1	Requirements	-	P
	Hoses, pipes and electric harnesses, as well as fittings and connectors, shall be designed and made of material to withstand expected pressure, voltage, temperature, abrasion, corrosion, etc. Excessive hose and electric cable length shall be avoided to prevent misuse and obstruction. Hoses and electric harnesses shall be routed and retained so that it is unlikely they will be used as hand holds or footsteps. Hoses and electric harnesses shall not interfere with the accessibility of service points	Pipe and hoses are of low pressure. Hoses and electric harnesses can't be used as hand holds or footsteps.	P

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Clause	Requirement	Remarks - Results	Verdict
	Hoses and pipe assemblies that can leak flammable liquids or gases onto hot surfaces, shall either be guarded to prevent the liquid going onto the hot surface or be dimensioned to be able to contain twice the operating pressure. In case of fuel pipes, 1,2 times the maximum operating pressure is sufficient		
6.14.2	Verification	-	P
	Compliance with requirements shall be verified by inspection and examination of the documentation provided by component manufacturers	Fulfill the requirements.	P
6.15	Electrical equipment	Refer to sub-clauses below.	P
6.15.1	Generating sets	-	P
6.15.1.1	Degree of protection	-	P
	These requirements do not apply to the safety extra low voltage circuits	See below	P
6.15.1.1.1	Protection against solid foreign objects and protection of persons against access to hazardous parts inside the enclosure	Refer to sub-clauses below.	P
6.15.1.1.1.1	Requirements (minimum degree of protection)	-	P
	a) For generating sets except low power generating sets — generating set : IP2X, — operator interface : IP3X, — live parts on the inside of doors : IP1X, and — switching and control devices : IP4X. NOTE If inside of doors: IP2X. b) For low power generating sets — generating set : IP2X, and — operator interface : IP3X.	IP2X for generating sets and IP3X for operator interface. Select models BS2500E and BS8500E for IP verification.	P
6.15.1.1.1.2	Verification	-	P
	The degree of protection shall be verified on the generating set in accordance with the test method and acceptance criteria of IEC 60529.	The degree of protection has been verified by test according to IEC 60529.	P
6.15.1.1.2	Protection of the equipment inside the enclosure against harmful effects due to the ingress of water	Refer to sub-clauses below.	P
6.15.1.1.2.1	Requirements (minimum degree of protection)	-	P
	a) For generating sets except low power generating sets — generating set : IPX1M, and — operator interface : IPX3M. b) For low power generating sets — generating set and operator interface : IPX3M	The degree of protection (IPX3M) has been verified by test according to IEC 60529. Select models BS2500E and BS8500E for IP verification.	P
6.15.1.1.2.2	Verification	-	P

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Clause	Requirement	Remarks - Results	Verdict
	The test method for each degree of protection shall be in accordance with IEC 60529 in operation condition with no load. The test sample for the test shall be in a clean and new condition with all parts in place and mounted in the manner stated by the manufacturer. The degree of protection shall be verified in accordance with the acceptance criteria following a) or b). a) Generating sets except low power generating sets shall comply with the acceptance criteria of IEC 60529. b) For the lower power generating sets. After the test against ingress of water, — a dielectric test shall be performed in accordance with IEC 60335-1: 2013, 16.3, Table 7, and — the creepage distance shall comply with IEC 60335-1:2013, 29.2, Table 17.	The generating set has passed dielectric test with AC 1250 V after IPX3M test. Creepage distances comply with IEC 60335-1:2013, 29.2, Table 17.	P
6.15.1.2	Insulation	Refer to sub-clauses below.	P
6.15.1.2.1	Requirements	-	P
	The insulation of output circuit shall comply with IEC 60204-1.	Refer to Part II.	P
6.15.1.2.2	Verification	-	P
	Insulation of output circuit shall be verified according to IEC 60204-1:2009, 18.3, 18.4. In addition, for generators equipped with safety extra low-voltage circuits for the output that may be in direct contact of persons with its live parts during the operation, such as the output for battery charging outside the generating sets, or extra low- voltage circuits for control circuits inside generating sets, the generating set windings for these circuits shall be electrically isolated from other windings. The voltage test according to IEC 60034-1:2010, 9.2 shall be performed between the main and/or excitation windings at: $2U_N$ + 2000 V for generating set windings of safety extra low voltage circuit 2 U_N + 1000 V for generating set windings of extra low voltage circuit where, U_N is the rated output voltage of the generating set.	Tests for insulation of output circuit according to IEC 60204-1:2009, 18.3, 18.4 have been performed and passed.	P
6.15.1.3	Protective bonding circuit	Refer to sub-clauses below.	P
6.15.1.3.1	Requirements	-	P
	The protective bonding circuit shall comply with IEC 60204-1	Refer to Part II.	P
6.15.1.3.2	Verification	-	P
	The function of the protective bonding circuit shall be verified according to IEC 60204-1:2009, 18.2	Fulfill the requirements.	P
6.15.1.4	Clearances, creepage distances and solid insulation	Refer to sub-clauses below.	P
6.15.1.4.1	Requirements	-	P
	Creepage distances and clearances shall not be less than the values, in mm, in IEC 60335-1:2013, Clause 29	Creepage distances and clearances fulfill the requirements. See attached table 5.	P
6.15.1.4.2	Verification	-	P

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Clause	Requirement	Remarks - Results	Verdict
	Compliance shall be checked by measurement of the clearances and verification on the basis of manufacturing documents	Fulfill the requirements.	P
6.15.2	Other electrical equipment	-	P
	Electrical equipment used to operate the generating set shall meet the requirements of Annex B	Fulfill the requirements.	P
6.16	Noise	Refer to sub-clauses below.	P
6.16.1	Requirements	-	P
	When designing the generating set, the available information and technical measures to control noise at source shall be taken into account, see for example, ISO/TR 11688-1. The main sources of airborne noise on generating sets include the following: — the engine; — the cooling system fan if provided; — the exhaust system	Considered.	P
6.16.2	Verification	See below	P
	Airborne noise shall be measured as specified in ISO 8528-10:1998, Clause 9 at 75 % of rated power (PRP), except for low power generating sets to ISO 8528-8:2016, 3.3 (COP) and determined according to ISO 8528-10:1998, Clause 13 for the sound power level and according to ISO 8528-10:1998, Clause 14 for the emission sound pressure level.	Checked and OK A-weighted sound power level tested and included in user manual.	P
6.17	Access systems	Not required or used.	N/A
6.17.1	Requirements	-	N/A
	Surfaces of all access system (e.g. walkways and platforms, etc.), if required, shall be slip resistant under the expected use to minimize the possibility of foot slippage. Access systems shall be level and free from obstructions and protrusions to prevent injury. The structure shall be sufficiently sturdy and stable to support any expected load without undue deformation or loss of integrity. Access systems shall be designed according to ISO 14122-2:2001 and ISO 14122-2:2001/Amd1:2010.	Refer to 6.17.	N/A
6.17.2	Verification	-	N/A
	Compliance with the requirements shall be verified by test or calculation	Refer to 6.17.	N/A
6.18	Access to service points	Not related.	N/A
6.18.1	Requirements	-	N/A
	Openings intended for maintenance purposes shall comply with ISO 15534-2.	No such opening.	N/A
6.18.2	Verification	-	N/A
	Compliance with the requirements shall be verified by inspection and measurement	Refer to 6.18.1.	N/A
6.19	Gaseous and particulate exhaust emissions	Refer to sub-clauses below.	P
6.19.1	Requirements	-	P

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Clause	Requirement	Remarks - Results	Verdict
	The exhaust shall be directed away from the generating set control panel. For generating sets intended to be used indoors, the exhaust shall be directed outside. NOTE This is the responsibility of the installer, see 7.1	The exhaust is directed away from the generating set control panel.	P
6.19.2	Verification	-	P
	Compliance with the requirement shall be verified by inspection.	Fulfill the requirements.	P
6.20	Drainage	Refer to sub-clauses below,.	P
6.20.1	Requirements	-	P
	Provisions shall be made to allow drainage of fuel, coolant and lubrication oil without any spillage. This can be achieved by — permanently installed pipework to a collection point, or — providing access for collection containers to allow direct drainage, or — access to drain plugs without the need to remove guards.	Provisions allowing drainage of fuel, lubrication oil are provided.	P
6.20.2	Verification	-	P
	Compliance with the requirements shall be verified by inspection	Fulfill the requirements.	P
7	**Operating and maintenance instructions**	Refer to sub-clauses below.	P
7.1	Requirements	-	P
	Operating and maintenance instruction shall comply with ISO 12100:2010, 6.4.5 and shall provide adequate information to enable the generating set to be operated safely and give clear advice concerning its installation, use and maintenance. Extensive use should be made of photographs and/or diagrams. The operating and maintenance instructions shall include, but not be limited, to the following: a) general description, in particular description of the generating set nameplate, and explanation of the adjustment points that shall not be modified; b) general information concerning the toxicity of exhaust gases, fuel and oil; c) information concerning the limitation of use at locations where the risk of fire may be high; d) filling with fuel and oil; e) starting and stopping; f) correct use of batteries; g) indications about the hot surfaces and their guards when provided; h) routine maintenance instructions;	All necessary information is provided.	P

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Clause	Requirement	Remarks - Results	Verdict
	i) correct disposal of residual fluids; j) indication that the installation and major repair work shall be carried out only by specifically trained personnel; k) information on installation precautions, e.g. exhaust system, intake system, cooling system, drainage, fuelling, electrical connection, noise and access; l) if necessary advice on the need of personal protection equipment; m) in the case of generating sets provided for use by laymen the supplied instructions shall meet the requirements as defined in Annex C; n) the operation manual shall contain information on sound power level from the generating set and the emission sound pressure level at the operator's position(s) as follows: 1) A-weighted sound power level (LwA in accordance with ISO 8528-10:1998) emitted by the machine, together with uncertainty of stated values where the equivalent continuous A-weighted emission sound pressure level at the operator's station(s) exceeds 80 dB. The declaration of this value shall have the format of a single number declaration as defined in ISO 4871. 2) A-weighted emission sound pressure level (LpA) at the operator's station (at a distance of 1 m where no operator station is existing) where this exceeds 70 dB, together with uncertainty of stated values; where this level does not exceed 70 dB, this fact shall be indicated. The declaration of this value shall have the format of a dual-number declaration as defined in ISO 4871 3) For indoor generating sets for which the ambient noise levels depend on the conditions of installation, it is not possible to specify these ambient noise levels in the operating and maintenance instructions. In this case, the operating and maintenance instructions shall include a warning about the dangers of airborne noise and on the need for performing, after the installation, acoustic measurements to determine the sound pressure level in the conditions specified in 6.16.2 and for implementing appropriate protective measures if necessary		P
7.2	Verification	-	P
	Compliance with the requirements shall be verified by examination of the operating and maintenance instructions and then by inspection of the generating set.	Fulfill the requirements.	P
8	**Safety labels**	Refer to sub-clauses below.	P
8.1	Requirements	-	P

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Clause	Requirement	Remarks - Results	Verdict
	The labels shall be clearly visible, legible and indelible. The symbols shall be labelled according to ISO or IEC relevant standards. Safety labels shall be present on a generating set to inform the user of potential danger if these risks have been identified by the manufacturer. Low power generating sets shall be labelled with at least the following safety labels: a) read the operator's instruction manual; b) exhaust gas is poisonous; do not operate in an unventilated area [Carbon monoxide (CO) danger]; c) not to refuel when operating. Safety labels shall be, for example, as shown below.	All required labels were provided and fulfill the requirements.	P
8.2	Verification	-	P
	The conformity of the safety labels shall be verified by inspection	Fulfill the requirements.	P
9	**Marking**	Refer to sub-clauses below.	P
9.1	Requirements	-	P
	Generating sets shall be marked legibly and indelibly with the following minimum information: — the name and address and trademark of the manufacturer and where applicable his authorized representative; — the designation of the machinery "Generating set" or " Low-power generating set " — the designation of series or type1) — the serial number; — the year of construction, that is the year in which the manufacturing process is completed; — mass in kilograms; — the rated power, in kilowatts, with the prefixes COP, PRP, LTP or ESP in accordance with ISO 8528-1:2005, Clause 13; — the performance class in accordance with ISO 8528-1:2005; — the rated power factor — the rated frequency, in hertz; — the rated voltage, in volts; — the rated current, in amperes; — for low power generating sets: — the quality class in accordance with ISO 8528-8:2016, 7.3.2; — the maximum power, in kilowatts, with the prefix MAX in accordance with ISO 8528-8:2016, 3.4; — the degree of protection provided by the generating set (at least IP23M). NOTE Information related to the maximum side altitude above sea level (m) and the maximum site ambient temperature (C°) are not relevant for the rating plate but can be made available in a technical documentation	All necessary information is provided on the nameplate.	P
9.2	Verification	-	P

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Clause	Requirement	Remarks - Results	Verdict
	The conformity of the markings shall be verified by inspection.	Fulfill the requirements.	P
Annex A (normative)	**List of hazards**	Considered.	P
Annex B (normative)	**Application of IEC 60204-1:2009 for generating sets**	Refer to Part II.	P
Annex C (normative)	**Instruction manual — Safety guide additional requirements for low-power generating sets for use by laymen**	Required information is contained in user manual.	P

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Clause	Requirement	Remarks - Results	Verdict

Attached table 1: Temperature rise under normal operating conditions

Test according to the following related clause:

Clause 6.8.3	Guarding against hot surface	P
Clause 6.12	Fire protection	P
Clause 6.14.1	Temperature rise of generators under normal operating conditions	P

Test for **BS2500E:**

Test requirements		Voltage (V)	Current (A)	Output power (W)
Operated at rated power	Start	223.4	8.911	1993
	Middle	224.1	8.930	1998
	End	224.2	8.940	2003

Temperature rise measurement (with thermocouple)

No.	Points	Required value (°C)	T(℃)
1.	Control panel	50	41.4
2.	Starting handle	50	36.6
3.	Lower side of bottom support	90	46.2
4.	Motor enclosure	80	78.9
5.	Fixed guard near muffler	80	110.3
6.	Fixed guard near muffler	80	74.6
7.	Muffler exhaust pipe	80	85.4
8.	Muffler exhaust pipe	80	130.4
9.	Cap of cylinder	80	65.1
10.	Amb.	--	28.0

Temperature rise measurement (resistance method)

Winding	t_1(°C)	R_1(Ω)	t_2(°C)	R_2(Ω)	T(K)	Limit (K)
Main winding	28.0	2.250	29.6	2.996	85.8	105 (class F)
Auxiliary winding	28.0	3.650	29.6	4.723	75.7	105 (class F)
DC winding	28.0	0.156	--	--	--	105 (class F)

Test for **BS3500E:**

Test requirements		Voltage (V)	Current (A)	Output power (W)
Operated at rated power	Start	224.7	12.52	2819
	Middle	224.6	12.43	2795
	End	234.2	12.45	2793

Temperature rise measurement (with thermocouple)

No.	Points	Required value (°C)	T(℃)
1.	Control panel	50	40.4

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Clause	Requirement	Remarks - Results	Verdict

2.	Starting handle	50	24.6
3.	Bottom of fuel tank	80	33.8
4.	Lower side of bottom support	90	61.1
5.	Motor enclosure	80	73.8
6.	Fixed guard near muffler	80	110.3
7.	Fixed guard near muffler	80	61.5
8.	Muffler exhaust pipe	80	141
9.	Muffler exhaust pipe	80	154
10.	Cap of cylinder	80	53.6
11.	Amb.	--	28.0

Temperature rise measurement (resistance method)

Winding	t_1(°C)	R_1(Ω)	t_2(°C)	R_2(Ω)	T(K)	Limit (K)
Main winding	28.0	1.149	29.0	1.581	97.9	105 (class F)
Auxiliary winding	28.0	2.732	29.0	3.621	84.6	105 (class F)
DC winding	28.0	0.144	--	--	--	105 (class F)

Test for **BS6500E:**

Test requirements		Voltage (V)	Current (A)	Output power (W)
Operated at rated power	Start	226.6	22.26	5041
	Middle	226.6	22.07	5013
	End	227.1	22.01	5005

Temperature rise measurement (with thermocouple)

No.	Points	Required value (°C)	T(℃)
1.	Control panel	50	39.0
2.	Starting handle	50	32.6
3.	Bottom of fuel tank	80	48.4
4.	Lower side of bottom support	90	64.2
5.	Motor enclosure	80	66.2
6.	Fixed guard near muffler	80	126.1
7.	Fixed guard near muffler	80	185.2
8.	Muffler exhaust pipe	80	86.7
9.	Muffler exhaust pipe	80	135.4
10.	Cap of cylinder	80	45.2
11.	Amb.	--	28.0

Temperature rise measurement (resistance method)

Winding	t_1(°C)	R_1(Ω)	t_2(°C)	R_2(Ω)	T(K)	Limit (K)
Main winding	28.0	0.532	29.0	0.702	83.0	105 (class F)
Auxiliary winding	28.0	1.059	29.0	1.342	69.3	105 (class F)
DC winding	28.0	0.12	--	--	--	105 (class F)

Test for **BS7500E:**

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Clause	Requirement	Remarks - Results	Verdict

Test requirements		Voltage (V)	Current (A)	Output power (W)
Operated at rated power	Start	225.6	26.55	5997
	Middle	226.6	26.38	5987
	End	227.3	26.44	6012

Temperature rise measurement (with thermocouple)

No.	Points	Required value (°C)	T(℃)
1.	Control panel	50	39.8
2.	Starting handle	50	34.4
3.	Bottom of fuel tank	80	49.6
4.	Lower side of bottom support	80	72.8
5.	Motor enclosure	80	55.6
6.	Fixed guard near muffler	80	130.1
7.	Fixed guard near muffler	80	171
8.	Muffler exhaust pipe	80	183
9.	Muffler exhaust pipe	80	196
10.	Cap of cylinder	80	68.4
11.	Amb.	--	28.0

Temperature rise measurement (resistance method)

Winding	t_1(°C)	R_1(Ω)	t_2(°C)	R_2(Ω)	T(K)	Limit (K)
Main winding	28.0	0.459	30.6	0.627	93.1	105 (class F)
Auxiliary winding	28.0	1.072	30.6	1.396	78.5	105 (class F)
DC winding	28.0	0.136	--	--	--	105 (class F)

Test for **BS8500E:**

Test requirements		Voltage (V)	Current (A)	Output power (W)
Operated at rated power	Start	226.9	30.86	7006
	Middle	228.4	30.68	7009
	End	229.3	30.47	6994

Temperature rise measurement (with thermocouple)

No.	Points	Required value (°C)	T(℃)
1.	Control panel	50	40.8
2.	Starting handle	50	35.4
3.	Bottom of fuel tank	80	52.6
4.	Lower side of bottom support	80	70.4
5.	Rear cover	80	52.8
6.	Motor enclosure	80	57.6
7.	Fixed guard near muffler	80	136.2
8.	Fixed guard near muffler	80	180
9.	Muffler exhaust pipe	80	122.4
10.	Muffler exhaust pipe	80	140
11.	Cap of cylinder	80	82.9
12.	Amb.	--	20.0

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Clause	Requirement	Remarks - Results	Verdict

Temperature rise measurement (resistance method)						
Winding	t_1(°C)	R_1(Ω)	t_2(°C)	R_2(Ω)	T(K)	Limit (K)
Main winding	29.0	0.351	30.0	0.473	90.8	105 (class F)
Auxiliary winding	29.0	0.749	30.0	0.986	82.5	105 (class F)
DC winding	29.0	0.115	--	--	--	105 (class F)

Remark: according to clause 6.8.3.4 of EN ISO 8528-13:2016, "When a guard does not permit the reduction of the temperature below the limits threshold, a warning marking shall be fixed, in addition , on or near the this guard to warn the generating sets user of the presence of a burn danger." Warning mark is provided besides the muffler.

Attached table 2: temperature rise measurements under over load conditions

Test according to clause 6.13.1	P

Test for **BS2500E:**

Maximum output power (W)	2205 W
Operating time (min)	30 min

Temperature rise measurement (resistance method)						
Winding	t_1(°C)	R_1(Ω)	t_2(°C)	R_2(Ω)	T(K)	Limit (K)
Main winding	28.0	2.250	30.0	3.251	115.0	125(Class F)
Auxiliary winding	28.0	3.650	30.0	5.120	103.9	125(Class F)

Test for **BS3500E:**

Maximum output power (W)	3008W
Operating time (min)	30 min

Temperature rise measurement (resistance method)						
Winding	t_1(°C)	R_1(Ω)	t_2(°C)	R_2(Ω)	T(K)	Limit (K)
Main winding	28.0	1.149	29.0	1.657	115.3	125(Class F)
Auxiliary winding	28.0	2.732	29.0	3.820	103.7	125(Class F)

Test for **BS65000E:**

Maximum output power (W)	5530 W
Operating time (min)	5 min
Temperature rise measurement (resistance method)	

Winding	t_1(°C)	R_1(Ω)	t_2(°C)	R_2(Ω)	T(K)	Limit (K)
Main winding	28.0	0.532	29.0	0.724	93.9	125(Class F)
Auxiliary winding	28.0	1.059	29.0	1.389	81.0	125(Class F)

Test for **BS7500E:**

Maximum output power (W)	6503 W
Operating time (min)	30 min

Temperature rise measurement (resistance method)

Winding	t_1(°C)	R_1(Ω)	t_2(°C)	R_2(Ω)	T(K)	Limit (K)
Main winding	28.0	0.459	31.0	0.660	112.2	125(Class F)
Auxiliary winding	28.0	1.072	31.0	1.493	100.3	125(Class F)

Test for **BS8500E:**

Maximum output power (W)	7395 W
Operating time (min)	20 min

Temperature rise measurement (resistance method)

Winding	t_1(°C)	R_1(Ω)	t_2(°C)	R_2(Ω)	T(K)	Limit (K)
Main winding	29.0	0.351	30.0	0.493	105.8	125(Class F)
Auxiliary winding	29.0	0.749	30.0	1.012	91.7	125(Class F)

Attached table 3: electric strength test

Test according to clause 10			P
Test for models: **BS2500E, BS3500E, BS6500E, BS7500E, BS8500E**			
Test voltage applied between	Time (min)	Voltage (V)	Breakdown (Yes/No)
L/N – Metal enclosure	1	1250 (after IPX3M test)	No
Internal wire	5	2000	No

Attached table 4: protection against electric shock

Test according to clause 10		P
Types for test	Time (s)	Phenomenon
BS2500E, BS3500E, BS6500E, BS7500E, BS8500E	<0.4	The voltage is reduced to <50V with circuit breaker opened.

EN ISO 8528-13: 2016

Clause	Requirement	Remarks - Results	Verdict

Attached table 5: clearance, creepage distances and solid insulation

Test according to IEC 60335-1:2013, Clause 29	P

Test for **BS2500E:**

Overvoltage category	II				
Working voltage to earth (r.m.s.)	Max. 250 V				
Rated impulse voltage:	2500V				
Clearance cl and creepage distance cr at/of:	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
Stator winding –stator core	250 (Max)	1.5+0.5	4.0	1.5+0.5	4.0
Rotator winding –rotator core	250 (Max)	1.5+0.5	4.0	1.5+0.5	4.0
Rotator winding– armature	250 (Max)	1.5+0.5	3.5	1.5+0.5	3.5
AC winding –DC winding	250 (Max)	3.0+0.5	∞	8.0	∞

Test for **BS3500E:**

Overvoltage category	II				
Working voltage to earth (r.m.s.)	Max. 250 V				
Rated impulse voltage:	2500V				
Clearance cl and creepage distance cr at/of:	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
Stator winding –stator core	250 (Max)	1.5+0.5	4.0	1.5+0.5	4.0
Rotator winding –rotator core	250 (Max)	1.5+0.5	4.0	1.5+0.5	4.0
Rotator winding– armature	250 (Max)	1.5+0.5	3.5	1.5+0.5	3.5
AC winding –DC winding	250 (Max)	3.0+0.5	∞	8.0	∞

Test for **BS6500E:**

Overvoltage category	II				
Working voltage to earth (r.m.s.)	Max. 250 V				
Rated impulse voltage:	2500V				
Clearance cl and creepage distance cr at/of:	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
Stator winding –stator core	250 (Max)	1.5+0.5	4.0	1.5+0.5	4.0

Clause	Requirement	Remarks - Results	Verdict

Rotator winding –rotator core	250 (Max)	1.5+0.5	4.0	1.5+0.5	4.0
Rotator winding– armature	250 (Max)	1.5+0.5	3.5	1.5+0.5	3.5
AC winding –DC winding	250 (Max)	3.0+0.5	∞	8.0	∞

Test for **BS7500E:**

Overvoltage category	II				
Working voltage to earth (r.m.s.)	Max. 250 V				
Rated impulse voltage:	2500V				
Clearance cl and creepage distance cr at/of:	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
Stator winding –stator core	250 (Max)	1.5+0.5	4.0	1.5+0.5	4.0
Rotator winding –rotator core	250 (Max)	1.5+0.5	4.0	1.5+0.5	4.0
Rotator winding– armature	250 (Max)	1.5+0.5	3.5	1.5+0.5	3.5
AC winding –DC winding	250 (Max)	3.0+0.5	∞	8.0	∞

Test for **BS8500E:**

Overvoltage category	II				
Working voltage to earth (r.m.s.)	Max. 250 V				
Rated impulse voltage:	2500V				
Clearance cl and creepage distance cr at/of:	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
Stator winding –stator core	250 (Max)	1.5+0.5	4.0	1.5+0.5	4.0
Rotator winding –rotator core	250 (Max)	1.5+0.5	4.0	1.5+0.5	4.0
Rotator winding– armature	250 (Max)	1.5+0.5	3.5	1.5+0.5	3.5
AC winding –DC winding	250 (Max)	3.0+0.5	∞	8.0	∞

Remark: 1, lacquered conductors of windings are considered to be bare conductors, but creepage distances for basic insulation in other than a double insulation construction need not be greater than the associated clearance specified in Table 16 taking into account 29.1.1;

2, the rated voltage is 230V, select the overvoltage category II, so the rated impulse voltage is 2500V and the required minimum clearance is 1.5+0.5mm;

3, the creepage and clearance between AC winding and DC winding are considered to be reinforced insulation. The DC winding is enclosed by insulating paper.

EN ISO 8528-13: 2016

Clause	Requirement	Remarks - Results	Verdict

ATTACHED TABLE 6: COMPONENT LIST

List of critical components for model **BS2500, BS2500E**:

Object/part No.	Manufacturer/ trademark	Type/ model	Technical data	Standard	Mark(s) of conformity
1.Engine	Taizhou Bison Machinery Co., Ltd.	BS168-1	196cc	EN ISO 8528-13:2016	Test with machine
2.Generator	Taizhou Bison Machinery Co., Ltd.	2000W	Main winding: 2.250Ω Auxi. winding: 3.650Ω DC winding: 0.156Ω Temp.: 28.0℃ Material: copper Class: F	EN ISO 8528-13:2016	Test with machine
3.Socket outlet	ZHEJIANG SUOBEN ELECTRIC CO.,LTD	02021602	AC250V, 16A, IP44	DIN VDE 0620-1/03. 2013	TUV 50312482
4. AC Circuit Breaker (AC)	WENZHOU SINNA ELECTRIC CO., LTD	SNB1-30-A2	AC240/415,50/60Hz 9A	EN60934:2001+A1+A2	TÜV/ 50046704
5. Fuse	Shen Zhen Lanson Electronics Co, Ltd		8A,10A	EN 60127-1:2006+A1+A2 EN 60127-2:2015	VDE 40009306
6. AVR	CONGQING LILAN ELECTRIC CO., LTD.	AVR1-3KW		EN ISO 8528-13:2016	Test with machine
7. Voltmeter	FUZHOU HAN JING Electric Co., Ltd	9114(1)	0-300V	EN ISO 8528-13:2016	Test with machine
8. Power switch (for model without electrcial starter)	Yeqing Jinghan Electronic Co., Ltd.	KDC3 KDC4	AC250V, 16(10)A	EN 61058-1:2002/A2	TÜV SUD N8A170779494008

Remark:
(1) The impact test with 1J and creepage distance measured for voltmeters.

List of critical components for model **BS3500，BS3500E**:

Object/part No.	Manufacturer/ trademark	Type/ model	Technical data	Standard	Mark(s) of conformity
1.Engine	Taizhou Bison Machinery Co., Ltd.	BS170F	210cc	EN ISO 8528-13:2016	Test with machine
2.Generator	Taizhou Bison Machinery Co., Ltd.	2800W	Main winding: 2.250Ω Auxi. winding: 3.650Ω DC winding: 0.156Ω Temp.: 28.0℃ Material: copper Class: F	EN ISO 8528-13:2016	Test with machine
3.Socket outlet	ZHEJIANG SUOBEN ELECTRIC CO.,LTD	02021602	AC250V, 16A, IP44	DIN VDE 0620-1/03. 2013	TUV 50312482
4. AC Circuit Breaker (AC)	WENZHOU SINNA ELECTRIC CO., LTD	SNB1-30-A2	AC240/415,50/60Hz 13A	EN60934:2001+A1+A2	TÜV/ 50046704
5. Fuse	Shen Zhen Lanson Electronics Co, Ltd		8A,10A	EN 60127-1:2006+A1+A2 EN 60127-2:2015	VDE 40009306
6. AVR	CONGQING LILAN ELECTRIC CO., LTD.	AVR1-3KW		EN ISO 8528-13:2016	Test with machine

EN ISO 8528-13: 2016

Clause	Requirement	Remarks - Results	Verdict

7. Voltmeter	FUZHOU HAN JING Electric Co., Ltd	9114(1)	0-300V	EN ISO 8528-13:2016	Test with machine
8. Power switch (for model without electrcial starter)	Yeqing Jinghan Electronic Co., Ltd.	KDC3 KDC4	AC250V, 16(10)A	EN 61058-1:2002/A2	TÜV SUD N8A1707794 94008
Remark: (1) The impact test with 1J and creepage distance measured for voltmeters.					

List of critical components for model **BS6500，BS6500E**:

Object/part No.	Manufacturer/ trademark	Type/ model	Technical data	Standard	Mark(s) of conformity
1.Engine	Taizhou Bison Machinery Co., Ltd.	BS188F	390cc	EN ISO 8528-13:2016	Test with machine
2.Generator	Taizhou Bison Machinery Co., Ltd.	2000W	Main winding: 2.250Ω Auxi. winding: 3.650Ω DC winding: 0.156Ω Temp.: 28.0℃ Material: copper Class: F	EN ISO 8528-13:2016	Test with machine
3.Socket outlet (16A)	ZHEJIANG SUOBEN ELECTRIC CO.,LTD	02021602	AC250V, 16A, IP44	DIN VDE 0620-1/03. 2013	TUV 50312482
4.Socket outlet (32A)	ZHEJIANG SUOBEN ELECTRIC CO.,LTD	11033201 11033202	AC200/380 to 240/415V 50/60Hz	EN60309-1:1999+A1+A2 EN60309-2:1999+A1+A2	TUV 50457756
5. AC Circuit Breaker (For 16A socket outlet)	WENZHOU SINNA ELECTRIC CO., LTD.	SNB1-30	AC240,50/60Hz 16A	EN60934:2001+A1+A2	TÜV/ 50046704
6. AC Circuit Breaker (For 32A socket outlet)	WENZHOU SINNA ELECTRIC CO., LTD.	SNB1-50	AC415,50/60Hz 23A	EN60934:2001+A1+A2	TÜV/ 50046704
7. Fuse	ShenZhen Lanson Electronics Co, Ltd		8A, 10A	EN 60127-1:2006+A1+A2 EN 60127-2:2015	VDE 40009306
8. AVR	CONGQING LILAN ELECTRIC CO., LTD.	AVR7-8KW		EN ISO 8528-13:2016	Test with machine
9. Voltmeter	FUZHOU HAN JING Electric Co., Ltd	9114(1)	0-300V	EN ISO 8528-13:2016	Test with machine
10. Power switch (for model without electrcial starter)	Yeqing Jinghan Electronic Co., Ltd.	KDC3 KDC4	AC250V, 16(10)A	EN 61058-1:2002/A2	TÜV SUD N8A1707794 94008
Remark: (1) The impact test with 1J and creepage distance measured for voltmeters.					

EN ISO 8528-13: 2016

Clause	Requirement	Remarks - Results	Verdict

List of critical components for model **BS7500，BS7500E**:

Object/part No.	Manufacturer/ trademark	Type/ model	Technical data	Standard	Mark(s) of conformity
1.Engine	Taizhou Bison Machinery Co., Ltd.	BS190F	420cc	EN ISO 8528-13:2016	Test with machine
2.Generator	Taizhou Bison Machinery Co., Ltd.	6000W	Main winding: 2.250Ω Auxi. winding: 3.650Ω DC winding: 0.156Ω Temp.: 28.0℃ Material: copper Class: F	EN ISO 8528-13:2016	Test with machine
3.Socket outlet (16A)	ZHEJIANG SUOBEN ELECTRIC CO.,LTD	02021602	AC250V, 16A, IP44	DIN VDE 0620-1/03. 2013	TUV 50312482
4.Socket outlet (32A)	ZHEJIANG SUOBEN ELECTRIC CO.,LTD	11033201 11033202	AC200/380 to 240/415V 50/60Hz	EN60309-1:1999+A1+A2 EN60309-2:1999+A1+A2	TUV 50457756
5. AC Circuit Breaker (For 16A socket outlet)	WENZHOU SINNA ELECTRIC CO., LTD	SNB1-30	AC240,50/60Hz 16A	EN60934:2001+A1+A2	TÜV/ 50046704
6. AC Circuit Breaker (For 32A socket outlet)	WENZHOU SINNA ELECTRIC CO., LTD	SNB1-50	AC415,50/60Hz 27A	EN60934:2001+A1+A2	TÜV/ 50046704
7. Fuse	Shen Zhen Lanson Electronics Co, Ltd		8A, 10A	EN 60127-1:2006+A1+A2 EN 60127-2:2015	VDE 40009306
8. AVR	CONGQING LILAN ELECTRIC CO., LTD.	AVR7-8KW		EN ISO 8528-13:2016	Test with machine
9. Voltmeter	FUZHOU HAN JING Electric Co., Ltd	9114(1)	0-300V	EN ISO 8528-13:2016	Test with machine
10. Power switch (for model without electrcial starter)	Yeqing Jinghan Electronic Co., Ltd.	KDC3 KDC4	AC250V, 16(10)A	EN 61058-1:2002/A2	TÜV SUD N8A1707794 94008

Remark:
(1) The impact test with 1J and creepage distance measured for voltmeters.

List of critical components for model **BS8500，BS8500E**:

Object/part No.	Manufacturer/ trademark	Type/ model	Technical data	Standard	Mark(s) of conformity
1.Engine	Taizhou Bison Machinery Co., Ltd.	BS192F	440cc	Taizhou Bison Machinery Co., Ltd.	BS192F
2.Generator	Taizhou Bison Machinery Co., Ltd.	7000W	Main winding: 2.250Ω Auxi. winding: 3.650Ω DC winding: 0.156Ω Temp.: 28.0℃ Material: copper Class: F	Taizhou Bison Machinery Co., Ltd.	7000W
3.Socket outlet (16A)	ZHEJIANG SUOBEN ELECTRIC CO.,LTD	02021602	AC250V, 16A, IP44	DIN VDE 0620-1/03. 2013	TUV 50312482
4.Socket outlet	ZHEJIANG SUOBEN ELECTRIC	11033201	AC200/380 to	EN60309-1:1999+A1+A2	TUV

EN ISO 8528-13: 2016

Clause	Requirement	Remarks - Results	Verdict

(32A)	CO.,LTD	11033202	240/415V 50/60Hz	EN60309-2:1999+A1+A2	50457756
5. AC Circuit Breaker (For 16A socket outlet)	WENZHOU SINNA ELECTRIC CO., LTD	SNB1-30	AC240,50/60Hz 16A	EN60934:2001+A1+A2	TÜV/ 50046704
6. AC Circuit Breaker (For 32A socket outlet)	WENZHOU SINNA ELECTRIC CO., LTD	SNB1-50	AC415,50/60Hz 30A	EN60934:2001+A1+A2	TÜV/ 50046704
7. Fuse	Shen Zhen Lanson Electronics Co, Ltd		8A, 10A	EN 60127-1:2006+A1+A2 EN 60127-2:2015	VDE 40009306
8. AVR	CONGQING LILAN ELECTRIC CO., LTD.	AVR7-8KW		EN ISO 8528-13:2016	Test with machine
9. Voltmeter	FUZHOU HAN JING Electric Co., Ltd	9114(1)	0-300V	EN ISO 8528-13:2016	Test with machine
10. Power switch (for model without electrcial starter)	Yeqing Jinghan Electronic Co., Ltd.	KDC3 KDC4	AC250V, 16(10)A	EN 61058-1:2002/A2	TÜV SUD N8A170779494008

Remark:
(1) The impact test with 1J and creepage distance measured for voltmeters.

End of Test Report CN21N4EW 001 Part I of II

Measurement Equipment List

TÜVRheinland®
Precisely Right.

Service Start Date 14.09.2021
Service End Date 18.09.2021

Cost Center 192
Deliverable/Report Number CN21N4EW 001
AMEL ID 0244326771B00010

Client Taizhou Bison Machinery Co., Ltd.
Product Gasoline Engine Generator
Comment

Equip.	Description	Model	Manufacturer	Serial Number	Last Date DD.MM.YYYY	Int.	Due Date DD.MM.YYYY
G1811685	Voltage Withstand Tester	TOS5051A	KIKUSUI Electronic Corporation	NONE	29.06.2021	12	29.06.2022
G1812177	Glow Wire Tester	GW-V	Shanghai Han Qiu	20020801	08.04.2021	12	08.04.2022
G1811493	Spring-operated Impact Hammer	F22.50	PTL Dr. Grabenhorst GmbH	5040204	22.03.2020	24	22.03.2022
G1811692	Ball Pressure Test Apparatus	None	Shanghai Han Qiu	NONE	30.12.2020	12	30.12.2021
G1811606	IPX3~ IPX6 Tester	DEYI-01	Wuxi Deyi High-tech Co., Ltd.	NONE	30.12.2020	12	30.12.2021
G1811964	AC Digital Power Meter	8776A	Qingdao Qingzhi	870705097A	30.12.2020	12	30.12.2021
G1811625	Milliohm Meter	3540	HIOKI E.E. CORPORATION	40112076	30.12.2020	12	30.12.2021
G1811500	Data Acquisition/Switch Unit	34970A	Agilent Technologies	MY44009365	30.12.2020	12	30.12.2021
G1811690	Earth resistance meter	TOS6200	KIKUSUI Electronic Corporation	NONE	30.06.2021	12	30.06.2022
G1811638	Oscilloscope Probe	10074C	Agilent Technologies	NONE	30.12.2020	12	30.12.2021
G1811639	Oscilloscope Probe	10074C	Agilent Technologies	NONE	30.12.2020	12	30.12.2021
G1811637	2500V 250MHz Oscilloscope Probe	P5100	Tektronic Inc	NONE	30.12.2020	12	30.12.2021
G1811957	Steel Tape	0~ 5m	Shanghai Tiandao Tools Company	NONE	06.01.2020	60	06.01.2025
G1811630	Digital Clamp Meter	337	FLUKE Corporation	86760675	30.12.2020	12	30.12.2021
G1811629	Hygrothermograph	ZJ1-2	Meteorology Instrument Factory	408043	30.12.2020	12	30.12.2021
G1811905	Handy Push-Pull Gauge	NK-50	ALGOL INSTRUMENT CO., LTD.	55000	30.12.2020	12	30.12.2021

* No entry for devices that are not subject to regular calibration or require initial verification/calibration only.

where required, Signature: Jia Xiang

Prüfbericht-Nr.: *Test report no.:*	**CN21N4EW 001 Part II of II**	**Auftrags-Nr.:** *Order no.*:	244326771	
Kunden-Referenz-Nr.: *Client reference no.:*	**2166539**	**Auftragsdatum:** *Order date:*	22.04.2021	
Auftraggeber: *Client:*	Taizhou Bison Machinery Co., Ltd. / Room 201,NO.155 WEST TAIHE ROAD, JIAOJIANG, TAIZHOU CITY, 318000 Zhejiang P.R. China			
Prüfgegenstand: *Test item:*	Gasoline Engine Generator			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	Refer to page 2 of Part I			
Auftrags-Inhalt: *Order content*:	Type tests			
Prüfgrundlage: *Test specification:*	EN60204-1:2018 Modified according to EN ISO 8528-13:2016 Annex B			

Wareneingangsdatum: *Date of sample receipt:*	N/A
Prüfmuster-Nr.: *Test sample no:*	Refer to page 2 of Part I
Prüfzeitraum: *Testing period:*	14.09.2021 - 18.09.2021
Ort der Prüfung: *Place of testing:*	As Client
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shanghai) Co., Ltd
Prüfergebnis*: *Test result*:*	Pass

geprüft von: *tested by:*	Jie Xiong	**genehmigt von:** *authorized by:*	Xinling Liu
Datum: *Date: 2021.12.20*	Jie Xiong	**Ausstellungsdatum:** *Issue date: 2021.12.20*	Xinling Liu
Stellung */ Position:*	Project Engineer	**Stellung** */ Position:*	Technical Certifier

Sonstiges */ Other:* This report is only valid in its full version: Part I of II and Part II of II.

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

EN 60204-1:2018

Clause	Requirement	Remarks - Results	Verdict
1	**Scope**	Informative paragraph.	-
2	**Normative references**	Informative paragraph.	-
3	**Definitions**	Informative paragraph.	-
4	**General requirements**	-	-
4.1	**General**	Risk assessment provided.	P
4.2	**Selection of equipment**	-	P
4.2.1	**General** (compliance with EN or IEC standards)	Evidence of compliance with relevant EU requirement provided for: - Socket outlet for single phase; - Socket outlet for Industrial purpose; - Circuit breaker(AC) - Fuse - Power switch	P
4.2.2	**Switchgear**	Considered.	P
4.3	**Electrical supply** (+/-10%, +/-1Hz, harmonics, unbalance, impulses, interruption, dips etc.)	Comply with ISO 8528-8 clause 7.	P
4.4	**Physical environment and operating conditions**	Specifications provided in user manual.	P
4.4.1	**General**	-	P
4.4.2	Electromagnetic compatibility (EMC) (see EMC directive)	Covered by EMC directive	N/A
4.4.3	Ambient air temperature (5-40°C)	Information regarding ambient temperature provided in user manual.	P
4.4.4	Humidity (30-90%)	Information regarding humidity provided in user manual.	P
4.4.5	Altitude (1000m)	Information regarding installation altitude (max 1000 m) provided in user manual.	P
4.4.6	Contaminants (see 11.3 for details)	Covered by 11.3.	P
4.4.7	Ionizing and non-ionizing radiation	Not required	N/A
4.4.8	**Vibration, shock, and bump**	Considered in design, installation requirements provided in user manual.	P
4.5	**Transportation and storage** (-25-55°C/70°C)	Information regarding transport/storage temperature provided in user manual.	P
4.6	**Provisions for handling** (see 13.4.6)	No such equipment.	N/A
5	**Incoming supply conductor terminations and devices for disconnecting and switching off**	-	P

Clause	Requirement	Remarks - Results	Verdict
5.1	**Incoming supply conductor terminations** (EN 60445, 5.2, 5.3.1 and 5.3.2d)	The generating set uses IT system. Neutral conductor and protective bonding circuit are not connected. The generating set shall not be used as standby-to-mains-unit. Relevant information is provided in user manual.	N/A
5.2	**Terminal for connection of the external protective conductor** (table 1, 8.2.2 and EN 60445)	Terminal for the connection of an external protective conductor is provided. Marked with symbol 5019 of IEC 60417-DB-12M:2002	P
5.3	**Supply disconnecting (isolating) device**	Adjusted according to ISO 8528-13, Socket-outlet is used as electrical disconnection device.	P
5.3.1	General (for each supply)	See above.	P
5.3.2	Type The supply disconnecting device shall be one of the following types: a) switch-disconnector, with or without fuses, in accordance with IEC 60947-3, utilization category AC-23B or DC-23B; b) control and protective switching device suitable for isolation, in accordance with IEC 60947-6-2; c) a circuit-breaker suitable for isolation in accordance with IEC 60947-2; d) any other switching device in accordance with an IEC product standard for that device and which meets the isolation requirements and the appropriate utilization category and/or specified endurance requirements defined in the product standard; e) a plug/socket combination for a flexible cable supply.	See above.	P
5.3.3	Requirements (IEC 60417-5007, IEC 60417-5008, red handle for E-stop, padlock, stalled motor, etc.)	See above.	P
5.3.4	Operating means of the supply disconnecting device	See above.	P
5.3.5	Excepted circuits (lighting, undervoltage, UPS, etc.)	None	N/A
5.4	**Devices for removal of power for prevention of unexpected start-up** (disconnect of 5.3.2, 3.17 and 5.6)	None	N/A
5.5	**Devices for isolating electrical equipment** (see 5.3, 5.3.2 and 5.6)	Main disconnect (socket outlet) provided	P
5.6	**Protection against unauthorized, inadvertent and/or mistaken connection** (see 5.4, 5.5 and 5.3.2 d)	Main disconnect (socket outlet) provided	P
6	**Protection against electric shock**	-	-

Clause	Requirement	Remarks - Results	Verdict
6.1	**General**	Class I equipment. Direct contact is prevented by basic insulation and enclosure. Indirect contact is prevented by earthing of the exposed conductive parts to external protective conductor.	P
6.2	**Basic protection**	-	P
6.2.1	General (see 6.2, IEC 60364-4 and EN 60529 IP4X/XXB)	-	P
6.2.2	Protection by enclosures (general > IP4X; a) opened by tool and without disconnect > IP2X inside; b) disconnect with interlock > IP2X inside; c) without tool and without disconnect > IP2X and interlock for barrier)	Enclosure can only be opened with tools, IP2X fulfilled.	P
6.2.3	Protection by insulation of live parts (completely covered)	Conductors and switches insulated.	P
6.2.4	Protection against residual voltages (60V/5sec or 60μC/1sec or IP2X)	No such risk	N/A
6.2.5	Protection by barriers (IEC 60364-4-41)	None.	N/A
6.2.6	Protection by placing out of reach or protection by obstacles (IEC 60364-4-41)	None.	N/A
6.3	**Fault protection**	-	-
6.3.1	General	IT system, all exposed conductive parts are interconnected through a protective conductor and earthed. The protective bonding circuit is connected to an earth terminal and marked. The generating set is automatically shut off in 0.4 s in case of short-circuiting, verified by the test of a short-circuiting with a resistance of 1.5 Ω between phase conductor and neutral conductor.	P
6.3.2	Prevention of the occurrence of a touch voltage	Considered	P
6.3.2.1	General		P
6.3.2.2	Protection by provision of class II equipment or by equivalent insulation	Provision of class II insulation between AC and DC circuit provided.	P
6.3.2.3	Protection by electrical separation		P
6.3.3	Protection by automatic disconnection of supply	Short-circuiting test has been performed and passed.	P
6.4	**Protection by the use of PELV**		P

Clause	Requirement	Remarks - Results	Verdict
6.4.1	General requirements (25/60V and 6/15 etc.)		P
6.4.2	Sources for PELV	Not used.	N/A
7	**Protection of equipment**	-	P
7.1	**General**	-	P
7.2	**Overcurrent protection**	Not applicable according to EN ISO 8528-13: 2016 Annex B	N/A
7.2.1	General	See above	N/A
7.2.2	Supply conductors (data for installation protection device)	See above	N/A
7.2.3	Power circuits (7.2.10, neutral conductor, etc.)	See above	N/A
7.2.4	Control circuits (connection to safety ground)	See above	N/A
7.2.5	Socket outlets and their associated conductors (for each socket outlet)	See above	N/A
7.2.6	Lighting circuits (unearthed conductor)	See above	N/A
7.2.7	Transformers (see 7.2.10)	See above	N/A
7.2.8	Location of overcurrent protective devices (conductor, reduction for less 3m and own duct)	See above	N/A
7.2.9	Overcurrent protective devices (must readily available in country of use)	See above	N/A
7.2.10	Rating and setting of overcurrent protective devices (as low as possible)	See above	N/A
7.3	**Protection of motors against overheating**	-	P
7.3.1	General (more than 0.5kW, restart not possible)	Considered	P
7.3.2	Overload protection	The output power is determined by engine and generator, overload test performed and the temperature of windings is lower than limit value (125K); circuit breaker is used for overload protection.	P
7.3.3	Over-temperature protection (IEC 60034-11)	Cooling fan is integrated on the main axis of the motor. Reduction or impairment is not foreseeable.	P
7.4	**Protection against abnormal temperature** (heater protection)	Not required.	N/A
7.5	**Protection against the effects of supply interruption or voltage reduction and subsequent restoration**	Not applicable according to EN ISO 8528-13: 2016 Annex B.	N/A
7.6	**Motor overspeed protection** (see 9.3.2)	Not applicable according to EN ISO 8528-13: 2016 Annex B.	N/A
7.7	**Additional earth fault/residual current protection** (see 6.3)	Not required.	N/A
7.8	**Phase sequence protection**	Not required.	N/A

Clause	Requirement	Remarks - Results	Verdict
7.9	**Protection against overvoltages due to lightning and to switching surges**	None.	N/A
7.10	**Short-circuit current rating**	Not required.	N/A
8	**Equipotential bonding**	-	P
8.1	**General**	Protective bonding provided	P
8.2	**Protective bonding circuit**	-	P
8.2.1	General (figure 2, all stress, etc.)	Sizes of earthing conductors comply with table 1.	P
8.2.2	Protective conductors (13.2.2, size in accordance with Table 1)	See above.	P
8.2.3	Continuity of the protective bonding circuit (doors, hinges etc. need conductor, except for PELV etc.)	Continuity of the protective bonding circuit ensured and verified by testing.	P
8.2.4	Protective conductor connecting points	Green and yellow conductor properly terminated and labels provided.	P
8.2.5	Mobile machines	Not mobile.	N/A
8.2.6	Additional requirements for electrical equipment having earth leakage currents higher than 10 mA	No such hazard	N/A
8.3	**Measures to restrict the effects of high leakage current**	See above.	N/A
8.4	**Functional bonding** (insulation failure and EMI, see 4.4.2 and 9.4.3.1)	-	N/A
9	**Control circuits and control functions**	Not applicable according to EN ISO 8528-13: 2016 Annex B	N/A
9.1	**Control circuits**	See above	N/A
9.1.1	**Control circuit supply** (transformer, except for less than two controls etc.)	See above	N/A
9.1.2	Control circuit voltages (< = 277V)	See above	N/A
9.1.3	Protection (7.2.4 and 7.2.10)	See above	N/A
9.2	**Control functions**	See above	N/A
9.2.1	General	See above	N/A
9.2.2	Categories of stop functions (category 0, 1, and 2 etc.)	See above	N/A
9.2.3	Operation	See above	N/A
9.2.3.1	General (interlock see 9.3)	See above	N/A
9.2.3.2	Start	See above	N/A
9.2.3.3	Stop (category 0, 1, and 2 etc.)	See above	N/A
9.2.3.4	Emergency operations (emergency stop, emergency switching off)	See above	N/A
9.2.3.4.1	General	See above	N/A
9.2.3.4.2	Emergency stop	See above	N/A
9.2.3.4.3	Emergency switching off	See above	N/A
9.2.3.5	Operating modes	See above	N/A
9.2.3.6	Monitoring of command actions	See above	N/A
9.2.3.7	Hold-to-run controls	See above	N/A
9.2.3.8	Two-hand control	See above	N/A

Clause	Requirement	Remarks - Results	Verdict
9.2.3.9	Enabling control	See above	N/A
9.2.3.10	Combined start and stop controls	See above	N/A
9.2.4	Cableless control system (CCS)	See above	N/A
9.2.4.1	General requirements	See above	N/A
9.2.4.2	Monitoring the ability of a cableless control system to control a machine	See above	N/A
9.2.4.3	Control limitation	See above	N/A
9.2.4.4	Use of multiple cableless operator control stations	See above	N/A
9.2.4.5	Portable cableless operator control stations	See above	N/A
9.2.4.6	Deliberate disabling of cableless operator control stations	See above	N/A
9.2.4.7	Emergency stop devices on portable cableless operator control stations	See above	N/A
9.2.4.8	Emergency stop reset	See above	N/A
9.3	**Protective interlocks**	See above	N/A
9.3.1	Reclosing or resetting of an interlocking safeguard	See above	N/A
9.3.2	Exceeding operating limits	See above	N/A
9.3.3	Operation of auxiliary functions	See above	N/A
9.3.4	Interlocks between different operations and for contrary motions (interlock against contrary motion)	See above	N/A
9.3.5	Reverse current braking	See above	N/A
9.3.6	Suspension of safety functions and/or protective measures	See above	N/A
9.4	Control functions in the event of failure	See above	N/A
9.4.1	General requirements (protective device, proven techniques, redundancy, functional tests...)	See above	N/A
9.4.2	Measures to minimize risk in the event of failure	See above	N/A
9.4.2.1	General	See above	N/A
9.4.2.2	Use of proven circuit techniques and components (one terminal, de-energizing for stop, positive open operation, design...)	See above	N/A
9.4.2.3	Provisions of partial or complete redundancy (on-line, off-line...)	None	N/A
9.4.2.4	Provision of diversity (combination of open and closed contacts, different components, electrical and non-electrical systems...)	None	N/A
9.4.2.5	Provision for functional tests (automatic or manually...)	See above	N/A
9.4.3	Protection against malfunction of control circuits	See above	N/A
9.4.3.1	Insulation faults	See above	N/A
9.4.3.1.1	General (method a, b, c, d)	See above	N/A
9.4.3.1.2	Method a) – Earthed control circuits fed by transformers	See above	N/A
9.4.3.1.3	Method b) – Non-earthed control circuits fed by transformers	See above	N/A
9.4.3.1.4	Method c) – Control circuits fed by transformer with an earthed centre-tap winding	See above	N/A
9.4.3.1.5	Method d) – Control circuits not fed by a transformer	See above	N/A
9.4.3.2	Voltage interruptions (7.5...)	See above	N/A
9.4.3.3	Loss of circuit continuity	See above	N/A

Clause	Requirement	Remarks - Results	Verdict
10	Operator interface and machine-mounted control devices	-	P
10.1	General	Not applicable according to EN ISO 8528-13: 2016 Annex B	N/A
10.1.1	General requirements (IEC 61310 and IEC 60447)	See above	N/A
10.1.2	Location and mounting (>= 0.6m...)	See above	N/A
10.1.3	Protection	See above	N/A
10.1.4	Position sensors (no damage...)	See above	N/A
10.1.5	Portable and pendant control stations	See above	N/A
10.2	**Actuators**	-	P
10.2.1	Colours (table 2, red and yellow!...)	Color coding for push button appropriate	P
10.2.2	Markings	See above.	P
10.3	Indicator lights and displays	-	P
10.3.1	General	Voltmeter and indicator light provided for power output	P
10.3.2	Colours (EN 50099...)	Meet requirement.	P
10.3.3	Flashing lights and displays (immediate action...)	None	N/A
10.4	Illuminated push-buttons (table 2 and 4...)	None.	N/A
10.5	Rotary control devices (rotation...)	None.	N/A
10.6	Start devices (inadvertent operation...)	Not applicable according to EN ISO 8528-13: 2016 Annex B	N/A
10.7	Emergency stop devices	None.	N/A
10.7.1	Location of emergency stop devices	See above.	N/A
10.7.2	Types of emergency stop device (push-button, pull-cord, and pedal-operated)	See above.	N/A
10.7.3	Operation of the supply disconnecting device to effect emergency stop	None.	N/A
10.8	Emergency switching off devices	None.	N/A
10.8.1	Location of emergency switching off devices	See above.	N/A
10.8.2	Types of emergency switching off device	See above.	N/A
10.8.3	Local operation of the supply disconnecting device to effect emergency switching off	-	N/A
10.9	**Enabling control device**	None.	N/A
11	**Controlgear: location, mounting, and enclosures**	-	P
11.1	**General requirements**	-	P
11.2	Location and mounting	-	P
11.2.1	Accessibility and maintenance (0.4-2.0m, see 13.4.5)	Control gear easily accessible	P
11.2.2	Physical separation or grouping (power circuits, associated control circuits, other)	OK	P
11.2.3	Heating effects (limits...)	No heat generating components	N/A

Clause	Requirement	Remarks - Results	Verdict
11.3	Degrees of protection (at least IP22 for enclosures of controlgear, see EN 60529...)	Not applicable according to EN ISO 8528-13: 2016 Annex B	N/A
11.4	Enclosures, doors and openings (doors <= 0.9m, no openings between liquids and electrical devices, fasteners of captive type...)	Enclosure material capable of withstanding mechanical, electrical and thermal stresses	P
11.5	Access to electrical equipment (see 481.2.4 of IEC 60364-4-81, 0.7m x 2.0m...)	None	N/A
12	Conductors and cables	-	P
12.1	General requirements (EN 60439-1...)	See below.	P
12.2	Conductors (table 5)	Conductors properly rated.	P
12.3	Insulation (PVC, 2000V test voltage, 500V for PELV, see IEC 60364-4-41, class III equipment...)	Voltage test has been doneand passed.	P
12.4	Current-carrying capacity in normal service (table 5, table 6, and D2...)	Conductors properly rated.	P
12.5	Conductor and cable voltage drop (<= 5%...)	Meet the requirements.	P
12.6	Flexible cables	See below.	P
12.6.1	General (table D.4...)	Properly guided and supported. The conductors have the suitable flexibility.	P
12.6.2	Mechanical rating (15 N/mm2...)	Meet the requirements.	P
12.6.3	Current-carrying capacity of cables wound on drums	None.	N/A
12.7	Conductor wires, conductor bars and slip-ring assemblies	-	P
12.7.1	Basic protection	Conductor wires protected by basic insulation and enclosure.	P
12.7.2	Protective conductors	Protective bonding circuit provided. No neutral conductor.	P
12.7.3	Protective conductor current collectors	None.	N/A
12.7.4	Removable current collectors with a disconnector function	None.	N/A
12.7.5	Clearances in air	Meet the requirements.	P
12.7.6	Creepage distances	Meet the requirements.	P
12.7.7	Conductor system sectioning	None.	N/A
12.7.8	Construction and installation of conductor wire, conductor bar systems and slip-ring assemblies	None	N/A
13	Wiring practices	-	P
13.1	Connections and routing	-	P
13.1.1	General requirements (loosening, one terminal, correspond with schematics, no solder, EN 60947-7-1, no cross overs...)	-Connections against loosening. -No soldering used. -No wiring crosses over the terminals.	P

Clause	Requirement	Remarks - Results	Verdict
13.1.2	Conductor and cable runs (from terminal to terminal, no strain to termination, ...)	-No splices or joints for the conductors and cables. -Termination well supported, no strain.	P
13.1.3	Conductors of different circuits (insulation for highest voltage, separation of live conductors before disconnect or marked with different color...)	Insulation meet the requirement.	P
13.1.4	AC circuits – Electromagnetic effects (prevention of eddy currents)	Conduct installed in plastic enclosure.	N/A
13.1.5	Connection between pick-up and pick-up converter of an inductive power supply system (as short as possible…)	None.	N/A
13.2	Identification of conductors	-	P
13.2.1	General requirements	Conductors labeled and colouring coding used in accordance with electrical drawing.	P
13.2.2	Identification of the protective conductor / protective bonding conductor (60417-IEC-5019 symbol or green-and-yellow...)	Green-and-yellow.	P
13.2.3	Identification of the neutral conductor (light blue (3.2.2 of IEC 60446)...)	None.	N/A
13.2.4	Identification by colour (black > power, red > control, orange > interlock...)	By color coding	P
13.3	Wiring inside enclosures (IEC 60332, 11.2.1, 8.2.3...)	Flame-retardant insulating material is used for the insulation. Conductors are well supported.	P
13.4	Wiring outside enclosures	See below	P
13.4.1	General requirements (individual glands, bushings, ...)	Cable glands are provided at cable entrance to ensure degree of protection	N/A
13.4.2	External ducts (13.5, ...)	None	N/A
13.4.3	Connection to moving elements of the machine (12.2, 12.6, flexible conduit, 25mm, no metallic conduits, ...)	None	N/A
13.4.4	Interconnection of devices on the machine (no in series connection of devices...)	Connected to terminal blocks.	P
13.4.5	Plug/socket combinations (safety ground first, > 16A must be locked, identification, see 6.2.4 and IEC 60309-1...)	Socket outlets on the generating set are certified types and are the output of the generating set. Type of the plug from the end user is unknown. Relevant information is provided in user manual.	N/A
13.4.6	Dismantling for shipment (protected, ...)	None	N/A
13.4.7	Additional conductors (spare conductors)	None	N/A
13.5	Ducts, connection boxes and other boxes	-	P

Clause	Requirement	Remarks - Results	Verdict
13.5.1	General requirements (no edges, separation from liquids...)	No sharp edge, flash, burr, rough surface or thread can come in contact with the insulation of the conductors.	P
13.5.2	Rigid metal conduit and fittings	Fulfill the requirements.	P
13.5.3	Flexible metal conduit and fittings (corrosion...)	None	N/A
13.5.4	Flexible non-metallic conduit and fittings	None	N/A
13.5.5	Cable trunking systems	None	N/A
13.5.6	Machine compartments and cable trunking systems	Electrical system is well separated with other systems.	P
13.5.7	Connection boxes and other boxes	Fulfill the requirements.	P
13.5.8	Motor connection boxes	-	P
	Motor connection boxes shall enclose only connections to the motor and motor-mounted devices (for example brakes, temperature sensors, plugging switches, tachometer generators).	The generating set has only one connection box, which contains motor conductors, motor mounted devices.	N/A
14	Electric motors and associated equipment	-	P
14.1	General requirements (EN 60034-1, 7.3, 7.6, 7.2, 5.3, 5.4, 5.5, 7.5, 7.6, 9.4, 11...)	Tested with machine	P
14.2	Motor enclosures (EN 60034-5, IP23...)	IP23	P
14.3	Motor dimensions (IEC 60072-1, IEC 60072-2...)	Not safety relevant.	N/A
14.4	Motor mounting and compartments (EN 60034-1, guarding...)	Properly enclosed.	P
14.5	Criteria for motor selection (EN 60034-1, IEC 60146, ...)	Motor suitable for use.	P
15	Socket-outlets and lighting	Not applicable according to EN ISO 8528-13: 2016 Annex B	N/A
15.1	Socket-outlets for accessories (socket-outlets based on EN 60309-1, see 6.4, 7.2, 7.3, 5.3.5...)	See above.	N/A
15.2	Local lighting of the machine and of the equipment	See above.	N/A
15.2.1	General (see 8.2.2, 4.4.2...)	See above.	N/A
15.2.2	Supply (<= 50V, 250V, one source like transformer, separate overcurrent protection, factory lighting, 7.2.6...)	See above.	N/A
15.2.3	Protection (7.2.6...)	See above.	N/A
15.2.4	Fittings (lampholders based on IEC, ...)	See above.	N/A
16	Marking, warning signs and reference designations	Not applicable according to EN ISO 8528-13: 2016 Annex B	N/A
16.1	General	See above.	N/A
16.2	Warning signs (IEC 60417-5036, no disconnect, ...)	See above.	N/A
16.2.1	Electric shock hazard	See above.	N/A

Clause	Requirement	Remarks - Results	Verdict
16.2.2	Hot surfaces hazard	See above.	N/A
16.3	Functional identification (IEC 60417, ISO 7000...)	See above.	N/A
16.4	Marking of enclosures of electrical equipment (name, mark, ratings, IEC 62023...)	See above.	N/A
16.5	Reference designations	See above.	N/A
17	Technical documentation	Not applicable according to EN ISO 8528-13: 2016 Annex B	N/A
17.1	General (see annex I)	See above.	N/A
17.2	Information related to the electrical equipment (description, supply requirements, environment, block diagram, schematics, sequence of operation, inspection, functional tests, maintenance, part lists...)	See above.	N/A
18	Verification	-	P
18.1	General	-	P
18.2	Verification of conditions for protection by automatic disconnection of supply	See below.	P
18.2.1	General	IT system.	P
18.2.2	Test 1 – Verification of the continuity of the protective bonding circuit	IT system. Verified by test current 10A, supplied by DC 24 V, test criteria according to IEC 60364-6-61.	P
18.2.3	Test 2 – Fault loop impedance verification and suitability of the associated overcurrent protective device	IT system.	N/A
18.2.4	Application of the test methods for TN-systems	IT system.	N/A
18.3	Insulation resistance tests	Measured value: >200MΩ	P
18.4	Voltage tests	1000V, 1sec applied and passed	P
18.5	Protection against residual voltages	Not needed. Refer to 6.2.4.	N/A
18.6	Functional tests	Passed	P
18.7	Retesting	Not related.	N/A
Annex A (normative)	Fault protection by automatic disconnection of supply	Tested	P
Annex B (informative)	Enquiry form for the electrical equipment of machines	Not applied, however it is recommended to use this form with end user.	N/A

End of Test Report CN21N4EW 001 Part II of II