

TECHNICAL CONSTRUCTION FILE
FILE NO.: EBO2305079-E174-3

ACCORDING TO
2006/42/EC MACHINERY DIRECTIVE
2014/30/EU EMC DIRECTIVE

RELATED TO THE

Industrial Cobot

MODEL: H5-790, H5-920, H5-1000, H7-890, H10-1400, H10-1500, H16-1100, H16-1200, H25-2000, H5G-790, H5G-920, H5G-1000, H7G-890, H10G-1400, H10G-1500, H16G-1100, H16G-1200, H25G-2000
PRESENTED BY

Guangzhou Aucotech Automation Technology Ltd
Room 903, Building E1, Design City, No. 7, Hexian North Street, Helong Street,
Baiyun District, Guangzhou City, CHINA

Content

Part I : General

- 1.1 Version
- 1.2 General description
- 1.3 Quality control system
- 1.4 Declaration of conformity
- 1.5 List of applicable regulations and standards

Part II : Assessment of conformity

- 2.1 Essential health and safety requirements
- 2.2 Risk assessment

Part III : Test report

- 3.1 EN 60204-1 report
- 3.2 Noise report
- 3.3 EN ISO 12100 report
- 3.4 EN ISO 13849-1 report
- 3.5 EN ISO 10218-1 report
- 3.6 EN IEC 61000-6-4/EN IEC 61000-6-2, EN IEC 61000-3-2 and EN 61000-3-3 report

Annex : Technical Information

Part I : General

1.1 Version

Version No.	Date	Description
00	June 9, 2023	Original
01	March 18, 2025	New Report (Change Applicant, Manufacturer, Address, Brand Name, Product Name, Model Name)
02	May 20, 2025	New Report (Add Model)
03	February 11, 2026	New Report (Add Model)

1.2 General description

Basically, this kind of machine doesn't belong to hazard machine and with low risk when using it. All possible risk have been analysis in the risk assessment report and been prevent by suitable ways.

The main risk of this kind of machine could be:

- The risk of access to the power transmission elements.
- The risk of access to the electricial parts

In order to prevent the main risks mentioned above, the protection guarding systems are provided, and all the detail safety provision are constructed in accordance with the requirement of EN13857.

In order to ensure the conformity for CE marking for these machines, some main

European and/or International standards have been used to made assessment of conformity, they are :

- EN 60204-1 for checking of electrical equipment
- EN ISO 12100, EN ISO 13849-1 and EN ISO 10218-1 for checking the machinery safety
- EN IEC 61000-6-4/EN IEC 61000-6-2/EN IEC 61000-3-2 and EN 61000-3-3 for cheching the machinery

EMC

The test reports for these applicable standards in detail have been included in the relevant sub-clauses of this technical construction file.

1.3 Quality control system

In order to ensure the conformity of the series production, the **Guangzhou Auctech Automation Technology Ltd** has taken the related procedures mentioned below :

(1) Carry out the inspection for parts and components according to the TCF

Before the assemblies of the series production, the QC engineers of **Guangzhou Auctech Automation Technology Ltd** has to check and inspect the technical specifications and intended functions of parts and components to ensure the correct use of them according to the contents of TCF and principle described in the related technical information.

(2) Carry out the inspection & testing for the products before packing

Before packing the products, the QC engineers of **Guangzhou Auctech Automation Technology Ltd** have to do the necessary inspection and testing to ensure the conformity of related requirements. In particular, the testing and inspection of electrical characteristics and outer feature.

(3) Carry out the inspection for the packing

After finishing the necessary inspection and testing for the products, an inspection for the packing has to be done to ensure the necessary elements being included in this packing before shipment.

(4) Provision for the change of design

Any change of the products described in this TCF must be checked in detail and written down again in the TCF by the designer of **Guangzhou Auctech Automation Technology Ltd** The change may effects the related electrical or mechanical characteristics.

(5) Provision for the Quality Assurance

For the provisions of internal control measures to ensure the conformity of series production of the machines, **Guangzhou Auctech Automation Technology Ltd** has built an internal quality control system in accordance with the international standard of ISO-9001.

1.4 Declaration of conformity

EC DECLARATION OF CONFORMITY



according to the following EC Directive

- Machinery Directive : 2006/42/EC
- Electromagnetic Compatibility: 2014/30/EU

The undersigned, representing

Applicant Name: Guangzhou Auctech Automation Technology Ltd

Applicant Address: Room 903, Building E1, Design City, No. 7, Hexian North Street, Helong Street, Baiyun District, Guangzhou City, CHINA

Manufacturer Name: Guangzhou Auctech Automation Technology Ltd

Manufacturer Address: Room 903, Building E1, Design City, No. 7, Hexian North Street, Helong Street, Baiyun District, Guangzhou City, CHINA

Importer: _____

Importer Address: _____

Name and address of the person (established in the Community) authorised to compile the technical file: _____

declaring that the machine

Product Name: Industrial Cobot

Commercial Name: Industrial Cobot

Function: _____

Brand Name: AUCTECH 

Model: H5-790, H5-920, H5-1000, H7-890, H10-1400, H10-1500, H16-1100, H16-1200, H5G-790, H5G-920, H5G-1000, H7G-890, H10G-1400, H10G-1500, H16G-1100, H16G-1200, H25G-2000

Type: H5-790

Serial Number: _____

Fulfills all the relevant provisions of Directive

2006/42/EC, 2014/30/EU

And tested in accordance with below standards:

EN 60204-1:2018, Safety of machinery - Electrical equipment of machines, Part 1: General Requirements

EN ISO 12100: 2010, Safety of machinery — General principles for design — Risk assessment and risk reduction

EN ISO 10218-1:2011, Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots (ISO 10218-1:2011)

EN ISO 13849-1: 2015, Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design

EN IEC 61000-6-4:2019, Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments

EN IEC 61000-6-2:2019, Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments

EN IEC 61000-3-2:2019+A1:2021, Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase)

EN 61000-3-3:2013+ A1:2019+A2:2021, Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection

Person responsible for making this declaration

Name, Surname : GuangRiang Yan

Position/ Title : General Manager

Guangzhou, P.R.CHINA

(place)

February 9, 2026

(date)



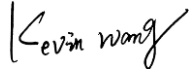
(company stamp and legal signature)

1.5 List of applicable regulations and standards

Regulations

- Machinery Directive: 2006/42/EC
- EMC Directive: 2014/30/EU
- Standards
- EN 60204-1:2018, Safety of machinery - Electrical equipment of machines, Part 1: General Requirements
- EN ISO 12100: 2010, Safety of machinery — General principles for design — Risk assessment and risk reduction
- EN ISO 13849-1:2015, Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)
- EN ISO 10218-1:2011, Robots and robotic devices — Safety requirements for industrial robots —Part 1: Robots
- EN IEC 61000-6-4:2019, Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments
- EN IEC 61000-6-2:2019, Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments
- EN IEC 61000-3-2:2019+A1:2021, Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
- EN 61000-3-3:2013+ A1:2019+A2:2021, Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

Part II: Assessment of conformity

Council Directive 2006/42/EC, Annex I Essential health and safety requirements relating to the design and construction of machinery and safety components EN 60204-1: 2018 Safety of machinery – Electrical equipment of machines, Part 1: General requirements EN ISO 12100:2010 Safety of machinery – General principles for design – Risk assessment and risk reduction EN ISO 13849-1:2015, Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015) EN ISO 10218-1:2011, Robots and robotic devices — Safety requirements for industrial robots —Part 1: Robots	
Tested by(name and signature)..... :	Bernie Xia 
Approved by(name and signature)....:	Kevin Wang 
Date of issue	February 11, 2026
Testing Laboratory:	Shenzhen EBO Testing Center
Address	2F, Qiaohongsheng Cultural Creative Park, Yintian Industrial Zone, Xixiang Street, Bao 'an District, Shenzhen
Testing location/procedure	Guangzhou Aucotech Automation Technology Ltd
Address	Room 903, Building E1, Design City, No. 7, Hexian North Street, Helong Street, Baiyun District, Guangzhou City, CHINA
Applicant's name:	Guangzhou Aucotech Automation Technology Ltd
Address	Room 903, Building E1, Design City, No. 7, Hexian North Street, Helong Street, Baiyun District, Guangzhou City, CHINA
Test specification:	
Directive.....:	2006/42/EC
Test procedure	CE-MD
Manufacturer.....:	Guangzhou Aucotech Automation Technology Ltd
Address	Room 903, Building E1, Design City, No. 7, Hexian North Street, Helong Street, Baiyun District, Guangzhou City, CHINA
Factory	Guangzhou Aucotech Automation Technology Ltd
Address	Room 903, Building E1, Design City, No. 7, Hexian North Street, Helong Street, Baiyun District, Guangzhou City, CHINA
Test item description	Industrial Cobot
Trademark	AUCTECH 
Main model/Type reference.....:	H5-790, H5-920, H5-1000, H7-890, H10-1400, H10-1500, H16-1100, H16-1200, H25-2000, H5G-790, H5G-920, H5G-1000, H7G-890, H10G-1400, H10G-1500, H16G-1100, H16G-1200, H25G-2000
Rating(s)	Input:220-230V~, 9.3A, 50Hz, 1.95KW



Part II: Assessment of conformity

1.	Essential Health and Safety Requirements		—
1.1	General remarks		—
1.1.1	Definitions	Information only	P
1.1.2	Principles of safety integration	Considered for the machine	P
a)	Machinery must be designed and constructed so that it is fitted for its function, and can be operated, adjusted and maintained without putting persons at risk when these operations are carried out under the conditions foreseen but also taking into account any reasonably foreseeable misuse thereof.	These requirements have been complied with.	P
	The aim of measures taken must be to eliminate any risk throughout the foreseeable lifetime of the machinery including the phases of transport, assembly, dismantling, disabling and scrapping.	These requirements have been complied with.	P
b)	In selecting the most appropriate methods, the manufacturer or his authorized representative must apply the following principles, in the order given:		P
	-eliminate or reduce risks as far as possible (inherently safe machinery design and construction),	The measures have been taken to eliminate or reduce risks as far as possible.	P
	-take the necessary protective measures in relation to risks that cannot be eliminated	Appropriate guards and warning signs are used.	P
	-inform users of the residual risks due to any shortcomings of the protective measures adopted, indicate whether any particular training is required and specify any need to provide personal protective equipment.	The related safety information for the users to operate the machine has been included in the instruction manual.	P
c)	When designing and constructing machinery and when drafting the instructions, the manufacturer or his authorised representative must envisage not only the intended use of the machinery but also any reasonably foreseeable misuse thereof.	All safety principles have been taken into account as far as possible during the design of these machines.	P
	The machinery must be designed and constructed in such a way as to prevent abnormal use if such use would engender a risk. Where appropriate, the instructions must draw the user's attention to ways -which	These requirements have been complied with, and the related information also has been provided within the instruction manual.	P

	experience has shown might occur - in which the machinery should not be used.		
d)	Machinery must be designed and constructed to take account of the constraints to which the operator is subject as a result of the necessary or foreseeable use of personal protective equipment.	These requirements have been taken into account during the design of this machine.	P
e)	Machinery must be supplied with all the special equipment and accessories essential to enable it to be adjusted, maintained and used safely.	It has been complied with.	P
1.1.3	Materials and products	The machine comprise of metal.	P
	The materials used to construct machinery or products used and created during its use must not endanger exposed persons' safety or health	Materials and products cannot endanger exposed person's safety or health.	P
	In particular, where fluids are used, machinery must be designed and constructed for use without risks due to filling, use, recovery or draining.	It has been complied with.	P
1.1.4	Lighting		P
	The manufacturer must supply integral lighting suitable for the operations concerned where its lack is likely to cause a risk despite ambient lighting of normal intensity.		P
	Machinery must be designed and constructed so that there is no area of shadow likely to cause nuisance, that there is no irritating dazzle and that there are no dangerous stroboscopic effects on moving parts due to the lighting.	It has been complied with..	P
	Internal parts requiring frequent inspection and adjustment and maintenance areas must be provided with appropriate lighting.		P
1.1.5	Design of machinery to facilitate its Handling	Wood package and transporting vehicle used	--
	Machinery or each component part thereof must:		--
	-be capable of being handled and transported safely,		P
	-be packaged or designed so that it can be stored safely and without damage	The machinery can be stored safely and without damage.	P
	During the transportation of the machinery and/or its component parts, there must be no possibility of sudden movements or of hazards	movements or of hazards due to insability as long as the machinery and/or its component	P

	due to instability as long as the machinery and/or its component parts are handled in accordance with the instructions.	parts are handled.	
	Where the weight, size or shape of machinery or its various component parts prevents them from being moved by hand, the machinery or each components part must:		--
	-Either be fitted with attachments for lifting gear, or		N
	-Be designed so that it can be fitted with such attachments, or		P
	- Be shaped in such a way that standard lifting gear can easily be attached		N
	Where machinery or one of its component parts is to be moved by hand, it must:		-
	-Either be easily movable, or		N
	-Be equipped for picking up and moving in complete safety		N
	Special arrangement must be made for the handling of tools and/or machinery parts, even if lightweight, which could be dangerous.		N
1.1.6	Ergonomics		--
	Under the intended conditions of use, the discomfort, fatigue and physical and psychological stress faced by the operator must be reduced to the minimum possible, taking into account ergonomic principles such as:		--
	-allowing for the variability of the operator's physical dimensions, strength and stamina,	The requirement has been complied with.	P
	- providing enough space for movements of the parts of the operator's body,	The requirement has been complied with.	P
	-avoiding a machine-determined work rate,	The requirement has been complied with.	P
	- avoiding monitoring that requires lengthy concentration,	The requirement has been complied with.	P
	- adapting the man/machinery interface to the foreseeable characteristics of the operators.		N
1.1.7	Operating positions		P
	The operating position must be designed and constructed in such a way as to avoid any risk due to exhaust gases and/or lack of oxygen.	The requirement has been complied with.	P
	If the machinery is intended to be used in a		N

	hazardous environment presenting risks to the health and safety of the operator or if the machinery itself gives rise to a hazardous environment, adequate means must be provided to ensure that the operator has good working conditions and is protected against any foreseeable hazards.		
	Where appropriate, the operating position must be fitted with an adequate cabin designed, constructed and/or equipped to fulfill the above requirements. The exit must allow rapid evacuation. Moreover, when applicable, an emergency exit must be provided in a direction which is different from the usual exit.		N
1.1.8	Seating		N
	Where appropriate and where the working conditions so permit, work stations constituting an integral part of the machinery must be designed for the installation of seats.	Not applicable.	N
	If the operator is intended to sit during operation and the operating position is an integral part of the machinery, the seat must be provided with the machinery.		N
	The operator's seat must enable him to maintain a stable position. Furthermore, the seat and its distance from the control devices must be capable of being adapted to the operator.		N
	If the machinery is subject to vibrations, the seat must be designed and constructed in such a way as to reduce the vibrations transmitted to the operator to the lowest level that is reasonably possible. The seat mountings must withstand all stresses to which they can be subjected. Where there is no floor beneath the feet of the operator, footrests covered with a slip-resistant material must be provided.		N
1.2	Controls	See below	P
1.2.1	Safety and reliability of control systems		P
	Control systems must be designed and constructed so that they are safe and reliable, in a way that will prevent a dangerous situation	All related safe and reliable technologies have been used adequately for these machines.	P

	arising.		
	Above all they must be designed and constructed:		--
	- They can withstand the rigors of normal use and external influences	The whole control system can withstand the rigors of normal use and external factors.	P
	-a fault in the hardware or the software of the control system does not lead to hazardous situations,	The requirement has been complied with.	P
	-Errors in control system logic don't lead to dangerous situations	Errors in logic don't lead to dangerous situations.	P
	- reasonably foreseeable human error during operation does not lead to hazardous situations.	The requirement has been complied with.	P
	Particular attention must be given to the following points:		--
	- the machinery must not start unexpectedly,	The machinery cannot start unexpectedly.	P
	-the parameters of the machinery must not change in an uncontrolled way, where such change may lead to hazardous situations,	The requirement has been complied with.	P
	- the machinery must not be prevented from stopping if the stop command has already been given,	The machinery cannot be prevented from stopping when the stop command has already been given.	P
	-no moving part of the machinery or piece held by the machinery must fall or be ejected,		P
	-automatic or manual stopping of the moving parts, whatever they may be, must be unimpeded,	The requirement has been complied with.	P
	-the protective devices must remain fully effective or give a stop command,	Remain fully effective.	P
	-the safety-related parts of the control system must apply in a coherent way to the whole of an assembly of machinery and/or partly completed machinery.	The requirement has been complied with.	P
	For cable-less control, an automatic stop must be activated when correct control signals are not received, including loss of communication.		N
1.2.2	Control devices		--
	Control devices must be:		--
	-clearly visible and identifiable, using	It has been complied with.	P

	pictograms where appropriate,		
	- positioned in such a way as to be safely operated without hesitation or loss of time and without ambiguity,	Suitable position for each control device has been taken.	P
	-Designed so that the movement of the control is consistent with its effect	The movement of the control is consistent with its effect.	P
	- located outside the danger zones, except where necessary for certain control devices such as an emergency stop or a teach pendant,	They are located outside the danger zones.	P
	- Positioned so that their operation can't cause additional risk	Suitable position for each control device has been taken.	P
	-designed or protected in such a way that the desired effect, where a hazard is involved, can only be achieved by a deliberate action,		N
	-made in such a way as to withstand foreseeable forces; particular attention must be paid to emergency stop devices liable to be subjected to considerable forces.		P
	Where a control is designed and constructed to perform several different actions, namely where there is no one-to-one correspondence, the action to be performed must be clearly displayed and subject to confirmation where necessary.		N
	Controls devices must be so arranged that their layout, travel and resistance to operation are compatible with the action to be performed, taking account of ergonomic principles	All control devices have been arranged adequately and taking account of ergonomic principles.	P
	Constraints due to the necessary foreseeable use of personal protection equipment must be taken into account		N
	Machinery must be fitted with indicators as required for safe operation		P
	The operator must be able to read them from the control position		P
	From each control position, the operator must be able to ensure that no-one is in the danger zones, or the control system must be designed and constructed in such a way that starting is prevented while someone is in the danger zone.	The operator can be able to ensure the no-one is in the danger zones from the control position.	P
	If neither of these possibilities is applicable,		N

	before the machinery starts, an acoustic and/or visual warning signal must be given. The exposed persons must have time to leave the danger zone or prevent the machinery starting up.		
	If necessary, means must be provided to ensure that the machinery can be controlled only from control positions located in one or more predetermined zones or locations.		P
	Where there is more than one control position, the control system must be designed in such a way that the use of one of them precludes the use of the others, except for stop controls and emergency stops.		N
	When machinery has two or more operating positions, each position must be provided with all the required control devices without the operators hindering or putting each other into a hazardous situation.		N
1.2.3	Starting		P
	It must be possible to start machinery only by voluntary actuation of a control provided for the purpose	These machines shall be started only by voluntary actuation of a control.	P
	The same requirement applies:		--
	-When restarting the machinery after stoppage, whatever the cause		P
	- When effecting a significant change in the operating conditions		P
	However, the restarting of the machinery or a change in operating conditions may be effected by voluntary actuation of a device other than the control device provided for the purpose, on condition that this does not lead to a hazardous situation.		N
	For machinery functioning in automatic mode, the starting of the machinery, restarting after a stoppage, or a change in operating conditions may be possible without intervention, provided this does not lead to a hazardous situation.		N
	Where machinery has several starting control devices and the operators can therefore put each other in danger, additional devices must		N

	be fitted to rule out such risks. If safety requires that starting and/or stopping must be performed in a specific sequence, there must be devices which ensure that these operations are performed in the correct order.		
1.2.4	Stopping devices		P
1.2.4.1	Normal stopping		P
	Each machine must be fitted with a control whereby the machine can be brought safely to a complete stop	The normal stopping devices have been used for these machines.	P
	Each workstation must be fitted with a control to stop some or all of the moving parts of the machinery, depending on the type of hazard, so that the machinery is rendered safe	Workstation has fitted with a normal stopping device.	P
	The machinery's stop control must have priority over the start controls	They have priority over the start controls.	P
	Once the machinery or its dangerous parts have stopped, the energy supply to the actuators concerned must be cut off	The energy supply has been cut off after the machine is stopped.	P
1.2.4.2	Operational stop		--
	Where, for operational reasons, a stop control that does not cut off the energy supply to the actuators is required, the stop condition must be monitored and maintained.		P
1.2.4.3	Emergency stop		P
	machinery must be fitted with one or more emergency stop devices to enable actual or impending danger to be averted	The requirement has been complied with.	P
	The following exceptions apply:		--
	- Machines in which an emergency stop device would not lessen the risk, either because it would not reduce the stopping time or because it would not enable the special measures required to deal with the risk to be taken		N
	- Hand-held portable machines and hand-guided machines		N
	The emergency stop device must:		--
	- Have clearly identifiable, clearly visible and quickly accessible controls	The requirement has been complied with.	P
	-Stop the dangerous process as quickly as possible, without creating additional hazards	The requirement has been complied with.	P
	-Where necessary, trigger or permit the	No this kind of application	N

	triggering of certain safeguard movements		
	Once active operation of the emergency stop control has ceased following a stop command, that command must be sustained by engagement of the emergency stop device until that engagement is specifically overridden		N
	It must be possible to disengage the device only by an appropriate operation, and disengaging the device must not restart the machinery but only permit restarting		N
	The emergency stop function must be available and operational at all times, regardless of the operating mode.		N
	Emergency stop devices must be a backup to other safeguarding measures and not a substitute for them.		N
1.2.4.4	Complex installations		P
	In the case of machinery or parts of machinery designed to work together, must so design and construct the machinery that the stop controls, including the emergency stop, can stop not only the machinery itself but also all equipment upstream and/or downstream if its continued operation can be dangerous		N
1.2.5	Mode Selection		P
	The control mode selected must override all other control systems with the exception of the emergency stop	These specified requirements have been complied with.	P
	If machinery has been designed and built to allow for its use in several control or operating modes presenting different safety levels, it must be fitted with a mode selector which can be locked in each position	Not applicable.	N
	Each position of the selector must correspond to a single operating or control mode	Each of them is corresponding to a single operating or control mode.	P
	The selector may be replaced by another selection method which restricts the use of certain functions of the machinery to certain categories of operator	No this kind of application.	N
	If, for certain operations, the machinery must be able to operate with its protection devices		N

	neutralized, the mode selector must simultaneously:		
	-disable all other control or operating modes,		N
	-Permit movements only by controls requiring sustained action		N
	-Permit the operation of dangerous moving parts only in enhanced safety conditions while preventing hazards from linked sequences		N
	-Prevent any movement liable to pose a danger by acting voluntarily or involuntarily on the machine's internal sensors		N
	If these four conditions cannot be fulfilled simultaneously, the control or operating mode selector must activate other protective measures designed and constructed to ensure a safe intervention zone.		N
	In addition, the operator must be able to control operation of the parts he is working on at the adjustment point.		N
1.2.6	Failure of the power supply		P
	The interruption, re-establishment after an interruption or fluctuation in whatever manner of the power supply to the machinery must not lead to a dangerous situation	No risk is generated from these accidental situations.	P
	In particular:		--
	-The machinery must not start unexpectedly		P
	-the parameters of the machinery must not change in an uncontrolled way when such change can lead to hazardous situations,	the parameters of the machinery will not change in an uncontrolled way	P
	-The machinery must not be prevented from stopping if the command has already been given	This requirement has been complied with.	P
	- No moving part of the machinery or piece held by the machinery must fall or be ejected	This clause has been met.	P
	- Automatic or manual stopping of the moving parts whatever they must be unimpeded	This requirement has been complied with.	P
	- The protection devices must remain fully effective	All protection devices can remain effective fully.	P
1.2.7	Failure of the control circuit		P
1.2.8	Software		P
1.3	Protection against mechanical hazards	See below	P
1.3.1	Risk of loss of stability	Square construction and low	P

		center of gravity, no overturn, drop and movement	
	Machinery, components and fittings thereof must be so designed and constructed that they are stable enough, under the foreseen operating conditions for use without risk of overturning, falling or unexpected movement	The stability of machines, components and fittings has been taken into consideration.	P
	If the shape of the machinery itself or its intended installation doesn't offer sufficient stability, appropriate means of anchorage must be incorporated and indicated in the instructions		N
1.3.2	Risk of break-up during Operation		P
	The various parts of machinery and their linkages must be able to withstand the stress to which they are subject when used as foreseen by the manufacturer	All parts used can withstand sufficient stress for working.	P
	The durability of the materials used must be adequate for the nature of the workplace foreseen by the manufacturer, in particular as regards the phenomena of fatigue, aging, corrosion and abrasion	All materials used have adequate durability.	P
	The manufacturer must indicate in the instructions the type and frequency of inspection and maintenance required for safety reasons, where appropriate, indicate the parts subject to wear and the criteria for replacement	This information in relation to inspection and maintenance etc. are indicated in the instruction manual.	P
	Where a risk of rupture or disintegration remains despite the measures taken the moving parts must be mounted and positioned in such a way that in case of rupture their fragments will be contained	No this kind of situation.	N
	Both rigid and flexible pipes carrying fluids, particularly those under high pressure, must be able to withstand the foreseen internal and external stresses and must be firmly attached and/or protected against all manner of external stresses and strains; precaution must be taken to ensure that no risk is posed by a rupture		N
	Where the material to be processed is fed to the tool automatically, the following conditions must be fulfilled to avoid risks to the persons exposed:		--

	-When the work piece comes into contact with the tool the later must have attained its normal working conditions	This requirement has been complied with.	P
	- When the tool starts and/or stops the feed movement and the tool movement must be coordinated	This requirement has been complied with.	P
1.3.3	Risks due to falling or ejected Objects	No object falling and ejecting	P
	Precautions must be taken to prevent risks from falling or ejected objects		N
1.3.4	Risks due to surfaces, edges or angles	Smooth surface and edges	P
	In so far as their purpose allows, accessible parts of the machinery must have no sharp edges, no sharp angles, and no rough surfaces likely to cause injury	All parts have been processed carefully so that they have no sharp edges, no sharp angles, and no rough surfaces likely to cause injury.	P
1.3.5	Risks related to combined machinery		--
	Where the machinery is intended to carry out several different operations with the manual removal of the piece between each operation, it must be designed and constructed in such a way as to enable each element to be used separately without the other elements constituting a danger or risk for the exposed person		N
	For this purpose, it must be possible to start and stop separately and elements that are not protected		N
1.3.6	Risks relating to variations in the rotational speed of tools		--
	Where the machinery performs operations under different conditions of use, it must be designed and constructed in such a way that selection and adjustment of these conditions can be carried out safely and reliably		P
1.3.7	Prevention of risks related to moving parts		P
	The moving parts of machinery must be designed, built and laid out to avoid hazards or, where hazards persist, fixed with guards or protective devices in such a way as to prevent all risk of contact which could lead to accidents	Appropriate protective guards have been fitted to avoid hazards.	P
	All necessary steps must be taken to prevent accidental blockage of moving parts involved in		P

	the work		
	In cases where, despite the precautions taken, a blockage is likely to occur, specific protection devices or tools, the instruction handbook and possibly a sign on the machinery should be provided by the manufacturer to enable the equipment to be safely unblocked		N
	The instructions and, where possible, a sign on the machinery shall identify these specific protective devices and how they are to be used.		N
1.3.8	Choice of protection against risks arising from moving parts	A nip warning symbol provided	P
	Guards or protection devices used to protect against the risks related to moving parts must be selected on the basis of the type of risk	Guards or protection devices have been used appropriately.	P
	The following guidelines must be used to help make the choice		--
1.3.8.1	Moving transmission parts		P
	Guards designed to protect exposed persons against the risks associated with moving transmission parts must be:		--
	-Either fixed, complying with requirements 1.4.1 and 1.4.2.1 or	The fixed guards are used.	P
	- interlocking movable guards as referred to in section 1.4.2.2.		N
	Interlocking movable guards should be used where frequent access is envisaged.		N
1.3.8.2	Moving parts involved in the process		--
	guards or protection devices designed to protect exposed persons against the risks associated with moving parts contributing to the work must be:		--
	- either fixed guards complying with requirements 1.4.1 and 1.4.2.1	fixed guards complying with requirements 1.4.1 and 1.4.2.1	P
	- interlocking movable guards as referred to in section 1.4.2.2, or		N
	- protective devices as referred to in section 1.4.3, or		N
	- a combination of the above.		N
	However, when certain moving parts directly involved in the process can't be made completely or partially inaccessible during		--

	operation owing to operations requiring near-by operator intervention, where technically possible such parts must be fitted with:		
	- fixed guards or interlocking movable guards preventing access to those sections of the parts that are not used in the work, and		N
	-adjustable guards as referred to in section 1.4.2.3 restricting access to those sections of the moving parts where access is necessary.		N
1.3.9	Risks of uncontrolled movements		--
	When a part of the machinery has been stopped, any drift away from the stopping position, for whatever reason other than action on the control devices, must be prevented or must be such that it does not present a hazard.	The requirement has been complied with.	P
1.4	Required characteristics of guard and protection devices		P
1.4.1	General requirements	Steel used	P
	Guards and protection devices must:		
	-Be of robust construction	They are of robust construction.	P
	-be securely held in place,	be securely held in place,	P
	-Not give rise to any additional risk	No additional risk is generated.	P
	-Not be easy to bypass or render nonoperational	They cannot be easy to bypass or render non-operational.	P
	-Be located at an adequate distance from the danger zone	Appropriate safety distances according to EN ISO13857 has been complied with.	P
	-Cause minimum obstruction to the view of the production process	This requirement has been complied with.	P
	-enable essential work to be carried out on the installation and/or replacement of tools and for maintenance purposes by restricting access exclusively to the area where the work has to be done, if possible without the guard having to be removed or the protective device having to be disabled.		P
	In addition, guards must, where possible, protect against the ejection or falling of materials or objects and against emissions generated by the machinery.		N
1.4.2	Special requirements for guards		P
1.4.2.1	Fixed guards		P

	Fixed guards must be fixed by systems that can be opened or removed only with tools.		P
	Their fixing systems must remain attached to the guards or to the machinery when the guards are removed.		P
	Where possible, guards must be unable to remain in place without their fixings		P
1.4.2.2	Movable guards	Not provided	N
	Interlocking movable guards must:		--
	-As far as possible remain fixed to the machinery when open		N
	-be designed and constructed in such a way that they can be adjusted only by means of an intentional action.		N
	Interlocking movable guards must be associated with an interlocking device that:		--
	-prevents the start of hazardous machinery functions until they are closed and		N
	-gives a stop command whenever they are no longer closed.		N
	Where it is possible for an operator to reach the danger zone before the risk due to the hazardous machinery functions has ceased, movable guards must be associated with a guard locking device in addition to an interlocking device that:		N
	-prevents the start of hazardous machinery functions until the guard is closed and locked, and		N
	-keeps the guard closed and locked until the risk of injury from the hazardous machinery functions has ceased.		N
	Interlocking movable guards must be designed in such a way that the absence or failure of one of their components prevents starting or stops the hazardous machinery functions.		N
1.4.2.3	Adjustable guards restricting access	Not provided	N
	Adjustable guards restricting access to those areas of the moving parts strictly necessary for the work must:		N
	- Be adjustable manually or automatically according to the type of work involved		N

	-Be readily adjustable without the use of tools		N
1.4.3	Special requirements for protection devices		N
	Protection devices must be designed and incorporated into the control system so that:		N
	- Moving parts can't start up while they are within the operator's reach		N
	-persons cannot reach moving parts while the parts are moving, and		N
	- The absence or failure of one of their components prevents starting or stops the moving parts		N
	Protective devices must be adjustable only by means of an intentional action.		N
1.5	Protection against other hazards	See below	P
1.5.1	Electricity supply	All electrical parts, protecting by enclose and reinforced insulation construction, protective earthing used. Overcurrent, overvoltage, overload, overspeed, overtemperature, overvoltage and undervoltage protection provided by circuit breaker. No residual voltage hazard No electric shock hazard All connection comply with requirements, identification correct. The details pls see EN60204-1 safety report	P
	Where machinery has an electricity supply it must be designed, constructed and equipped so that all hazards of an electrical nature are or can be prevented		P
	The safety objectives set out in Directive 2014/35/EU shall apply to machinery. However, the obligations concerning conformity assessment and the placing on the market and/or putting into service of machinery with regard to electrical hazards are governed solely by this Directive.		P
1.5.2	Static electricity	Protective earthing circuits used	P
	Machinery must be so designed and	Adequate safety design for this	P

	constructed as to prevent or limit the build-up of potentially dangerous electrostatic charges and/or be fitted with a discharging system	requirement has been taken.	
1.5.3	Energy supply other than electricity		N
	Where machinery is powered by an energy other than electricity, it must be so designed, constructed and equipped as to avoid all potential hazards associated with these types of energy		N
1.5.4	Errors of fitting	Machine design to avoid assembly Errors. machine assembly by manufacturer relevant identification and tag provided	P
	Errors likely to be made when fitting or refitting certain parts which could be a source of risk must be made impossible by the design of such parts or, failing this, by information on moving parts and/or their housings where the direction of movement must be known to avoid a risk	Appropriate design has been taken during design and attention has been paid during fitting.	P
	Where necessary, the instructions must give further information on these risks.	Adequate instructions are given in the instruction manual.	P
	Where a faulty connection can be the source of risk, incorrect connections must be made impossible by design or, failing this, by information given on the elements to be connected and, where appropriate, on the means of connection.		P
1.5.5	Extreme temperature	No hazard	P
	Step must be taken to eliminate any risk of injury caused by contact with or proximity to machinery parts or materials at high or very low temperatures		N
	The necessary steps must also be taken to avoid or protect against the risk of hot or very cold material being ejected.		N
1.5.6	Fire	No hazard	P
	Machinery must be designed and constructed to avoid all risk of fire or overheating posed by the machinery itself or by gases, liquids, dusts, vapors or the other substances produced or used by the machinery		N

1.5.7	Explosion		--
	Machinery must be designed and constructed to avoid any risk of explosion posed by the machinery itself or by gases, liquids, dusts, vapors or other substances produced or used by the machinery		N
	Machinery must comply, as far as the risk of explosion due to its use in a potentially explosive atmosphere is concerned, with the provisions of the specific Community Directives.		N
1.5.8	Noise	No infective noise, comply with requirement<80dB	P
	Machinery must be so designed and constructed that risks resulting from the emission of airborne noise are reduced to the lowest level taking accounting of technical progress and the availability of means of reducing noise, in particular at source	Appropriate measure has been taken.	P
	The level of noise emission may be assessed with reference to comparative emission data for similar machinery.		N
1.5.9	Vibration	Shock-proof washer used	P
	Machinery must be so designed and constructed that risks resulting from vibrations produced by the machinery are reduced to the lowest level, taking account of technical progress and the availability of means of reducing vibration, in particular at source		N
	The level of vibration emission may be assessed with reference to comparative emission data for similar machinery.		N
1.5.10	Radiation	No hazard	P
	Undesirable radiation emissions from the machinery must be eliminated or be reduced to levels that do not have adverse effects on persons.	The requirement has been complied with.	P
	Any functional ionising radiation emissions must be limited to the lowest level which is sufficient for the proper functioning of the machinery during setting, operation and cleaning. Where a risk exists, the necessary protective measures must be taken.	No harmful emission of radiation has been found.	P

	Any functional non-ionising radiation emissions during setting, operation and cleaning must be limited to levels that do not have adverse effects on persons.	No harmful emission of radiation has been found.	N
1.5.11	External radiation		N
	Machinery must be so designed and constructed that external radiation doesn't interfere with its operation		N
1.5.12	Laser equipment		N
	Where laser equipment is used, the following provisions should be taken into account;		N
	-Laser equipment on machinery must be designed and constructed so as to prevent any accidental radiation		N
	-Laser equipment on machinery must be protected so that effective radiation, radiation produced by reflection or diffusion and secondary radiation don't damage health		N
	-Optical equipment for the observation or adjustment of laser equipment on machinery must be such that no health risk is created by the laser rays		N
1.5.13	Emission of dust, gases, etc.	No dust emission	N
	Machinery must be so designed, constructed and/or equipped that risks due to gases, liquids, dust, vapors and other waste materials which it produces can be avoided		N
	Where a hazard cannot be eliminated, the machinery must be so equipped that hazardous materials and substances can be contained, evacuated, precipitated by water spraying, filtered or treated by another equally effective method.		N
	Where the process is not totally enclosed during normal operation of the machinery, the devices for containment and/or evacuation must be situated in such a way as to have the maximum effect.		N
1.5.14	Risk of being trapped in a machine	Can't stand into machine	N
	Machinery must be so designed, constructed or fitted with a means of preventing a exposed person from being enclosed within it or, if that is		N

	impossible, with a means of summoning help		
1.5.15	Risk of slipping, tripping or falling		N
	Parts of the machinery where persons are liable to move about or stand must be designed and constructed to prevent persons slipping, tripping or falling on or off these parts		N
	Where appropriate, these parts must be fitted with handholds that are fixed relative to the user and that enable them to maintain their stability.		N
1.6	Maintenance		P
1.6.1	Machinery maintenance	Requirement in instruction Adjustment, lubricate and maintenance under disconnecting power and no hazard to person	P
	Adjustment and maintenance points must be located outside danger zones.	They are located outside danger zones.	P
	It must be possible to carry out adjustment, maintenance, repair, cleaning and servicing operations while machinery is at a standstill		P
	If one or more of the above conditions can't be satisfied for technical reasons, these operations must be possible without risk		N
	In the case of automated machinery and, where necessary, other machinery, the manufacturer must take provision for a connecting device for mounting diagnostic fault-finding equipment	The requirement has been complied with	P
	Automated machine components which have to be changed frequently, in particular for a change in manufacture or where they are liable to wear or likely to deteriorate following an accident, must be capable of being removed and replaced easily and in safety	The relative components can be removed and replaced easily and in safety.	P
	Access to the components must enable these tasks to be carried out with the necessary technical means in accordance with an operating method specified by the manufacturer	Appropriate means have been given in the instruction manual.	P
1.6.2	Access to operating position and servicing points		P
	Machinery must be designed and constructed in such a way as to allow access in safety to all	Appropriate protection measures have been taken so	P

	areas where intervention is necessary during operation, adjustment and maintenance of the machinery.	that all areas can be accessed safely.	
1.6.3	Isolation of energy source	Power system provided by user Separated by single trunk cable system Connection and requirement in instruction	P
	All machinery must be fitted with means to isolate it from all energy sources	Circuit breaker has been taken into used.	P
	Such isolators must be clearly identified		P
	They must be capable of being locked if reconnection could endanger exposed persons		N
	The isolator must be capable of being locked also where an operator is unable, from any of the points to which he has access, to check that the energy is still cut off		N
	In the case of machinery supplied with electricity through a plug capable of being plugged into a circuit, separation of the plug is sufficient		N
	After the energy is cut off, it must be possible to dissipate normally any energy remaining or stored in the circuits of the machinery without risk to exposed persons		P
	As an exception to the above requirements, certain circuits may remain connected to their energy source in order, for example, to hold parts, protect information, light interiors, etc. In this case, special steps must be taken to ensure operator safety		N
1.6.4	Operator intervention	Maintenance by skilled person.	P
	Machinery must be so designed, constructed and equipped that the need for operator intervention is limited		P
	If operator intervention can't be avoided, it must be possible to carry it out easily and in safety		P
1.6.5	Cleaning of internal parts	No dangerous residual object.	P
	The machinery must be designed and constructed in such a way that it is possible to clean internal parts which have contained dangerous substances or preparations without entering them; any necessary unblocking must		P

	also be possible from the outside		
	If it is absolutely impossible to avoid entering the machinery, the manufacturer must take steps during its construction to allow cleaning to take place safely.		P
1.7	INFORMATION	See below	P
1.7.1	Information and warnings on the machinery		N
	Information and warnings on the machinery should preferably be provided in the form of readily understandable symbols or pictograms.	Information and warnings are readily understandable pictograms.	P
	Any written or verbal information and warnings must be expressed in an official Community language or languages, which may be determined in accordance with the Treaty by the Member State in which the machinery is placed on the market and/or put into service and may be accompanied, on request, by versions in any other official Community language or languages understood by the operators.	The requirement has been complied with.	P
1.7.1.1	Information and information devices		--
	The information needed to control machinery must be provided in a form that is unambiguous and easily understood. It must not be excessive to the extent of overloading the operator.		P
	Visual display units or any other interactive means of communication between the operator and the machine must be easily understood and easy to use.		N
1.7.1.2	Warning devices		--
	Where the health and safety of persons may be endangered by a fault in the operation of unsupervised machinery, the machinery must be equipped in such a way as to give an appropriate acoustic or light signal as a warning.	It has been complied with.	P
	Where machinery is equipped with warning devices these must be unambiguous and easily perceived. The operator must have facilities to check the operation of such warning devices at all times.		P
	The requirements of the specific Community	It has been complied with.	P

	Directives concerning colors and safety signals must be complied with		
1.7.2	Warning of residual risks		--
	Where risks remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted, the necessary warnings, including warning devices, must be provided.		P
1.7.3	Marking		--
	All machinery must be marked legibly and indelibly with the following minimum particular:		--
	-the business name and full address of the manufacturer and, where applicable, his authorised representative,	It has been marked.	P
	- designation of the machinery,	It has been marked.	P
	-the CE Marking (see Annex III),	It has been marked.	P
	-designation of series or type,	It has been marked.	P
	-serial number, if any,	It has been marked.	P
	-the year of construction, that is the year in which the manufacturing process is completed.	This information has been provided.	P
	It is prohibited to pre-date or post-date the machinery when affixing the CE marking.	This information has been provided.	P
	Furthermore, machinery designed and constructed for use in a potentially explosive atmosphere must be marked accordingly.		N
	Machinery must also bear full information relevant to its type and essential for safe use. Such information is subject to the requirements set out in section 1.7.1.	The requirement has been complied with.	P
	Where a machine part must be handled during use with lifting equipment, its mass must be indicated legibly, indelibly and unambiguously.		P
1.7.4	Instructions		P
	All machinery must be accompanied by instructions in the official Community language or languages of the Member State in which it is placed on the market and/or put into service.	The language of the instructions is english.	P
	The instructions accompanying the machinery must be either 'Original instructions' or a 'Translation of the original instructions', in which case the translation must be accompanied by the original instructions.	It has been included in the instructions.	P

	By way of exception, the maintenance instructions intended for use by specialised personnel mandated by the manufacturer or his authorized representative may be supplied in only one Community language which the specialised personnel understand.	It has been included in the instructions.	P
	The instructions must be drafted in accordance with the principles set out below.	It has been included in the instructions.	P
1.7.4.1	General principles for the drafting of instructions		P
	a) The instructions must be drafted in one or more official Community languages. The words 'Original instructions' must appear on the language version(s) verified by the manufacturer or his authorized representative.	In english.	P
	(b) Where no 'Original instructions' exist in the official language(s) of the country where the machinery is to be used, a translation into that/those language(s) must be provided by the manufacturer or his authorized representative or by the person bringing the machinery into the language area in question. The translations must bear the words 'Translation of the original instructions'.		P
	(c) The contents of the instructions must cover not only the intended use of the machinery but also take into account any reasonably foreseeable misuse thereof.	It is included in the instructions.	P
	(d) In the case of machinery intended for use by non-professional operators, the wording and layout of the instructions for use must take into account the level of general education and acumen that can reasonably be expected from such operators.		P
1.7.4.2	Contents of the instructions		--
	Each instruction manual must contain, where applicable, at least the following information:		--
	a) the business name and full address of the manufacturer and of his authorized representative;	it is included.	P
	b) the designation of the machinery as marked on the machinery itself, except for the serial number (see section 1.7.3);	it is included.	P

	(c) the EC declaration of conformity, or a document setting out the contents of the EC declaration of conformity, showing the particulars of the machinery, not necessarily including the serial number and the signature;	it is included.	P
	(d) a general description of the machinery;	it is included.	P
	(e) the drawings, diagrams, descriptions and explanations necessary for the use, maintenance and repair of the machinery and for checking its correct functioning;	it is included.	P
	(f) a description of the workstation(s) likely to be occupied by operators;	it is included.	P
	(g) a description of the intended use of the machinery;	it is included.	P
	(h) warnings concerning ways in which the machinery must not be used that experience has shown might occur;	it is included.	P
	(i) assembly, installation and connection instructions, including drawings, diagrams and the means of attachment and the designation of the chassis or installation on which the machinery is to be mounted;	it is included.	P
	(j) instructions relating to installation and assembly for reducing noise or vibration;	it is included.	P
	(k) instructions for the putting into service and use of the machinery and, if necessary, instructions for the training of operators;	it is included.	P
	(l) information about the residual risks that remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted;	it is included.	P
	(m) instructions on the protective measures to be taken by the user, including, where appropriate, the personal protective equipment to be provided;		N
	(n) the essential characteristics of tools which may be fitted to the machinery;		P
	(o) the conditions in which the machinery meets the requirement of stability during use, transportation, assembly, dismantling when out of service, testing or foreseeable breakdowns;		P
	(p) instructions with a view to ensuring that		P

	transport, handling and storage operations can be made safely, giving the mass of the machinery and of its various parts where these are regularly to be transported separately;		
	(q) the operating method to be followed in the event of accident or breakdown; if a blockage is likely to occur, the operating method to be followed so as to enable the equipment to be safely unblocked;		P
	(r) the description of the adjustment and maintenance operations that should be carried out by the user and the preventive maintenance measures that should be observed;		P
	(s) instructions designed to enable adjustment and maintenance to be carried out safely, including the protective measures that should be taken during these operations;		P
	(t) the specifications of the spare parts to be used, when these affect the health and safety of operators;		P
	(u) the following information on airborne noise emissions:		--
	- Equivalent continuous A-weighted pressure level at workstations, where this exceeds 70 dB (A); where this level doesn't exceed 70 dB (A), this fact must be indicated		P
	-Peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 uPa)		N
	-Sound power level emitted by the machinery where the equivalent continuous A-weight sound pressure level at workstations exceeds 80 dB (A)		N
	These values must be either those actually measured for the machinery in question or those established on the basis of measurements taken for technically comparable machinery which is representative of the machinery to be produced.	The requirement has been complied with.	P
	In the case of very large machinery, instead of the A-weighted sound power level, the A-weighted emission sound pressure levels at specified positions around the machinery may		N

	be indicated.		
	Where the harmonized standards are not applied, sound levels must be measured using the most appropriate method for the machinery		N
	Whenever sound emission values are indicated the uncertainties surrounding these values must be specified. The operating conditions of the machinery during measurement and the measuring methods used must be described.		P
	Where the workstation(s) are undefined or cannot be defined, A-weighted sound pressure levels must be measured at a distance of 1 metre from the surface of the machinery and at a height of 1,6 metres from the floor or access platform.		P
	The position and value of the maximum sound pressure must be indicated		P
	Where specific Community Directives lay down other requirements for the measurement of sound pressure levels or sound power levels, those Directives must be applied and the corresponding provisions of this section shall not apply;		N
	(v) Where machinery is likely to emit nonionising radiation which may cause harm to persons, in particular persons with active or non-active implantable medical devices, information concerning the radiation emitted for the operator and exposed persons.		N
1.7.4.3	Sales literature		--
	Sales literature describing the machinery must not contradict the instructions as regards health and safety aspects. Sales literature describing the performance characteristics of machinery must contain the same information on emissions as is contained in the instructions.	The requirement has been complied with.	P
2.	Essential Health and Safety Requirements for Certain Categories of Machinery		—
2.1	Agri-foodstuffs machinery		N
2.1.1	General		N
	Machinery intended for use with foodstuffs or with cosmetics or pharmaceutical products		N

	must be designed and constructed in such a way as to avoid any risk of infection, sickness or contagion. The following requirements must be observed:		N
	(a) materials in contact with, or intended to come into contact with, foodstuffs or cosmetics or pharmaceutical products must satisfy the conditions set down in the relevant Directives. The machinery must be designed and constructed in such a way that these materials can be cleaned before each use. Where this is not possible disposable parts must be used;		N
	(b) all surfaces in contact with foodstuffs or cosmetics or pharmaceutical products, other than surfaces of disposable parts, must:		N
	– be smooth and have neither ridges nor crevices which could harbour organic materials. The same applies to their joinings,		N
	– be designed and constructed in such a way as to reduce the projections, edges and recesses of assemblies to a minimum		N
	– be easily cleaned and disinfected, where necessary after removing easily dismantled parts; the inside surfaces must have curves with a radius sufficient to allow thorough cleaning;		N
	(c) it must be possible for liquids, gases and aerosols deriving from foodstuffs, cosmetics or pharmaceutical products as well as from cleaning, disinfecting and rinsing fluids to be completely discharged from the machinery (if possible, in a 'cleaning' position);		N
	(d) machinery must be designed and constructed in such a way as to prevent any substances or living creatures, in particular insects, from entering, or any organic matter from accumulating in areas that cannot be cleaned;		N
	(e) machinery must be designed and constructed in such a way that no ancillary substances hazardous to health, including the lubricants used, can come into contact with foodstuffs, cosmetics or pharmaceutical		N

	products. Where necessary, machinery must be designed and constructed in such a way that continuing compliance with this requirement can be checked.		
2.1.2	Instructions		N
	The instructions for foodstuffs machinery and machinery for use with cosmetics or pharmaceutical products must indicate recommended products and methods for cleaning, disinfecting and rinsing, not only for easily accessible areas but also for areas to which access is impossible or inadvisable		N
2.2	Portable hand-held and/or hand-guided machinery	The machine is not a portable hand-held or hand-guided type	N
2.3	Machinery for working wood and analogous materials	The machine is not used in the wood working industry	N
3.	Essential Health and Safety Requirements to Offset due to the Mobility of Machinery		—
3.1	General	The machine is not intended for mobility application	N
3.1.1	Definition	Information only	N
3.1.2	Lighting		N
3.1.3	Design of machinery to facilitate its handling		N
3.2	Work stations		N
3.2.1	Driving position		N
3.2.2	Seating		N
3.2.3	Other places		N
3.3	Controls		N
3.3.1	Control devices		N
3.3.2	Starting/moving		N
3.3.3	Travelling function		N
3.3.4	Movement of pedestrian-controlled machinery		N
3.3.5	Control circuit failure		N
3.4	Protection against mechanical hazards		N
3.4.1	Uncontrolled movements		N
3.4.2	Risk of break-up during operation		N
3.4.3	Rollover		N
3.4.4	Falling objects		N
3.4.5	Means of access		N
3.4.6	Towing devices		N

3.4.7	Transmission of power between self-propelled machinery (or tractor) and recipient machinery		N
3.4.8	Moving transmission parts		N
3.5	Protection against other hazards		N
3.5.1	Batteries		N
3.5.2	Fire		N
3.5.3	Emissions of dust, gases, etc.		N
3.6	Indications		N
3.6.1	Signs and warning		N
3.6.2	Marking		N
3.6.3	Instruction handbook		N
4.	Essential Health and Safety Requirements to Offset the Particular Hazards due to a Lifting Operation		—
4.1	General remarks	The machine is not intended for any lifting operations	N
4.1.1	Definition	Information only	N
4.1.2	Protection against mechanical hazards		N
4.1.2.	Risk due to lack of stability		N
4.1.2.	Guide rails and rail tracks		N
4.1.2.	Mechanical strength		N
4.1.2.	Pulleys, drums, chains or ropes		N
4.1.2.	Seperate lifting accessories		N
4.1.2.	Control of movements		N
4.1.2.	Handling of loads		N
4.1.2.	Lightning		N
4.2	Special requirements for machinery whose power source is other than manual effort		N
4.2.1	Controls		N
4.2.1.1	Driving position		N
4.2.1.2	Seating		N
4.2.1.3	Control devices		N
4.2.1.4	Loading control		N
4.2.2	Installation guided by cables		N
4.2.3	Risks to exposed persons. Means of access to driving position and intervention points		N
4.2.4	Fitness for purpose		N
4.3	Marking		N
4.3.1	Chains and ropes		N
4.3.2	Lifting accessories		N

4.3.3	Machinery		N
4.4	Instruction handbook		N
4.4.1	Lifting accessories		N
4.4.2	Machinery		N
5.	Essential Health and Safety Requirements for Machinery Intended for Underground Work		—
5.1	Risks due to lack of stability	The machine is not intended for underground work	N
5.2	Movement		N
5.3	Lighting		N
5.4	Control devices		N
5.5	Stopping		N
5.6	Fire		N
5.7	Emissions of dust, gases, etc.		N

Part II: 2.2 Risk assessment

Risk assessment Methodology

The risk assessment is based on a method recommended in ISO/TR14121-2:2007, in which the factors Se-CI(Fr, Pr, Av) and diagram are used to evaluate the level of risk. The meaning of those is described in the following:

(1) Se, severity of the possible harm:

- 1: Scratches, bruises that are cured by first aid or similar.
- 2: More severe scratches, bruises, stabbing which require medical attention from professionals.
- 3: Normally irreversible injury; it will be slightly difficult to continue work after healing.
- 4: Irreversible injury in such a way that it will very difficult to continue work after healing, if possible at all.

(2) Fr, average interval between frequency of the exposure and its duration:

- 1: Interval between exposure is more than a year.
- 2: Interval between exposure is more than two weeks but less than or equal to a year.
- 3: Interval between exposure is more than a day but less than or equal to two weeks.
- 4: Interval between exposure is more than an hour but less than or equal to a day. Where the duration is short than 10 min, the above values may be decreased to the next level.
- 5: Interval less than or equal to an hour. This value is not to be decreased at any time.

(3) Pr, possibility of occurrence of a hazardous event:

- 1: Negligible: for example, this kind of component never fails so that a hazardous event occurs. No possibility of human error.
- 2: Rarely: for example, it is unlikely that this kind of component will fail so that a hazardous event occurs. Human error is unlikely.
- 3: Possible: for example, this kind of component can fail so hazardous event occurs. Human error is possible.
- 4: Likely: for example, this kind of component will probably fail so a hazardous event occurs. Human error is likely.
- 5: Very High: for example, this kind of component is not made for this application. It will fail so that a hazardous event occurs. Human behavior is such that the likelihood of error is very high.

(4) Av, possibility of avoiding or limiting harm:

- 1: Likely: for example, it is likely that contact with moving parts behind and inter locked guard will be avoided in most cases should the interlocking fail and the movements continue.
- 2: Possible: for example, it is possible to avoid an entanglement hazard where the speed is slow.
- 3: Impossible: for example, it is impossible to avoid the sudden appearance of a powerful laser beam or a part of machine becoming live because of a fault in electrical insulation.

The risk is evaluated by using the matrix as below:

Severity Se	Class CI (Fr+Pr+Av)				
	3-4	5-7	8-10	11-13	14-15
4					
3					
2					
1					

Where the severity, Se, cross the class, CI:

In the black area, protective measures have to be implemented to reduce risk;

In the gray area, protective measures are recommended to be implemented to further reduce risk;

In the remaining area, the risk is already adequately reduced.

No.	EHSR	Subclause of EN ISO 12100	Hazard/ Hazardous event	Life cycle/ Tasks	Hazardous situation	Risk Estimation	Risk reduction and protective measures
1. Mechanical							
1.1		6.2.2.1	Being run over	-	N/A	-	-
1.2		6.2.2.2	Being thrown	-	N/A	-	-
1.3	1.3.7	6.2.3 a) 6.2.3 b) 6.2.6 6.2.10 6.3.1 6.3.2 6.3.3 6.3.5.2 6.3.5.4 6.3.5.5 6.3.5.6 6.4.1 6.4.3 6.4.4 6.4.5	Crushing	1.Commissioning 2. Operation	1. When entering the working area of the mould. 2. The machine maintenance operator put his/her head into the machine process zone during setting, change of fixture, and visual inspection check. When access the moving clamping mechanism area.	Se 4, Fr 4, Pr 3, Av 3; CI 10	Fixed guards are fitted on top, rear and both sides of the machine process zone to prevent operators access to the danger machine process zone from the direction except from front. Light curtains are fitted in front of the machine process zone to detect present of bodies or parts of bodies access into the danger process zone, once detection of present of bodies or parts of bodies, the down strike moving parts driven by main pneumatic piston will be stopped immediately. Emergency stop devices are fitted to provide emergency stop function to stop the machine and cut off the power supply to moving parts and other dangerous parts in the situation of emergency. Warning labels and safety instructions are provided to remind operator for relevant risk.

1.4	1.3.4
1.5	1.3.7
1.6	1.3.7
1.7	
1.8	
1.9	
1.10	1.3.7
1.11	1.5.15
1.12	

Cutting or severing	-	N/A	-	-
Drawing in or trapping	-	N/A	-	-
Entanglement	-	N/A	-	-
Friction, abrasion	-	N/A	-	-
Impact	1.Commissioning 2. Operation	1. When entering the working area of the mould. 2. The machine maintenance operator put his/her head into the machine process zone during setting, change of fixture, and visual inspection check. When access the moving clamping mechanism area.	Se 4, Fr 4, Pr 3, Av 3; CI 10	Fixed guards are fitted on top, rear and both sides of the machine process zone to prevent operators access to the danger machine process zone from the direction except from front. Light curtains are fitted in front of the machine process zone to detect present of bodies or parts of bodies access into the danger process zone, once detection of present of bodies or parts of bodies, the down strike moving parts driven by main pneumatic piston will be stopped immediately. Emergency stop devices are fitted to provide emergency stop function to stop the machine and cut off the power supply to moving parts and other dangerous parts in the situation of emergency. Warning labels and safety instructions are provided to remind operator for relevant risk.
Injection	-	N/A	-	-
Shearing	-	N/A	-	-
Slip, trip, and fall of person	-	N/A	-	-
Stabbing or puncture	-	N/A	-	-

1.13			Suffocation	-	N/A	-	-
2. Electrical							
2.1		6.2.9 6.3.2 6.3.3.2 6.3.5.4 6.4.4 6.4.5	Burn	1. Normal operation 2. Maintenance	Overload and/or short circuit of power circuit. Short circuit of control circuit. Failure of components of power circuit and/or control circuit.	Se 2, Fr 1, Pr 3, Av 2; CI 6	Overcurrent protection devices are provided to prevent overload or short circuit of power circuits and short circuit of control circuits. Warning labels and safety instructions are provided to remind operator for relevant risk.
2.2			Chemical effects	-	See 17 below	-	-
2.3			Effects on medical implants	-	See 17 below	-	-
2.4			Electrocution	-	See 17 below	-	-
2.5			Falling, being thrown	-	See 17 below	-	-
2.6			Fire	-	See 17 below	-	-
2.7			Projection of molten particles	-	See 17 below	-	-
2.8			Shock	1. Normal operation 2. Maintenance	Failure of electric insulation.	-	Basic insulation is applied to live parts to prevent direct contact of live parts. Supplementary insulation or reinforced insulation is provided to live parts to prevent indirect contact of live parts. Protective bonding of accessible metal parts of machine and electric components and provide residual current trip devices and overcurrent protection devices. Live parts inside control panel are provided with appropriate IP protection degree. Control panel are fitted with main disconnect and key lock devices. Warning labels and safety

							instructions are provided to remind operator for relevant risk.
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No.	EHSR	Subclause of EN ISO 12100	Hazard/ Hazardous event	Life cycle/ Tasks	Hazardous situation	Risk Estimation	Risk reduction and protective measures
3. Thermal							
3.1	1.5.5	6.2.4 b)	Burn	-	N/A	-	-
3.2		6.2.8 c) 6.3.2.7	Dehydration	-	N/A	-	-
3.3		6.3.3.2.1	Discomfort	-	N/A	-	-
3.4		6.3.4.5	Frostbite	-	N/A	-	-
3.5			Injuries by the radiation of heat sources	-	N/A	-	-
3.6	1.5.5		Scald	-	N/A	-	-
4. Noise							
4.1		6.2.2.2 6.2.3 c)	Discomfort	-	N/A	-	-
4.2		6.2.4 c)	Loss of awareness	-	N/A	-	-
4.3		6.2.8 c)	Loss of balance	-	N/A	-	-
4.4		6.3.1 6.3.2.1 b)	Permanent hear loss	-	N/A	-	-
4.5		6.3.2.5.1	Stress	-	N/A	-	-
4.6		6.3.3.2.1 6.3.4.2	Tinnitus	-	N/A	-	-
4.7		6.4.3	Tiredness	-	N/A	-	-
4.8		6.4.5.1 b) and c)	Any other (e.g. mechanical, electrical) as a consequence of an interference with speech communication or with acoustic signals	-	N/A	-	
5. Vibration							
5.1		6.2.2.2 6.2.3 c)	Discomfort	-	N/A	-	-
5.2		6.2.8 c)	Low- back morbidity	-	N/A	-	-
5.3		6.3.3.2.1 6.3.4.3	Neurological disorder	-	N/A	-	-
5.4		6.4.5.1 c)	Osteo- articular disorder	-	N/A	-	-
5.5			Trauma of the spine	-	N/A	-	-

No.	EHSR	Subclause of EN ISO 12100	Hazard/ Hazardous event	Life cycle/ Tasks	Hazardous situation	Risk Estimation	Risk reduction and protective measures
5.6			Vascular disorder	-	N/A	-	-
6. Radiation							
6.1		6.2.2.2 6.2.3 c) 6.3.3.2.1 6.3.4.5 6.4.5.1 c)	Burn	-	N/A	-	-
6.2			Damage to eyes and skin	1.Commissioning 2. Operation	1. The machine operator placing the sample into the machine process zone. 2. The machine maintenance operator put his/her hand into the machine process zone during setting, change of fixture, and visual inspection check.	Se 4, Fr 4, Pr 3, Av 3; CI 10	During the operation of machinery, appropriate guards should be used to prevent personnel from coming into contact with laser and Wearing Protective glasses Warning labels and safety instructions are provided to remind operator for relevant risk.
6.3			Effects on reproductive capability	-	N/A	-	-
6.4			Genetic mutation	-	N/A	-	-
6.5			Headache, insomnia, etc.	-	N/A	-	-
7. Material / substance							
7.1		6.2.2.2 6.2.3 b) 6.2.3 c) 6.2.4 a) 6.2.4 b) 6.3.1 6.3.3.2.1 6.3.4.4 6.4.5.1 c) 6.4.5.1 g)	Breathing difficulties, suffocation	-	N/A	-	-
7.2			Cancer	-	N/A	-	-
7.3			Corrosion	-	N/A	-	-
7.4			Effects on reproductive capability	-	N/A	-	-
7.5			Explosion	-	N/A	-	-
7.6			Fire	-	N/A	-	
7.7			Infection	-	N/A	-	-
7.8			Mutation	-	N/A	-	-
7.9			Poisoning	-	N/A	-	-
7.10			Sensitization	-	N/A		-

8. Ergonomic							
8.1		6.2.2.1	Discomfort	-	N/A	-	-
8.2		6.2.7					
8.2		6.2.8	Fatigue	-	N/A	-	-
8.3		6.2.11.8	Musculoskeletal disorder	-	N/A	-	-
8.4		6.3.2.1	Stress	-	N/A	-	-
8.5		6.3.3.2.1	Any other (e.g. mechanical, electrical) as a	-	N/A	-	-

No.	EHSR	Subclause of EN ISO 12100	Hazard/ Hazardous event	Life cycle/ Tasks	Hazardous situation	Risk Estimation	Risk reduction and protective measures
			consequence of human error				
9. Associated with environment in which the machine is used							
9.1		6.2.6	Burn	-	N/A	-	-
9.2		6.2.11.11	Slight disease	-	N/A	-	-
9.3		6.3.2.1	Slipping, falling	-	N/A	-	-
9.4		6.4.5.1 b)	Suffocation	-	N/A	-	-
9.5			Any other as a consequence of the effect caused by the sources of the hazards on the machine or parts of the machine	-	N/A	-	-
10. Hazard combination							
10.1		-	E.g. dehydration, loss of awareness het stroke	-	N/A	-	-
11. shape and/or superficial finishing of accessible parts of the machine							
11.1		6.2.2.1	Contact with rough surfaces	-	N/A	-	-
11.2			Contact with sharp edges and corners, protruding part	-	N/A	-	-
12. Moving parts of machine							
12.1		6.2.2, 6.2.14, 6.2.15	Contact with moving parts	-	N/A	-	-
12.2		6.3. 1 to 6.3.3 6.3.5.2 to 6.3.5.4 6.4.3 to 6.4.5	contact with rotating open ends	-	N/A	-	-
13. Kinetic energy and/or potential energy (gravity) of the machine, tools and materials used, processed, handled							
13.1		6.2.3, 6.2.5 6.2.10 to 6.2.12 6.3.2.1, 6.3.2.2 6.3.2.7 6.3.3 6.3.5.2, 6.3.5.4,	falling or ejection of objects	-	N/A	-	-

No.	EHSR	Subclause of EN ISO 12100	Hazard/ Hazardous event	Life cycle/ Tasks	Hazardous situation	Risk Estimation	Risk reduction and protective measures
		6.3.5.5 6.4.4, 6.4.5					
14. Stability of the machine and/or parts of the machine							
14.1	1.3.1	6.2.3 a) and b) 6.2.6 6.3.2.6, 6.3.2.7 6.4.3 to 6.4.5	Loss of stability	-	Machine is always in stable position	-	-
15. Mechanical strength of parts of the machine, tools, etc.							
15.1	1.3.2	6.2.3 a) and b) 6.2. 11, 6.2. 13 6.3.2, 6.3.2.7 6.3.3.1 to 6.3.3.3 6.3.5.2, 6.4.4, 6.4.5	Break-up during operation	-	N/A	-	-
16. Pneumatic, hydraulic equipment							
16.1		6.2.3 a) and b) 6.2. 10, 6.2. 13, 6.3.2.7	displacement of moving elements	-	N/A	-	-
16.2	1.3.2	6.3.3.1 to 6.3.3.3 6.3.5.4, 6.4.4, 6.4.5	High pressure fluid injection or ejection	-	N/A	-	-
16.3			Uncontrolled movements	-	N/A	-	-
17. Electrical equipment							
17.1	1.5.1	6.2.4 a) 6.2.9, 6.2.12 6.3.2, 6.3.3, 6.3.5.4 6.4.4, 6.4.5	Direct contact	1. Installation, commissioning 2. Setting 3. Maintenance 4. Fault finding, troubleshooting	With live terminals in the control cabinets.	Se 4, Fr 3, Pr 3, Av 3, CI 9	1. Operation panel with good characteristics to prevent creepage and water, and worked with PELV 2. Maintenance by regular electrician 3. Fully enclosed control cabinets, for main electrical cabinet, when open the cabinet, the power will cut off, for second cabinet, only

No.	EHSR	Subclause of EN ISO 12100	Hazard/ Hazardous event	Life cycle/ Tasks	Hazardous situation	Risk Estimation	Risk reduction and protective measures
							authorized person with key can open it, finger guards provided where appreciate. For more detail, please see EN 60204- 1 test report.
17.2			Disruptive discharge	-	See 17.6 below	-	
17.3			Electric arc	-	N/A	-	
17.4			Fire	-	N/A	-	
17.5	1.5.2		Indirect contact	-	When insulation failures	Se 4, Fr 6, Pr 2, Av 3; CI 11	1. Enhanced or double insulation with current breakers. 2. Approved under-voltage contactors are used. 3. earthing the accessible metal.
17.6			Short- circuit	-	-	-	Approved breakers with overcurrent protection functions are fitted.
18. Control system							
18.1		6.2.5 6.2. 11 to 6.2. 13 6.3.5.2 to 6.3.5.4 6.4.3 to 6.4.5	Dropping or ejection of a moving part of the machine or of a workpiece clamped by the machine	-	N/A	-	-
18.2			Failure to stop moving parts	-	N/A	-	-

File No: SIBOASI-2016009-A1

Page 13 of 127

No.	EHSR	Subclause of	Hazard/ Hazardous event	Life cycle/ Tasks	Hazardous situation	Risk Estimation	Risk reduction and protective measures
		EN ISO 12100					
18.3			Machine action resulting from inhibition (defeating of failure) of protective devices	-	N/A	-	-
18.4			Uncontrolled movements (including speed changes)	-	N/A	-	-
18.5			Unintended/ unexpected start-up	-	N/A	-	-
18.6	1.2. 1, 1.2.7		Other hazardous events due to failure (s) or poor design of the control system	-	N/A	-	-
19. Materials and substances or with physical factors (temperature, noise, vibration, radiation and environment)							
19.1		6.2.2.2 6.2.3 c) 6.2.4 6.2.8 6.3.1 6.3.3.2 6.3.4 6.4.3 to 6.4.5	Contact with objects with high or low temperature	-	N/A	-	-
19.2			Emission of a substance that can be hazardous	-	N/A	-	-
19.3			Emission of a level of noise that can be hazardous	-	N/A	-	-
19.4			Emission of a level of noise that can interfere with a speech communication or with acoustic signals	-	N/A	-	-
19.5			Emission of a level of vibration that can be hazardous	-	N/A	-	-

No.	EHSR	Subclause of	Hazard/ Hazardous event	Life cycle/ Tasks	Hazardous situation	Risk Estimation	Risk reduction and protective measures
		EN ISO 12100					
19.6			Emission of a level of radiation fields that can be hazardous	Operation	Unintended movement due to the environment EMI affection on the control system	Se 4, Fr 6, Pr 2, Av 3; CI 11	EMC and EMI safety performance is verified based on the Declaration of EMC Conformity issued by the supplier.
19.7			Harsh environmental conditions	-	Machine operates only in a normal natural environment	-	-
20. Workstation and/or process design							
20.1	1. 1.2d, 1.1.5 1.2.2	6.2.2.1 6.2.7, 6.2.8 6.2.11.8 6.3.5.5, 6.3.5.6 6.4.3 to 6.4.5	Excessive efforts	-	N/A	-	-
20.2			Human errors/ misbehaviour (unintentional and/or deliberately induced by the design)	-	N/A	-	-
20.3			Loss of direct visibility of the working area	-	N/A	-	-
20.4			Painful and tiring postures	-	N/A	-	-
20.5			Repetitive handling at high frequency	-	N/A	-	-

Part III : Test report**EN 60204 test report**

1	Scope		-
	This part of IEC 60204 applies to the application of electrical, electronic and programmable electronic equipment and systems to machines not portable by hand while working, including a group of machines working together in a co-ordinated manner.	These machine are within this scope.	Pass.
	This part of IEC 60204 is applicable to the electrical equipment or parts of the electrical equipment that operate with nominal supply voltages not exceeding 1 000 V for alternating current (AC) and not exceeding 1 500 V for direct current (DC), and with nominal supply frequencies not exceeding 200 Hz.	The nominal supply voltage for these machines is AC 230V, and the nominal frequency is 50Hz.	Pass.
2	Normative references		-
3	Terms and definitions		-
4	General requirements		-
4.1	General		-
	This part of IEC 60204 is intended to apply to electrical equipment used with a wide variety of machines and with a group of machines working together in a co-ordinated manner.	See the risk assessment report in detail.	Pass.
	The risks associated with the hazards relevant to the electrical equipment shall be assessed as part of the overall requirements for risk 120 assessment of the machine. This will determine the adequate risk reduction, and the necessary protective measures for persons who can be exposed to those hazards, while still maintaining an acceptable level of performance of the machine and its equipment.	Please the risk assessment report in detail.	Pass.
4.2	Selection of equipment		-
4.2.1	General		-
	Electrical components and devices shall:		-
	– be suitable for their intended use; and	This requirement has been considered during design.	Pass.
	– conform to relevant IEC standards where such exist; and	This requirement has been considered during design.	Pass.
	– be applied in accordance with the supplier's instructions.	This requirement has been considered during design.	Pass.
4.2.2	Electrical equipment in compliance with the IEC 60439 series		-
	The electrical equipment of the machine shall satisfy the safety requirements identified by the risk assessment of the machine. Depending upon the machine, its intended use and its electrical equipment, the designer may select parts of the electrical equipment of the machine that are in compliance with EN 60439-1 and, as necessary, other relevant parts of the EN 60439 series (see also Annex F).		Pass.
4.3	Electrical supply		-

4.3	Electrical supply		-
	The electrical equipment shall be designed to operate correctly with the relevant conditions of supply	They can be operated correctly with the relevant conditions of supply.	Pass.
4.4	Physical environment and operating conditions		
	Shall be suitable for use as specified: - Electromagnetic compatibility - Ambient air temperature - Humidity - Altitude - Contaminants - Ionizing and non-ionizing radiation - Vibration, shock and bump	This machine is suitable for use as specified in this clause.	Pass.
4.5	Transportation and storage		-
	Electrical equipment shall be designed to withstand, or suitable precautions shall be taken to protect against, the effects of transportation and storage temperatures within a range of – 25 °C to +55 °C and for short periods not exceeding 24 h at up to +70 °C. Suitable means shall be provided to prevent damage from humidity, vibration, and shock. A special agreement can be necessary between the supplier and the user (see Annex B).	These requirements have been meet.	Pass.
4.6	Provisions for handling		-
	Heavy and bulky electrical equipment that has to be removed from the machine for transport, or that is independent of the machine, shall be provided with suitable means for handling by cranes or similar equipment.		N/A
4.7	Installation		-
	Electrical equipment shall be installed in accordance with the electrical equipment supplier's instructions.		Pass.
5	Incoming supply conductor terminations and devices for disconnecting and switching off		-
5.1	Incoming supply conductor terminations		-
	It is recommended that, where practicable, the electrical equipment of a machine is connected to a single incoming supply. Where another supply is necessary for certain parts of the equipment (for example, electronic equipment that operates at a different voltage), that supply should be derived, as far as is practicable, from devices (for example, transformers, converters) forming part of the electrical equipment of the machine. For large complex machinery comprising a number of widely-spaced machines working together in a coordinated manner, there can be a need for more than one incoming supply depending upon the site supply arrangements (see 5.3.1).	Single power supply.	Pass.
	Unless a plug is provided with the machine for the connection to the supply (see 5.3.2 e), it is recommended that the supply conductors are terminated at the supply disconnecting device.	The supply conductors are terminated at the supply disconnecting device.	Pass.

	Where a neutral conductor is used it shall be clearly indicated in the technical documentation of the machine, such as in the installation diagram and in the circuit diagram, and a separate insulated terminal, labelled N in accordance with 16.1, shall be provided for the neutral conductor (see also Annex B).	neutral conductor has been used and satisfied this requirement.	Pass
	There shall be no connection between the neutral conductor and the protective bonding circuit inside the electrical equipment nor shall a combined PEN terminal be provided.	These requirements have been met.	Pass
	All terminals for the incoming supply connection shall be clearly identified in accordance with IEC 60445 and 16.1. For the identification of the external protective conductor terminal, see 5.2.	All of them have been identified clearly.	Pass.
5.2	Terminal for connection to the external protective earthing system		-
	For each incoming supply, a terminal shall be provided in the vicinity of the associated phase conductor terminals for connection of the machine to the external protective earthing system or to the external protective conductor, depending upon the supply distribution system.	A terminal has been provided for each incoming supply.	Pass.
	The terminal shall be of such a size as to enable the connection of an external protective copper conductor with a cross-sectional area in accordance with Table 1.	This requirement has been met.	Pass.
	Where an external protective conductor of a material other than copper is used, the terminal size shall be selected accordingly (see also 8.2.2).	This requirement has been met.	Pass.
	At each incoming supply point, the terminal for connection of the external protective earthing system or the external protective conductor shall be marked or labelled with the letters PE (see IEC 60445).	This requirement has been met.	Pass.
5.3	Supply disconnecting (isolating) device		-
5.3.1、	General		-
	A supply disconnecting device shall be provided: for each incoming source of supply to a machine(s); – for each on-board power supply.	A supply disconnecting device is provided.	Pass.
	The supply disconnecting device shall disconnect (isolate) the electrical equipment of the machine from the supply when required (for example for work on the machine, including the electrical equipment).	This device can disconnect the electrical equipment of the machine from supply.	Pass.
	When two or more supply disconnecting devices are provided, protective interlocks for their correct operation shall also be provided in order to prevent a hazardous situation, including damage to the machine or to the work in progress.		N/A
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;		Pass.

	b) disconnecter, with or without fuses, in accordance with IEC 60947-3, that has an auxiliary contact that in all cases causes switching devices to break the load circuit before the opening of the main contacts of the disconnecter ; 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 of IEC 60947-1 as well as a utilization category defined in the product standard as appropriate for on-load switching of motors or other inductive loads; e) a plug/socket combination for a flexible cable supply.		
5.3.3	Requirements		-
	When the supply disconnecting device is one of the types specified in 5.3.2 a) to d) it shall fulfill all of the following requirements:		-
	– isolate the electrical equipment from the supply and have one OFF (isolated) and one ON position marked with "O" and "I" (symbols IEC 60417-5008 (DB:2002-10) and IEC 60417-5007 (DB:2002-10), see 10.2.2);		Pass.
	– have a visible contact gap or a position indicator which cannot indicate OFF (isolated) until all contacts are actually open and the requirements for the isolating function have been satisfied;		Pass.
	– have an external operating means (for example handle), (exception: power-operated switchgear need not be operable from outside the enclosure where there are other means to open it). Where the external operating means is not intended for emergency operations, it is recommended that it be coloured BLACK or GREY (see 10.7.4 and 10.8.4);		Pass.
	– be provided with a means permitting it to be locked in the OFF (isolated) position (for example by padlocks). When so locked, remote as well as local closing shall be prevented;	Padlock has been provided.	Pass.
	– disconnect all live conductors of its power supply circuit. However, for TN supply systems, the neutral conductor may or may not be disconnected except in countries where disconnection of the neutral conductor (when used) is compulsory;		Pass.
	– have a breaking capacity sufficient to interrupt the current of the largest motor when stalled together with the sum of the normal running currents of all other motors and/or loads. The calculated breaking capacity may be reduced by the use of a proven diversity factor.	It has sufficient breaking sufficient to interrupt the current.	Pass.
	When the supply disconnecting device is a plug/socket combination, it shall fulfill the following requirements:		N/A
	– have the switching capability, or be interlocked with a switching device that has a breaking capacity,		N/A

	sufficient to interrupt the current of the largest motor when stalled together with the sum of the normal running currents of all other motors and/or loads. The calculated breaking capacity may be reduced by the use of a proven diversity factor. When the interlocked switching device is electrically operated (for example a contactor) it shall have an appropriate utilisation category.		
	– a) to f) of 13.4.5.		N/A
	Where the supply disconnecting device is a plug/socket combination, a switching device with an appropriate utilisation category shall be provided for switching the machine on and off.		N/A
	This can be achieved by the use of the interlocked switching device described above.		N/A
5.3.4	Operating means		-
	The operating means (for example, a handle) of the supply disconnecting device shall be easily accessible and located between 0,6 m and 1,9 m above the servicing level. An upper limit of 1,7 m is recommended.	Above 0.6m	Pass.
5.3.5	Excepted circuits		-
	The following circuits need not be disconnected by the supply disconnecting device:		-
	– lighting circuits for lighting needed during maintenance or repair;	Lighting circuit has been used.	Pass.
	– plug and socket outlets for the exclusive connection of repair or maintenance tools and equipment (for example hand drills, test equipment);		N/A
	– undervoltage protection circuits that are only provided for automatic tripping in the event of supply failure;		N/A
	– circuits supplying equipment that should normally remain energized for correct operation (for example temperature controlled measuring devices, product (work in progress) heaters, program storage devices);		N/A
	– control circuits for interlocking.		-
	It is recommended, however, that such circuits be provided with their own disconnecting device.		N/A
	Where such a circuit is not disconnected by the supply disconnecting device:		N/A
	– permanent warning label(s) in accordance with 16.1 shall be appropriately placed in proximity to the supply disconnecting device;		-
	– a corresponding statement shall be included in the maintenance manual, and one or more of the following shall apply;		-
	– a permanent warning label in accordance with 16.1 is affixed in proximity to each excepted circuit, or		-
	– the excepted circuit is separated from other circuits,		-

	or		
	– the conductors are identified by colour taking into account the recommendation of 13.2.4.		-
5.4	Devices for switching off for prevention of unexpected start-up		-
	Devices for switching off for the prevention of unexpected start-up shall be provided (for example where, during maintenance, a start-up of the machine or part of the machine can create a hazard).	There is such function to prevent unexpected start-up.	Pass.
	Such devices shall be appropriate and convenient for the intended use, shall be suitably placed, and readily identifiable as to their function and purpose (for example by a durable marking in accordance with 16.1 where necessary).	These requirements have been met.	Pass.
	Means shall be provided to prevent inadvertent and/or mistaken closure of these devices either at the controller or from other locations (see also 5.6).	A switch with key has been used.	Pass.
	The following devices that fulfill the isolation function may be provided for this purpose:		-
	– devices described in 5.3.2, – disconnectors, withdrawable fuse links and withdrawable links only if located in an enclosed electrical operating area (see 3.19).		Pass.
5.5	Devices for disconnecting electrical equipment		-
	Devices shall be provided for disconnecting (isolating) electrical equipment to enable work to be carried out when it is de-energised and isolated. Such devices shall be:	Devices have been provided for disconnecting electrical equipment.	Pass.
	– appropriate and convenient for the intended use;		Pass.
	– suitably placed;		Pass.
	– readily identifiable as to which part(s) or circuit(s) of the equipment is served (for example by durable marking in accordance with 16.1 where necessary).		Pass.
	Means shall be provided to prevent inadvertent and/or mistaken closure of these devices either at the controller or from other locations (see also 5.6).		Pass.
	The supply disconnecting device (see 5.3) may, in some cases, fulfill that function. However, where it is necessary to work on individual parts of the electrical equipment of a machine, or on one of a number of machines fed by a common conductor bar, conductor wire or inductive power supply system, a disconnecting device shall be provided for each part, or for each machine, requiring separate isolation.		Pass.
	In addition to the supply disconnecting device, the following devices that fulfill the isolation function may be provided for this purpose:		Pass.
	– devices described in 5.3.2;		Pass.
	– disconnectors, withdrawable fuse links and withdrawable links only if located in an electrical		Pass.

	operating area (see 3.15) and relevant information is provided with the electrical equipment (see 17.2 b) 9) and b)12)).		
5.6	Protection against unauthorized, inadvertent and/or mistaken connection		-
	The devices described in 5.4 and 5.5 that are located outside an enclosed electrical operating area shall be equipped with means to secure them in the OFF position (disconnected state), (for example by provisions for padlocking, trapped key interlocking). When so secured, remote as well as local reconnection shall be prevented.	No need.	N/A
	Where a non-lockable disconnecting device (for example withdrawable fuse-links, withdrawable links) other means of protection against reconnection (for example warning labels in accordance with 16.1) may be provided.		N/A
	However, when a plug/socket combination according to 5.3.2 e) is so positioned that it can be kept under the immediate supervision of the person carrying out the work, means for securing in the disconnected state need not be provided.		N/A
6	Protection against electric shock		-
6.1	General		-
	The electrical equipment shall provide protection of persons against electric shock from:		-
	– direct contact (see 6.2 and 6.4);	Please see the relative report.	Pass.
	– indirect contact (see 6.3 and 6.4).	Please see the relative report.	Pass.
	The measures for this protection given in 6.2, 6.3, and, for PELV, in 6.4, are a recommended selection from IEC 60364-4-41. Where those recommended measures are not practicable, for example due to the physical or operational conditions, other measures from IEC 60364-4-41 may be used.	Please see the relative report.	Pass.
6.2	Protection against direct contact		-
6.2.1	General		-
	For each circuit or part of the electrical equipment, the measures of either 6.2.2 or 6.2.3 and, where applicable, 6.2.4 shall be applied.	Please see the relative report.	Pass.
6.2.2	Protection by enclosures		-
	Live parts shall be located inside enclosures that conform to the relevant requirements of Clauses 4, 11, and 14 and that provide protection against direct contact of at least IP2X or IPXXB (see IEC 60529).	Above IP2X	Pass.
	Where the top surfaces of the enclosure are readily accessible, the minimum degree of protection against direct contact provided by the top surfaces shall be IP4X or IPXXD.	IP4X	Pass.
	Opening an enclosure (i.e. opening doors, lids, covers, and the like) shall be possible only under one of the		-

	following conditions:		
a)	The use of a key or tool is necessary for access. For enclosed electrical operating areas, see IEC 60364-4-41, or IEC 60439-1 as appropriate.	Tool is necessary for access to enclosed electrical operating areas.	Pass,
	All live parts, that are likely to be touched when resetting or adjusting devices intended for such operations while the equipment is still connected, shall be protected against direct contact to at least IP2X or IPXXB. Other live parts on the inside of doors shall be protected against direct contact to at least IP1X or IPXXA.	IP2X	Pass.
b)	The disconnection of live parts inside the enclosure before the enclosure can be opened. This may be accomplished by interlocking the door with a disconnecting device (for example, the supply disconnecting device) so that the door can only be opened when the disconnecting device is open and so that the disconnecting device can only be closed when the door is closed.	An interlock has been used.	Pass..
c)	Opening without the use of a key or a tool and without disconnection of live parts shall be possible only when all live parts are protected against direct contact to at least IP2X or IPXXB (see IEC 60529). Where barriers provide this protection, either they shall require a tool for their removal or all live parts protected by them shall be automatically disconnected when the barrier is removed.		N/A
6.2.3	Protection by insulation of live parts		-
	Live parts protected by insulation shall be completely covered with insulation that can only be removed by destruction.	This requirement has been met.	Pass.
	Such insulation shall be capable of withstanding the mechanical, chemical, electrical, and thermal stresses to which it can be subjected under normal operating conditions.	Such insulation can withstand these situations.	Pass.
6.2.4	Protection against residual voltages		-
	Live parts having a residual voltage greater than 60 V after the supply has been disconnected shall be discharged to 60 V or less within a time period of 5 s after disconnection of the supply voltage provided that this rate of discharge does not interfere with the proper functioning of the equipment. Exempted from this requirement are components having a stored charge of 60 μ C or less.		N/A
	Where this specified rate of discharge would interfere with the proper functioning of the equipment, a durable warning notice drawing attention to the hazard and stating the delay required before the enclosure may be opened shall be displayed at an easily visible location on or immediately adjacent to the enclosure containing the capacitances.		N/A
	If the withdrawal of plugs or similar devices would make the exposure of the conductors (e.g. pins), the discharge time shall not exceed 1 second such	No need.	N/A

	conductor shall have the protection degree at least IP2X or IPXXB		
6.2.5	Protection by barriers		-
	For protection by barriers, 412.2 of IEC 60364-4-41 shall apply.		N/A
6.2.6	Protection by placing out of reach or protection by obstacles		-
	For protection by placing out of reach, 412.4 of IEC 60364-4-41 shall apply.		N/A
	For protection by obstacles, 412.3 of IEC 60364-4-41 shall apply.		N/A
	For conductor wire systems or conductor bar systems with a degree of protection less than IP2X, see 12.7.1.		N/A
6.3	Protection against indirect contact		-
6.3.1	General		-
	Protection against indirect contact (3.29) is intended to prevent hazardous situations due to an insulation fault between live parts and exposed conductive parts.		-
	For each circuit or part of the electrical equipment, at least one of the measures in accordance with 6.3.2 to 6.3.3 shall be applied:		-
	– measures to prevent the occurrence of a touch voltage (6.3.2); or	See the relative clause.	Pass.
	–automatic disconnection of the supply before the time of contact with a touch voltage can become hazardous (6.3.3).	See the relative clause.	Pass.
6.3.2	Prevention of the occurrence of a touch voltage		-
6.3.2.1	General		-
	Measures to prevent the occurrence of a touch voltage include the following:		-
	– provision of class II equipment or by equivalent insulation; –electrical separation.	Please see the relative clause.	Pass.
6.3.2.2	Protection by provision of class II equipment or by equivalent insulation		-
	This measure is intended to prevent the occurrence of touch voltages on the accessible parts through a fault in the basic insulation.		-
	This protection is provided by one or more of the following:		-
	– class II electrical devices or apparatus (double insulation, reinforced insulation or by equivalent insulation in accordance with IEC 61140); – switchgear and control gear assemblies having total insulation in accordance with IEC 60439-1; – supplementary or reinforced insulation in accordance with 413.2 of IEC 60364-4-41	Appropriate insulations have been provided.	Pass.
6.3.2.3	Protection by electrical separation		-

	Electrical separation of an individual circuit is intended to prevent a touch voltage through contact with exposed conductive parts that can be energized by a fault in the basic insulation of the live parts of that circuit.		-
	For this type of protection, the requirements of 413.5 of IEC 60364-4-41 apply.	Appropriate measures have been taken.	Pass.
6.3.3	Protection by automatic disconnection of supply		-
	This measure necessitates co-ordination between:		-
	– the type of supply and earthing system;		-
	– the impedance values of the different elements of the protective bonding system;		-
	–the characteristics of the protective devices that detect insulation fault(s).		-
	Automatic disconnection of the supply of any circuit affected by an insulation fault is intended to prevent a hazardous situation resulting from a touch voltage.		-
	This protective measure comprises both:		-
	– protective bonding of exposed conductive parts (see 8.2.3),	This measure has been taken.	Pass.
	– and either:		-
	a)overcurrent protective devices for the automatic disconnection of the supply on detection of an insulation fault in TN systems, or	This measure has been taken.	Pass.
	b) residual current protective devices to initiate the automatic disconnection of the supply on detection of an insulation fault from a live part to exposed conductive parts or to earth in TT systems, or		N/A
	c) insulation monitoring or residual current protective devices to initiate automatic disconnection of IT systems. Except where a protective device is provided to interrupt the supply in the case of the first earth fault, an insulation monitoring device shall be provided to indicate the occurrence of a first fault from a live part to exposed conductive parts or to earth. This insulation monitoring device shall initiate an audible and/or visual signal which shall continue as long as the fault persists.		N/A
	Where automatic disconnection is provided in accordance with a), and disconnection within the time specified in Clause A.1 cannot be assured, supplementary bonding shall be provided as necessary to meet the requirements of Clause A.3.		N/A
6.4	Protection by the use of PELV		-
6.4.1	General requirements		-
	PELV (protective extra-low voltage) circuits shall satisfy all of the conditions specified in this clause	No PELV circuit has been used.	N/A
6.4.2	Sources for PELV		-
	The sources for PELV shall be one of the conditions specified in this clause	No PELV circuit has been used.	N/A

7	Protection of equipment		-
7.1	General		-
7.2	Over current protection		-
7.2.1	General		-
7.2.2	Supply conductors		-
	The supplier is not responsible for providing the over current device for the supply conductors.		Pass.
	Installation diagram with data necessary for selection of the over current protective device	Relative information has been provided.	Pass.
7.2.3	Power circuits		-
	All conductors shall be protected against over current (except earthed neutral conductor)	All conductors have been protected against overcurrent.	Pass.
	Cross-section area of neutral conductor	Cross-section area of neutral conductor is equal to the phase conductors'.	Pass.
	For neutral conductors smaller than phase conductors then IEC 364-4-473 shall apply	.	N/A
	In IT-systems, it is recommended that the neutral conductor is not used		N/A
7.2.4	Control circuits		-
	Conductors of control circuits connected to the supply voltage and of circuits feeding control circuit transformers shall be protected against over current in accordance with 7.2.3	This requirement has been met.	Pass.
	Conductors of control circuits supplied by a control circuit transformer or DC supply shall be protected against overcurrent (see also 9.4.3.1)		N/A
7.2.5	Socket outlets and their associated conductors		-
	Over current protection devices shall be provided in the unearthed live conductors		N/A
7.2.6	Lighting circuits		-
	All unearthed conductors of circuits supplying lighting shall be protected against the effects of short circuits by the provision of over current devices separate from those protecting other circuits		N/A
7.2.7	Transformers		-
	Transformers shall be protected against Over current in accordance with IEC 60076-5 and IEC 60743 as appropriate	All transformers have been protected against over current.	Pass.
	The type and setting of the overcurrent protective device should be in accordance with the recommendations of the transformer supplier	This requirement has been considered during design.	Pass.
7.2.8	Location of over current protective device		-
	Over current protective device shall be located at the point where the conductors to be protected are connected to their supply	This requirement has been considered during design.	Pass.
7.2.9	Over current protective devices		-

	Sufficient breaking capacity	The over current protective devices have sufficient breaking capacity.	Pass.
	Where fuses are used, a type readily available in the country of use shall be selected, or arrangement shall be made with the use for the supply of spare parts	This requirement has been considered during design.	Pass.
7.2.10	Rating and setting of over current protective devices		-
	The rated current of fuses or the setting current of other over current protective devices shall be selected as low as possible but adequate for the anticipated over currents	This requirement has been met.	Pass.
	The rated current or setting of an over current protective device is determined by the current carrying capacity of the conductors to be protected by that device in accordance with 13.4	This requirement has been considered during design.	Pass.
7.3	Protection of motors against overheating		-
7.3.1	General		
	Overload protection of motors shall be provided for each motor rated at more than 0.5kW	The overload protection is provided.	Pass.
	- Protection of motors against overheating can be achieved by: overload protection over-temperature protection current-limiting protection.	Appropriate protection has been taken.	Pass.
7.3.2	Overload protection		-
	Detection of overload shall be provided in each live conductor excepted for the neutral conductor		N/A
	For motors having single-phase or d.c power supplies. Detection in only one unearthed live conductor is permitted		N/A
	Where overload protection is achieved by switching off, the switching device shall switch off all live conductors. The switching of the neutral conductor is not necessary for overload protection.		N/A
	Where motors with special duty ratings are required to start or to brake frequently it can be difficult to provide overload protection with a time constant comparable with that of the winding to be protected. Appropriate protective devices designed to accommodate special duty motors or over-temperature protection (see 7.3.3) can be necessary.		N/A
	For motors that cannot be overloaded (for example torque motors, motion drives that either are protected by mechanical overload protection devices or are adequately dimensioned), overload protection is not required		N/A
7.3.3	Over-temperature protection		-
	The provision of motors with over-temperature protection (see IEC 60034-11) is recommended in situations where the cooling can be impaired (for example dusty environments).	Over-temperature protection devices have been provided.	Pass.

	Depending upon the type of motor, protection under stalled rotor or loss of phase conditions is not always ensured by over-temperature protection, and additional protection should then be provided.		N/A
	Over-temperature protection is also recommended for motors that cannot be overloaded (for example torque motors, motion drives that are either protected by mechanical overload protection devices or are adequately dimensioned), where the possibility of over-temperature exists (for example due to reduced cooling).		-
7.3.4	Current limiting protection		-
	Where protection against the effects of overheating in three phase motors is achieved by current limitation, the number of current limitation devices may be reduced from 3 to 2 (see 7.3.2). For motors having single phase AC or DC power supplies, current limitation in only one unearthed live conductor is permitted.		N/A
7.4	Abnormal temperature protection		-
	Use of abnormal temperature protection	No need.	N/A
7.5	Protection against supply interruption or voltage reduction and subsequent restoration		-
	Where a voltage drop or a supply interruption can cause a hazardous condition, damage to the machine, or to the work in progress, under voltage protection shall be provided	No this kind of hazard has been found.	N/A
	The operation of the under voltage device shall not impair the operation of any stopping control of the machine	No under voltage device is used.	N/A
	Upon restoration of the voltage or upon switching on the incoming supply, automatic or unexpected restarting of the machine shall be prevented	Automatic of unexpected restarting of the machine can be prevented.	Pass.
	Where only a part of the machine or of the group of machines working together in a coordinated manner is affected by the voltage reduction or supply interruption, the under voltage protection shall initiate appropriate control responses to ensure co-ordination		N/A
7.6	Motor over speed protection		-
	Use of the motor over speed protection		N/A
7.7	Earth fault/residual current protection		-
	Use of earth fault/residual current protection for automatic disconnection		N/A
7.8	Phase sequence protection		
	Where an incorrect sequence of the supply voltage can cause a hazardous condition or damage to the machine, protection shall be provided		N/A
7.9	Protection against over voltage due to lightning and to switching surges		-
	Protection devices can be provided to protect against the effects of over voltages due to lightning or to		N/A

	switching surges		
8	Equipotential bonding		-
8.1	General		-
8.2	Protective bonding circuit		-
8.2.1	General		-
	All parts of the protective bonding circuit shall be so designed that they are capable of withstanding the highest thermal and mechanical stresses that can be caused by earth-fault currents that could flow in that part of the protective bonding circuit.	All these circuits have been designed that are capable of withstanding the highest thermal and mechanical stresses.	Pass.
	Where the conductance of structural parts of the electrical equipment or of the machine is less than that of the smallest protective conductor connected to the exposed conductive parts, a supplementary bonding conductor shall be provided. This supplementary bonding conductor shall have a cross-sectional area not less than half that of the corresponding protective conductor.		N/A
	If an IT distribution system is used, the machine structure shall be part of the protective bonding circuit and insulation monitoring shall be provided. See 6.3.3 c).		N/A
	Conductive structural parts of equipment in accordance with 6.3.2.2 need not be connected to the protective bonding circuit. Extraneous conductive parts which form the structure of the machine need not be connected to the protective bonding circuit where all the equipment provided is in accordance with 6.3.2.2.		Pass.
	Exposed conductive parts of equipment in accordance with 6.3.2.3 shall not be connected to the protective bonding circuit.		Pass.
8.2.2	Protective conductors		-
	Protective conductors shall be identified in accordance with 13.2.2.	Please see clause 13.2.2 in detail.	Pass.
	Copper conductors are preferred.		Pass.
	Where a conductor material other than copper is used, its electrical resistance per unit length shall not exceed that of the allowable copper conductor and such conductors shall be not less than 16 mm ² in cross-sectional area.	Only copper conductors are used.	N/A
	– The cross-sectional area of protective conductors shall be determined in accordance with the requirements of: 543 of IEC 60364-5-54; or 7.4.3.1.7 of IEC 60439-1, as appropriate.	They have been used according to these requirements.	Pass.
	This requirement is met in most cases where the relationship between the cross-sectional area of the phase conductors associated with that part of the equipment and the cross-sectional area of the associated protective conductor is in accordance with Table 1 (see 5.2).		-

	See also 8.2.8.		-
8.2.3	Continuity of the protective bonding circuit		-
	All exposed conductive parts shall be connected to the protective bonding circuit in accordance with 8.2.1.	All these parts have been connected.	Pass.
	Where a part is removed for any reason (for example routine maintenance), the protective bonding circuit for the remaining parts shall not be interrupted.	This requirement has been met.	Pass.
	Connection and bonding points shall be so designed that their current-carrying capacity is not impaired by mechanical, chemical, or electrochemical influences.	Their current-carrying capacity is stable enough	Pass.
	Metal ducts of flexible or rigid construction and metallic cable sheaths shall not be used as protective conductors.	No this kind of construction has been used as protective bonding conductor.	Pass.
	Nevertheless, such metal ducts and the metal sheathing of all connecting cables (for example cable armouring, lead sheath) shall be connected to the protective bonding circuit.	No metal duct or metal sheathing has been used.	N/A
	Where the electrical equipment is mounted on lids, doors, or cover plates, continuity of the protective bonding circuit shall be ensured and a protective conductor (see 8.2.2) is recommended. Otherwise fastenings, hinges or sliding contacts designed to have a low resistance shall be used (see 18.2.2, Test 1).	No electrical equipment is mounted on lids, doors, or cover plates.	N/A
	The continuity of the protective conductor in cables that are exposed to damage (for example flexible trailing cables) shall be ensured by appropriate measures (for example monitoring).	Appropriate protection has been provided.	Pass.
	For requirements for the continuity of the protective conductor using conductor wires, conductor bars and slip-ring assemblies, see 12.7.2.	No this kind of device is used.	N/A
8.2.4	Exclusion of switching devices from the protective bonding circuit		-
	Shall not incorporate a switching device, an over current protective device nor a means for current detection for such devices		Pass.
	The only means permitted for interruption shall be carried out by instructed or skilled persons by using a tool		Pass.
	Where the continuity of the protective bonding circuit can be interrupted by means of removable current collectors or plug/socket combinations, the protective bonding circuit shall be interrupted by a first make last break contact. This also applies to removable or withdrawable plug-in units (see also 13.4.5).		N/A
8.2.5	Parts that need not be connected to the protective bonding circuit		-
	Screws, rivets, and nameplates and to parts inside an enclosure, are not necessary to connect to the protective bonding circuit		Pass.
8.2.6	Protective conductor connecting points		-
	All protective conductors shall be terminated in	These connecting points have	Pass.

	accordance with 13.1.1. The protective conductor connecting points shall have no other function and are not intended, for example, to attach or connect appliances or parts.	complied with the requirements.	
	Each protective conductor connecting point shall be marked or labelled as such using the symbol IEC 60417-5019 (DB:2002-10): or with the letters PE, the graphical symbol being preferred, or by use of the bicolour combination GREEN-AND-YELLOW, or by any combination of these.	All these points have been marked appropriately.	Pass.
8.2.7	Mobile machines		-
	On mobile machines with on-board power supplies, the protective conductors, the conductive structural parts of the electrical equipment, and those extraneous conductive parts which form the structure of the machine shall all be connected to a protective bonding terminal to provide protection against electric shock.	Not a mobile machine with on-board power supply.	N/A
	.Where a mobile machine is also capable of being connected to an external incoming power supply, this protective bonding terminal shall be the connection point for the external protective conductor.		N/A
8.2.8	Additional protective bonding requirements for electrical equipment having earth leakage currents higher than 10 mA AC or DC		-
	Where electrical equipment has an earth leakage current (for example adjustable speed electrical power drive systems and information technology equipment) that is greater than 10 mA AC or DC in any incoming supply, one or more of the following conditions for the associated protective bonding circuit shall be satisfied:		N/A
a)	the protective conductor shall have a cross-sectional area of at least 10 mm ² Cu or 16 mm ² Al, through its total run;		N/A
b)	where the protective conductor has a cross-sectional area of less than 10 mm ² Cu or 16 mm ² Al, a second protective conductor of at least the same cross-sectional area shall be provided up to a point where the protective conductor has a cross-sectional area not less than 10 mm ² Cu or 16 mm ² Al;		N/A
c)	automatic disconnection of the supply in case of loss of continuity of the protective conductor.		-
	To prevent difficulties associated with electromagnetic disturbances, the requirements of 4.4.2 also apply to the installation of duplicate protective conductors.		N/A
	In addition, a warning label shall be provided adjacent to the PE terminal, and where necessary on the nameplate of the electrical equipment. The information provided under 17.2 b)1) shall include information about the leakage current and the minimum cross-sectional area of the external protective conductor.		N/A

8.3	Functional bonding		-
	Protection against maloperation as a result of insulation failures can be achieved by connecting to a common conductor in accordance with 9.4.3.1.	The measure described in this clause has been used.	Pass.
	For recommendations regarding functional bonding to avoid maloperation due to electromagnetic disturbances, see 4.4.2.	See the relative clause.	Pass.
8.4	Measures to limit the effects of high leakage current		-
	The effects of high leakage current can be restricted to the equipment having high leakage current by connection of that equipment to a dedicated supply transformer having separate windings. The protective bonding circuit shall be connected to exposed conductive parts of the equipment and, in addition, to the secondary winding of the transformer. The protective conductor(s) between the equipment and the secondary winding of the transformer shall comply with one or more of the arrangements described in 8.2.8.	The measure described in this clause has been used.	Pass.
9	Control circuits and control functions		-
9.1	Control circuits		-
9.1.1	Control circuit supply		-
	Where control circuits are supplied from an source, control transformers shall be used for supplying the control circuits. Such transformers shall have separate windings.	An AC transformer has been used.	Pass.
	Where several transformers are used, it is recommended that the windings of those transformers be connected in such a manner that the secondary voltages are in phase.	Only one transformer has been used.	N/A
	Where DC control circuits derived from an AC supply are connected to the protective bonding circuit (see 8.2.1), they shall be supplied from a separate winding of the AC control circuit transformer or by another control circuit transformer.		N/A
9.1.2	Control circuit voltages		-
	The nominal value of the control voltage shall be consistent with the correct operation of the control circuit. The nominal voltage shall not exceed 277 V when supplied from a transformer.	The nominal voltage for control circuit is 220V.	Pass.
9.1.3	Protection		-
	Control circuits shall be provided with overcurrent protection in accordance with 7.2.4 and 7.2.10.		N/A
9.2	Control functions		-
9.2.1	Start functions		-
	Start functions shall operate by energizing the relevant circuit (see 9.2.5.2).	See the relative report.	Pass.
9.2.2	Stop functions		-
	Each machine shall be equipped with appropriate stop functions.	Appropriate stop functions have been taken.	Pass.

9.2.3	Operating modes		-
	Each machine can have one or more operating modes determined by the type of machine and its application. When a hazardous situation can result from a mode selection, unauthorized and/or inadvertent selection shall be prevented by suitable means (for example key operated switch, access code).	Only one operation mode	N/A
	Mode selection by itself shall not initiate machine operation. A separate actuation of the start control shall be required.		N/A
	For each specific operating mode, the relevant safety functions and/or protective measures shall be implemented.		N/A
	Indication of the selected operating mode shall be provided (for example the position of a mode selector, the provision of an indicating light, a visual display indication).		N/A
9.2.4	Suspension of safety functions and/or protective measures		-
	Where it is necessary to suspend safeguarding, a secure provision shall be provided to prevent automatic operation		N/A
9.2.5	Operation		-
9.2.5.1	General		-
	The necessary safety functions and/or protective measures (for example interlocks (see 9.3)) shall be provided for safe operation.		Pass.
	Measures shall be taken to prevent movement of the machine in an unintended or unexpected manner after any stopping of the machine (for example due to locked-off condition, power supply fault, battery replacement, lost signal condition with cableless control).	Measures have been taken.	Pass.
	Where a machine has more than one control station, measures shall be provided to ensure that initiation of commands from different control stations do not lead to a hazardous situation.	There is only one control station.	N/A
9.2.5.2	Start		-
	The start of an operation shall be possible only when all the safeguards are in place and functional (except described in 9.2.4)		Pass.
	Hold-to-run control shall be used for the others machines, as appropriate		N/A
	Suitable interlocks shall be provided to secure correct sequential starting		Pass.
	The use of more than one control station to initiate a start		N/A
9.2.5.3	Stop		-
	Stop category 0 and/or stop category 1 and/or stop category 2 stop functions shall be provided as indicated by the risk assessment and the functional	Appropriate stop function has been taken.	Pass.

	requirements of the machine		
	Stop functions shall override related start functions (see 9.2.5.2).	Stop function will override all the related start functions.	Pass.
	Where required, facilities to connect protective devices and interlocks shall be provided. If such a protective device or interlock causes a stop of the machine, it may be necessary for that condition to be signalled to the logic of the control system. The reset of the stop function shall not initiate any hazardous situation.	All these requirements have been met.	Pass.
	Where more than one control station is provided, stop commands from any control station shall be effective when required by the risk assessment of the machine.		N/A
9.2.5.4	Emergency operations (emergency stop, emergency switching off)		-
9.2.5.4.1	General		-
9.2.5.4.2	Emergency stop		-
	Shall function either as a category 0 stop or as a category 1 stop	Category 1 stop.	Pass.
	The choice of the emergency stop shall be determined by the risk assessment of the machine	According to the result of risk assessment of the machine.	Pass.
	Where a category 0 stop is used for emergency stop function, it shall have only hard-wired electromechanical components	No category 0 stop is used for emergency stop function.	N/A
	The operation of emergency stop shall not depend on electronic logic or on the transmission of commands over a communications network or link	No this kind of situation.	Pass.
	Where a category 1 stop is used for the emergency stop function, final removal of power to the machine actuators shall be ensured and carried out by means of electromechanical components	The final removal of power to the machine actuators is ensured by the controller and carried out by means of electromechanical components.	Pass.
9.2.5.4.3	Emergency switching off		-
	Use of emergency switching off		N/A
9.2.5.5	Monitoring of command actions		-
	Movement or action of a machine or part of a machine that can result in a hazardous situation shall be monitored by providing, for example, overtravel limiters, motor overspeed detection, mechanical overload detection or anti-collision devices.	Not this kind of hazardous situation.	N/A
9.2.6	Other control functions		-
9.2.6.1	Hold-to-run controls		-
	Hold-to-run controls shall require continuous actuation of the control device(s) to achieve operation.	No hold-to-run control has been used.	N/A
9.2.6.2	Two-hand control		-
	Three types of two-hand control are available, the selection of which is determined by the assessment	No two-hand control has been used.	N/A
9.2.6.3	Enabling control		-
	It shall be designed to allow motion when actuated in one position only (In any other position motion shall be	These machines have been designed to allow motion when	Pass.

	stopped)	actuated in position only.	
9.2.6.4	Combined start and stop controls		-
	Push-buttons and similar control devices that, when operated, alternately initiate and stop motion shall only be provided for functions which cannot result in a hazardous situation.	No this kind of device has been used.	N/A
9.2.7	Cableless control		-
9.2.7.1	General		-
	Means shall be provided to readily remove or disconnect the power supply of the operator control station (see also 9.2.7.3).	No this kind of device has been used.	N/A
	Means (for example key operated switch, access code) shall be provided, as necessary, to prevent unauthorized use of the operator control station.		N/A
	Each operator control station shall carry an unambiguous indication of which machine(s) is (are) intended to be controlled by that operator control station		N/A
9.2.7.2	Control limitation		-
	Measures shall be taken to prevent the machine from responding to signals other than those from the intended operator control station(s).		N/A
	Where necessary, means shall be provided so that the machine can only be controlled from operator control stations in one or more predetermined zones or locations.		N/A
9.2.7.3	Stop		-
	Operator control stations shall include a separate and clearly identifiable means to initiate the stop function of the machine or of all the motions that can cause a hazardous condition		N/A
	The actuating means to initiate this stop function shall not be marked or labeled as an emergency stop device		N/A
	A machine which is equipped with cableless control shall have a means of automatically initiating the stopping of the machine and of preventing a potentially hazardous operation		N/A
9.2.7.4	Use of more than one operator control station		-
	Where a machine has more than one operator control station, including one or more cableless control stations, measures shall be provided to ensure that only one of the control stations can be enabled at a given time. An indication of which operator control station is in control of the machine shall be provided at suitable locations as determined by the risk assessment of the machine.		N/A
	Exception: a stop command from any one of the control stations shall be effective when required by the risk assessment of the machine.		N/A
9.2.7.5	Battery-powered operator control stations		-

	A variation in the battery voltage shall not cause a hazardous situation. If one or more potentially hazardous motions are controlled using a battery-powered cableless operator control station, a clear warning shall be given to the operator when a variation in battery voltage exceeds specified limits. Under those circumstances, the cableless operator control station shall remain functional long enough for the operator to put the machine into a nonhazardous situation.		N/A
9.3	Protective interlocks		-
9.3.1	Reclosing or resetting of an interlocking safeguard		-
	The reclosing or resetting of an interlocking safeguard shall not initiate hazardous machine operation.	No safeguard can initiate machine motion or operation.	Pass.
9.3.2	Exceeding operating limits		-
	Where an operating limit (for example speed, pressure, position) can be exceeded leading to a hazardous situation, means shall be provided to detect when a predetermined limit(s) is exceeded and initiate an appropriate control action.		N/A
9.3.3	Operation of auxiliary functions		-
	The correct operation of auxiliary functions shall be checked by appropriate devices (for example pressure sensors).		N/A
9.3.4	Interlocks between different operations and for contrary motions		-
	Interlocking shall be provided against incorrect operation		N/A
9.3.5	Reverse current braking		
	Use of reverse current braking		N/A
9.4	Control functions in the event of failure		-
9.4.1	General requirements		-
	Provision of control functions in case of failure according to the level of risk assessment.	According to the risk assessment.	Pass.
9.4.2	Measures to minimize risk in the event of failure		-
9.4.2.1	Use of proven circuit techniques and components		-
	Use of proven circuit techniques and components	Appropriate components have been taken.	Pass.
9.4.2.2	Provisions for redundancy		-
	Provisions for redundancy		N/A
9.4.2.3	Use of diversity		-
	Use of diversity		N/A
9.4.2.4	Functional tests		-
	Carried out automatically by the control system or manually by inspection	By inspection manually.	Pass.
9.4.3	Protection against maloperation due to earth faults, voltage interruptions and loss of circuit continuity		-

9.4.3.1	Earth faults		-
	Bonding to the protective bonding circuit may be provided according to 8.2 and the devices may be connected as described in 9.1.4	Make reference to the relevant clause.	Pass.
9.4.3.2	Voltage interruptions		-
	Where a memory device is used, proper functioning in the event of power failure shall be ensured to prevent any loss of memory that can result in a hazardous condition	No memory device has been used.	N/A
9.4.3.3	Loss of circuit continuity		-
	Where the loss of continuity of safety-related control circuits depending upon sliding contacts can result in hazardous condition, appropriate measures shall be taken	No such function has been found.	N/A
10	Operator interface and machine-mounted control devices		-
10.1	General		-
10.1.1	General device requirements		-
	As far as is practicable, those devices shall be selected, mounted, and identified or coded according to IEC 60073 and IEC 60447	These requirements appropriate for this machine have been complied with.	Pass.
10.1.2	Location and mounting		-
	Appropriate location mounting for machine-mounted and hand-operated control devices	This requirement has been complied with.	Pass.
10.1.3	Protection		-
	Operator and machine mounted control devices shall withstand the stress of expected use.	They can withstand the stress of expected use.	Pass.
	The operator interface control devices shall have a min degree of protection: IPXXD	IPXXD	Pass.
10.1.4	Position sensors		-
	Position sensors shall not be damaged in the event of over travel	No position sensor has been used.	N/A
	Position sensors used in circuits with safety-related functions either shall have positive opening operation or shall provide similar reliability		N/A
10.1.5	Portable and pendant control stations		-
	Portable and pendant control stations and their control devices shall be so selected and arranged as to minimize the possibility of inadvertent machine operations caused by shocks and vibrations		N/A
10.2	Push-buttons		-
10.2.1	Colors		-
	Push-button actuators shall be color -coded according to table 2	Their colors are according to table 2.	Pass.
10.2.2	Markings		-
	Use of adequate markings for push-buttons	Adequate markings are used.	Pass.
10.3	Indicator lights and displays		-

10.3.1	Modes of use		-
	Indication and /or confirmation		Pass.
10.3.2	Colors		-
	Color-coded according to table 3 (Unless otherwise agree between the supplier and the user)	Their colors are according to table 3.	Pass.
10.3.3	Flashing lights		-
	Use of flashing lights		N/A
10.4	Illuminated push-buttons		-
	Color-coded according to table 2 and 3		N/A
10.5	Rotary control devices		-
	Devices having a rotational member shall be mounted to prevent rotation of the stationary member (Friction alone shall not be sufficient)		N/A
10.6	Start devices		-
	Shall be constructed and mounted to minimize inadvertent operation	Inadvertent operation can be prevented.	Pass.
10.7	Devices for emergency stop		-
10.7.1	Location		-
	Devices for emergency stop shall be readily accessible	It is readily accessible.	Pass.
	Emergency stop devices shall be located at each operator control station and at other locations where the initiation of an emergency stop can be required	All of them are located at each operator control station.	Pass.
10.7.2	Types		-
	- Use of type a push-button operated switch a pull-cord operated switch a pedal-operated switch without a mechanical guard	A push-button operated switch.	Pass.
	Shall be of the self-latching type and shall have positive opening operation	Self-latching type and positive opening operation.	Pass.
10.7.3	Restoration of normal function after emergency stop		-
	It shall not be possible to restore an emergency stop circuit until all emergency stop devices have been manually reset.	This requirement has been complied with.	Pass.
10.7.4	Local operation of the supply disconnecting device to effect emergency switching off		-
	Where the supply disconnecting device is to be locally operated for emergency switching off, it shall be readily accessible and should meet the colour requirements of 10.7.3		N/A
10.8	Emergency switching off devices		-
10.8.1	Location of emergency switching off devices		-
	Emergency switching off devices shall be located as necessary for the given application. Normally, those devices will be located separate from operator control stations. Where it is necessary to provide a control station with an emergency stop device and an emergency switching off device, means shall be		N/A

	provided to avoid confusion between these devices.		
10.8.2	Types of emergency switching off device		-
	The types of device for emergency switching off include: – a push-button operated switch with a palm or mushroom head type of actuator; – a pull-cord operated switch.		N/A
	The devices shall have direct opening action (see IEC 60947-5-1, Annex K).		N/A
	The push-button operated switch may be in a break-glass enclosure.		N/A
10.8.3	Colour of actuators		-
	Actuators of emergency switching off devices shall be coloured RED. If a background exists immediately around the actuator, then this background shall be coloured YELLOW.		N/A
	Where confusion can occur between emergency stop and emergency switching off devices, means shall be provided to minimise confusion.		N/A
10.8.4	Local operation of the supply disconnecting device to effect emergency switching off		-
	Where the supply disconnecting device is to be locally operated for emergency switching off, it shall be readily accessible and should meet the colour requirements of 10.8.3.		N/A
10.9	Enabling control device		-
	When an enabling control device is provided as a part of a system, it shall signal the enabling control to allow operation when actuated in one position only. In any other position, operation shall be stopped or prevented.	The enabling control device will activate only in one position.	Pass.
	Enabling control devices shall be selected and arranged so as to minimize the possibility of defeating.	This requirement has been complied with.	Pass.
	Enabling control devices shall be selected that have the following features in this clause.	Appropriate enabling control devices have been selected.	Pass.
11	Controlgear: location, mounting, and enclosures		-
11.1	General requirements		-
11.2	Location and mounting		-
11.2.1	Accessibility and maintenance		-
	All control gears can be identified without moving or the wiring	All of them can be identified without moving or the wiring.	Pass.
	Replacement without dismantling other equipment or parts of the machine	They can be replaced without dismantling other equipment or parts of the machine.	Pass.
	Terminals not associated with control gear shall also comply with the requirements mentioned above	Those relative requirements have been complied with.	Pass.
	Facilitate operation and maintenance from the front.	It can easily operation and maintenance from the front.	Pass.

	Use of special tools (if necessary)		Pass.
	If access is required for regular maintenance or adjustment, the devices shall be located between 0.4 m and 2.0 m above the severing level	Those relative requirements have been complied with.	Pass.
	It is recommended that terminals be at least 0.2m above the servicing level and so placed that connectors and cables can be easily connected to them	Above 0.2m and can be connected easily.	Pass.
	Except those for operating, indicating, measuring and cooling, no devices shall be mounted on doors, and normally removable access covers, of enclosures	No electrical devices mounted on doors.	Pass.
	If control devices are connected through plug-in arrangements, their association shall be made clear by type (shape), marking or designation, singly or in combination.	No control device is connected through plug-in arrangement.	N/A
	Plug in devices shall be provided with non-interchangeable features		N/A
	Use of plug/socket combinations shall be unobstructed access		N/A
11.2.2	Physical separation or grouping		-
	Non-electrical parts and devices not directly associated with the electrical equipment shall not be located within enclosures containing control gear	No this kind of parts or devices are located within enclosures containing control gear.	Pass.
	Devices such as solenoid valves should be separated from the other electrical equipment.	All solenoid valves have been separated from the other electrical equipment.	Pass.
	Control devices mounted in the same location and connected to the supply voltage, or to both supply and control voltages, shall be grouped separately from those connected only to the control voltages	Appropriate separation has been taken.	Pass.
	- Terminals shall be separated into groups for : power circuits; associated control circuits other control circuits, fed from external sources	They have been separated appropriately.	Pass.
	The clearances and creep distances specified for the devices shall be maintained	Appropriately clearances and creep distances have been provided.	Pass.
11.2.3	Heating effects		-
	Heat generating components shall be located so that the temperature of each component in the vicinity remains within the permitted limit	Wind cooling equipment has been provided.	Pass..
11.3	Degrees of protection		-
	Enclosures of control gear: at least IP 22	IP23	Pass.
11.4	Enclosures, doors and openings		-
	Enclosure shall be constructed using materials capable of withstanding the mechanical, electrical and thermal stresses	The material (metal plate with painting used for enclosure can withstand the mechanical, electrical and thermal stresses	Pass.
	Fasteners used to secure doors and covers should be of the captive type	Captive type.	Pass.

	Windows provided for viewing internally mounted indicating devices shall be of a material suitable to withstand mechanical stress and chemical attack.		N/A
	- It is recommended that enclosures doors shall have: Not wider than 0.9 m Vertical hinges Lift-off type Angle of opening at least 95°.	These requirements have been taken.	Pass.
	If enclosures which readily allow a person fully to enter, the relevant requirements specified in this clause shall be comply	No this kind of situation.	N/A
	The joints or gaskets of doors, lids, covers and enclosures shall withstand the chemical effects of the aggressive liquids, vapours, or gases used on the machine	They can withstand the chemical effects of the aggressive liquids, vapours, or gases used on the machine.	Pass.
	The means used to maintain the degree of protection of an enclosure on doors, lids and covers that require opening or removal for operation or maintenance shall be secured	They can be secured firmly.	Pass.
	The degree of protection for all openings in the enclosures shall be secured	The degree of protection can be secured.	Pass.
	Openings for cable shall be easily re-opened on site	They can be re-opened easily.	Pass.
	There shall be no opening between enclosures containing electrical equipment and compartments containing coolant, lubricating or hydraulic fluids, or those into which oil, other liquids, or dust can penetrate	No this kind of opening has been found.	Pass.
	The requirement mentioned above does not apply to electrical devices specially designed to operate in oil nor to electrical equipment in which coolants are used		N/A
	Where there are holes in an enclosure for mounting purpose, the degree of protection for the enclosure shall be secured	Appropriate protection degree can be secured.	Pass.
	Equipment that, can attain a surface temperature sufficient to cause a risk of fire or harmful effect to an enclosure material, the relevant requirements shall be complied	No this kind of equipment.	N/A
11.5	Access to control gear		-
	The min dimensions of gangways in front of and between control gear shall be according to 481.2.4 of IEC 60364-4-481	No this kind of gangway has been found.	N/A
	■ Doors in gangways and for access to electrical operating areas shall: be at least 0.7 m wide and 2.0 m high; open outward; have a menace to allow opening from the inside without the use of a key or tool	No this kind of gangway has been found.	N/A
12	Conductors and cables		-
12.1	General requirements		-
	Conductors and cables shall be selected so as to be suitable for the operating conditions (for example voltage, current, protection against electric shock,	All of conductors and cables used on these machines are suitable for the operating	Pass.

	grouping of cables) and external influences (for example ambient temperature, presence of water or corrosive substances, mechanical stresses (including stresses during installation), fire hazards) that can exist.	conditions and external influences.	
12.2	Conductors		-
	In general, conductors shall be of copper.		Pass
	Where aluminium conductors are used, the cross-sectional area shall be at least 16 mm ²	This requirement has been met.	Pass.
	To ensure adequate mechanical strength, the cross-sectional area of conductors should not be less than as shown in Table 5. However, conductors with smaller cross-sectional areas or other constructions than shown in Table 5 may be used in equipment provided adequate mechanical strength is achieved by other means and proper functioning is not impaired.	All these requirements have been complied with.	Pass.
	All conductors that are subject to frequent movement (for example one movement per hour of machine operation) shall have flexible stranding of class 5 or class 6.	This requirement has been met.	Pass.
12.3	Insulation		-
	The insulation of cables and conductors used, shall be suitable for a test voltage: – not less than 2 000 V AC for a duration of 5 min for operation at voltages higher than 50 V AC or 120 V DC, or – not less than 500 V AC for a duration of 5 min for PELV circuits (see IEC 60364-4-41, class III equipment).	This test has been carried out for the cables, and there is no breakdown is occurred.	Pass.
	The mechanical strength and thickness of the insulation shall be such that the insulation cannot be damaged in operation or during laying, especially for cables pulled into ducts.	Appropriate insulation with sufficient mechanical strength and thickness is provided.	Pass.
12.4	Current-carrying capacity in normal service		-
	Max allowable temperature of conductors shall not exceed the values given in table 6.	See table6.	Pass.
12.5	Conductor and cable voltage drop		-
	The voltage drop for conductors and cables shall not exceed 5% of the nominal voltage	Not exceed 5%.	Pass.
12.6	Flexible cables		-
12.6.1	General		-
	Flexible cables shall have Class 5 or Class 6 conductors.	This requirement has been met.	Pass.
	Cables that are subjected to severe duties shall be of adequate construction	Cables that are subjected to severe duties have adequate construction	Pass.
12.6.2	Mechanical rating		-
	The tensile stress for copper conductors shall not exceed 15 N/mm ² of the copper cross-sectional area	Not exceed 15 N/mm	Pass.

	If the demands of the application exceed the tensile stress, it of 15 N/mm ² , cables with special construction feature should be used and the allowed max. tensile stress strength should be agree with the cable manufacturer	No this kind of situation ² .	N/A
12.6.3	Current-carrying capacity of cables wound on drums		-
	Cables to be wound on drums shall be selected with conductors having a cross-sectional area such that, when fully wound on the drum and carrying the normal service load, the maximum allowable conductor temperature is not exceeded.	No cable is wound on drums.	N/A
	For cables of circular cross-sectional area installed on drums, the maximum current-carrying capacity in free air should be derated in accordance with Table 7 (see also Clause 44 of IEC 60621-3).	No cable is wound on drums.	N/A
12.7	Conductor wires, conductor bars and slip-ring assemblies		-
12.7.1	Protection against direct contact		-
	Conductor wires, conductor bars and slip-ring assemblies shall be installed or enclosed in such a way that, during normal access to the machine, protection against direct contact is achieved by the application of one of the following protective measures: protection by partial insulation of live parts, or where this is not practicable; – protection by enclosures or barriers of at least IP2X (see 412.2 of IEC 60364-4-41)		N/A
	Horizontal top surfaces of barriers or enclosures that are readily accessible shall provide a degree of protection of at least IP4X (see 412.2.2 of IEC 60364-4-41).		N/A
	Where the required degree of protection is not achieved, protection by placing live parts out of reach in combination with emergency switching off in accordance with 9.2.5.4.3 shall be applied.		N/A
	Conductor wires and conductor bars shall be so placed and/or protected as to:		N/A
	– prevent contact, especially for unprotected conductor wires and conductor bars, with conductive items such as the cords of pull-cord switches, strain-relief devices and drive chains; – prevent damage from a swinging load.		N/A
12.7.2	Protective conductor circuit		-
	Where conductor wires, conductor bars and slip-ring assemblies are installed as part of the protective bonding circuit, they shall not carry current in normal operation. Therefore, the protective conductor (PE) and the neutral conductor (N) shall each use a separate conductor wire, conductor bar or slip-ring. The continuity of the protective conductor circuit using sliding contacts shall be ensured by taking appropriate measures (for example, duplication of the current		N/A

	collector, continuity monitoring).		
12.7.3	Protective conductor current collectors		-
	Protective conductor current collectors shall have a shape or construction so that they are not interchangeable with the other current collectors. Such current collectors shall be of the sliding contact type.		N/A
12.7.4	Removable current collectors with a disconnecter		-
	Removable current collectors having a disconnecter function shall be so designed that the protective conductor circuit is interrupted only after the live conductors have been disconnected, and the continuity of the protective conductor circuit is re-established before any live conductor is reconnected (see also 8.2.4).		N/A
12.7.5	Clearances in air		-
	Clearances between the respective conductors, and between adjacent systems, of conductor wires, conductor bars, slip-ring assemblies and their current collectors shall be suitable for at least a rated impulse voltage of an overvoltage category III in accordance with IEC 60664-1.		N/A
12.7.6	Creepage distances		-
	Creepage distances between the respective conductors, between adjacent systems of conductor wires, conductor bars and slip-ring assemblies, and their current collectors shall be suitable for operation in the intended environment, for example open air (IEC 60664-1), inside buildings, protected by enclosures.		N/A
	In abnormally dusty, moist or corrosive environments, the following creepage distance requirements apply: – unprotected conductor wires, conductor bars, and slip-ring assemblies shall be equipped with insulators with a minimum creepage distance of 60 mm; – enclosed conductor wires, insulated multipole conductor bars and insulated individual conductor bars shall have a minimum creepage distance of 30 mm.	No such condition exist.	N/A
	The manufacturer's recommendations shall be followed regarding special measures to prevent a gradual reduction in the insulation values due to unfavourable ambient conditions (for example deposits of conductive dust, chemical attack).		N/A
12.7.7	Conductor system sectioning		-
	Where conductor wires or conductor bars are arranged so that they can be divided into isolated sections, suitable design measures shall be employed to prevent the energization of adjacent sections by the current collectors themselves.		N/A
12.7.8	Construction and installation of conductor wire, conductor bar systems and slip-ring assemblies		-
	Conductor wires, conductor bars and slip-ring assemblies in power circuits shall be grouped separately from those in control circuits.		N/A

	Conductor wires, conductor bars and slip-ring assemblies shall be capable of withstanding, without damage, the mechanical forces and thermal effects of short-circuit currents.		N/A
	Removable covers for conductor wire and conductor bar systems laid underground or underfloor shall be so designed that they cannot be opened by one person without the aid of a tool.	No such condition exists.	N/A
	Where conductor bars are installed in a common metal enclosure, the individual sections of the enclosure shall be bonded together and connected to a protective bonding conductor at several points depending upon their length. Metal covers of conductor bars laid underground or underfloor shall also be bonded together and connected to a protective bonding conductor.	No such condition exists.	N/A
	The protective bonding circuit shall include the covers or cover plates of metal enclosures or underfloor ducts. Where metal hinges form a part of the bonding circuit, their continuity shall be verified (see Clause 18).		N/A
	Underground and underfloor conductor bar ducts shall have drainage facilities.	No such condition exists.	N/A
13	Wiring practices		-
13.1	Connections and routing		-
13.1.1	General requirements		-
	All connections, especially those of the protective bonding circuit, shall be secured against accidental loosening.	All connections can be secured against accidental loosening.	Pass.
	The means of connection shall be suitable for the cross-sectional areas and nature of the conductors being terminated.	The means of connection is suitable.	Pass.
	The connection of two or more conductors to one terminal is permitted only in those cases where the terminal is designed for that purpose. However, only one protective conductor shall be connected to one terminal connecting point.	No terminal has been connected with three or more conductors.	Pass.
	Soldered connections shall only be permitted where terminals are provided that are suitable for soldering.	No soldered connection has been taken.	N/A
	Terminals on terminal blocks shall be plainly marked or labelled to correspond with markings on the diagrams.	All of them have been marked corresponding to markings on the diagrams.	Pass.
	Where an incorrect electrical connection (for example, arising from replacement of devices) can be a source of risk and it is not practicable to reduce the possibility of incorrect connection by design measures, the conductors and/or terminations shall be identified in accordance with 13.2.1.		Pass.
	The installation of flexible conduits and cables shall be such that liquids shall drain away from the fittings.	Liquids can drain away from the fittings.	Pass.
	Means of retaining conductor strands shall be provided when terminating conductors at devices or terminals	By appropriate terminals.	Pass.

	that are not equipped with this facility. Solder shall not be used for that purpose.		
	Shielded conductors shall be so terminated as to prevent fraying of strands and to permit easy disconnection.	Appropriate termination is taken.	Pass,
	Identification tags shall be legible, permanent, and appropriate for the physical environment.	They are legible, permanent, and appropriate for the physical environment.	Pass.
	Terminal blocks shall be mounted and wired so that the internal and external wiring does not cross over the terminals (see IEC 60947-7-1).	No conductor crosses over the terminals.	Pass.
13.1.2	Conductor and cable runs		-
	Conductors and cables shall be run from terminal to terminal without splices or joints. Connections using plug/socket combinations with suitable protection against accidental disconnection are not considered to be joints for the purpose of this Sub clause.	All of them are run from terminal to terminal without splices or joints.	Pass.
	Where it is necessary to connect and disconnect cables and cable assemblies, a sufficient extra length shall be provided for that purpose.		Pass.
	The terminations of cables shall be adequately supported to prevent mechanical stresses at the terminations of the conductors.	Adequate support measure has been taken.	Pass.
	Wherever practicable, the protective conductor shall be placed close to the associated live conductors in order to decrease the impedance of the loop.		Pass.
13.1.3	Conductors of different circuits		-
	Suitable arrangement for conductors of different circuits	Suitable arrangement is provided.	Pass.
13.1.4	Connection between pick-up and pick-up converter of an inductive power supply system		-
	The cable between the pick-up and the pick-up converter as specified by the manufacturer of the inductive power supply shall be: – as short as practicable; – adequately protected against mechanical damage.	These requirements have been complied with.	Pass.
13.2	Identification of conductors		-
13.2.1	General requirements		-
	Conductors shall be identifiable at each termination according to the technical documentation (see clause 17)	Make reference to clause 18.	pass
	Use of color-coding for identification of conductors		-
	It is recommended (for example to facilitate maintenance) that conductors be identified by number, alphanumeric, colour (either solid or with one or more stripes), or a combination of colour and numbers or alphanumeric. When numbers are used, they shall be Arabic; letters shall be Roman (either upper or lower case).	Appropriate measures have been taken to identify conductors.	Pass.

13.2.2	Identification of the protective conductor		-
	Shall be really distinguishable by shape, location, marking or color	By marking and color.	Pass.
	When identification is by color alone, the bicolor combination GREEN-AND YELLOW shall be used	By GREEN-AND-YELLOW.	Pass.
	For the bicolor combination GREEN-AND YELLOW : one of the color covers at least 30% and not more than 70% of the surface of the conductor, the other color covering the remainder of the surface		Pass.
	Use of graphical symbol 	The earthing symbol has been used.	Pass.
13.2.3	Identification of the neutral conductor		-
	The color shall be Light Blue	No neutral conductor has been used.	N/A
	Requirements for bare conductors used as neutral conductors		N/A
13.2.4	Identification by colour		-
	Where colour-coding is used for identification of conductors (other than the protective conductor (see 13.2.2) and the neutral conductor (see 13.2.3)), the following colours may be used:		-
	BLACK, BROWN, RED, ORANGE, YELLOW, GREEN, BLUE (including LIGHT BLUE), VIOLET, GREY, WHITE, PINK, TURQUOISE.	Some colors have been used.	Pass.
	It is recommended that, where colour is used for identification, the colour be used throughout the length of the conductor either by the colour of the insulation or by colour markers at regular intervals and at the ends or accessible location.	This requirement has been complied with.	Pass.
	For safety reasons, the colour GREEN or the colour YELLOW should not be used where there is a possibility of confusion with the bicolour combination GREEN-AND-YELLOW (see 13.2.2).	Neither color GREEN nor the color YELLOW has been used.	Pass.
	Where colour-coding is used for identification of conductors, it is recommended that they be colour-coded as follows: – BLACK: AC and DC power circuits; – RED: AC control circuits; – BLUE: DC control circuits; – ORANGE: excepted circuits in accordance with 5.3.5.	These requirements have complied with.	Pass.
13.3	Wiring inside enclosures		-
	Panel conductors shall be supported where necessary to keep them in place	Appropriate support is provided.	Pass.
	Non-Metallic ducts shall be permitted only when they are made with a flame-retardant insulating material	Some non-metallic ducts are used with a flame-retardant insulating material.	Pass.
	Connections to devices mounted on doors or to other movable parts shall be made using flexible conductors according to 12.2 and 12.6.	Connections according to 12.2 and 12.6..	Pass.

	The conductors shall be anchored to the fixed part and to the movable part independently of the electrical connection	Adequate anchored measures have been taken.	Pass.
	Conductors and cables that do not run in ducts shall be adequately supported	All of them have been supported adequately.	Pass.
	Terminal blocks or plug-socket combinations shall be used for control wiring that extends beyond the enclosure	This application has been taken.	Pass.
	Power cables and cables of measuring circuits may be directly connected to the terminals of the devices for which the connections were intended.	This application has been taken.	Pass.
13.4	Wiring outside enclosures		-
13.4.1	General requirements-		-
	The protection degree shall be ensured when cables or ducts are introduced into the enclosure	The protection degree can be secured.	Pass.
13.4.2	External ducts		-
	Shall be enclosed in suitable ducts as described in 13.5 except for suitably protected cables		N/A
	Fittings used with ducts or multi-conductor cable shall be suitable for the physical environment		N/A
	Flexible conduit or flexible multi-conductor cable shall be used where it is necessary to employ flexible connections to pendant push-button stations		N/A
	The weight of the pendant stations shall be supported by means other than the flexible conduit or the flexible multi-conductor cable		N/A
	Flexible conduit or flexible multi-conductor cable shall be used for connections involving small or infrequent movements		N/A
13.4.3	Connection to moving elements of the machine		-
	Connection to frequently moving parts shall be made using conductors according to 13.2	No device is connected to moving elements of the machine.	N/A
	Flexible cable and flexible conduit shall be so installed as to avoid excess flexing and straining, particularly the fittings		N/A
	Cables subject to movement shall be supported in such a way that there is no mechanical strain on the connection points nor any sharp flexing		N/A
	If the requirement mentioned above is achieved by using of a loop, it shall have sufficient length to provide for a bending radius of the cable of at least 10 times the diameter of the cable		N/A
	Flexible cables of machines shall be protected to minimize the possibility of external damage		N/A
	The cable sheath shall be resistant to the normal wear that can be expected from movement and to the effects of atmospheric contaminants		N/A
	If cables subject to movement are close to moving		N/A

	parts, it shall have a space of at least 25 mm between the moving parts and the cables		
	Where the distance mentioned above is not practicable, fixed barriers shall be provided between the cables and the moving parts		N/A
	The cable handling system shall be so designed that the lateral cable angles do not exceed 5°, avoiding torsion in the cable		N/A
	Measures shall be taken to ensure that at least two turns of flexible cables always remain on a drum		N/A
	Min. permitted bending radii for the forced guiding of flexible cables shall not be less than the values given in table 8		N/A
	The strength section between section between two bends in an S-shaped length or a bend into another plane shall be at least 20 times the diameter of the cable		N/A
	Where flexible conduit is adjacent to moving parts, the construction and supporting means shall prevent damage to the flexible conduit under all conditions of operation		N/A
	Flexible metallic conduit shall not be used for rapid or frequent movements		N/A
13.4.4	Interconnection of devices on the machine		-
	The connections shall be conveniently placed, adequately protected, and shown on the relevant diagrams		N/A
	Such terminals shall be conveniently placed, adequately protected, and shown on the relevant diagrams		N/A
13.4.5	Plug/socket combinations		-
	Shall be of adequate size and shall have sufficient contact pressure and a wiping action to ensure electrical continuity		N/A
	Clearances between contacts shall be adequate for the voltages used and shall be maintained during insertion and removal of the connectors		N/A
	Prevent unintentional contact with live parts at any time		N/A
	Protective bonding circuit connection shall be made before any live connections are made, and shall not be disconnected until all live connections in the plug are disconnected		N/A
	Rated at more than 16 A or that remain connected during normal service shall be of a remaining type to prevent unintended disconnection		N/A
	Rated at 63 A or above shall be of an interlocked type with a switch, so that connection and disconnection is possible only when the switch is in the OFF position		N/A
	If more than one plug-socket combination is used in the same electrical equipment, they shall be clearly identifiable		N/A

	It is recommended that mechanical coding be used to prevent incorrect insertion		N/A
	According to IEC 60309-1 or of a type used for domestic application shall not be used for control circuits		N/A
13.4.6	Dismantling for shipment		-
	Terminals shall be suitably enclosed and plug/socket combinations shall be protected from the physical environment during transportation and storage	All of them are enclosed suitably.	Pass.
13.4.7	Additional conductors		-
	Spare conductors shall be connected to spare terminals or isolated to prevent contact with live parts	All spare conductors are connected to spare terminals or isolated to prevent contact with live parts.	Pass.
13.5	Ducts, connection boxes and other boxes		-
13.5.1	General requirements		-
	Min. protection degree for ducts: IP 33	IP33.	Pass.
	Appropriate protection for conductors insulation	Suitable protection is taken.	Pass.
	Drain holes of 6 mm diameter are permitted		Pass.
	Ducts and cables trays shall be rigidly supported and positioned at a sufficient distance from moving parts	Suitable support and sufficient distance has been taken.	Pass.
	In areas where human passage is required, the ducts and cable trays shall be mounted at least 2 m above the working surface		N/A
	Ducts shall be provided only for mechanical protection	Adequate mechanical protection is provided.	Pass.
	Cable trays that are partially covered should not be considered to be ducts or cable trunking system, and the cables used shall be suitable for installation on cable trays	No cable tray is used.	N/A
13.5.2	Percentage fill of ducts		-
	The dimensions and arrangement of the ducts be such as to facilitate the insertion of the conductors and cables	This requirement has been complied with.	Pass.
13.5.3	Rigid metal conduit and fittings		-
	Shall be of galvanized steel or of a corrosion-resistant material	No rigid metal conduit is used.	N/A
	Conduits shall be securely held in place and supported at each end		N/A
	Fitting shall be threaded		N/A
	Where threadless fittings are used, the conduit shall be securely fastened to the equipment		N/A
	The conduit shall not be damage and the internal diameter of the conduit shall not e effectively reduced when it is bent		N/A
13.5.4	Flexible metal conduit and fittings		-
	Flexible metal tubing and suitable for the expected physical environment	No flexible conduit used.	N/A

13.5.5	Flexible non-metal conduit and fittings		-
	Shall be resistant to kinking and suitable for the expected physical environment	No flexible non-metal conduit and fittings.	N/A
13.5.6	Cable trunking systems		-
	Shall be rigidly supported and clear of all moving or contaminating portions of the machine	No cable trunking system is used.	N/A
	Covers shall be shaped to overlap the sides; gasket shall be permitted		N/A
	Covers shall be attached to cable trunking systems by hinges or chain and held closed by means of captive screws or other suitable fasteners		N/A
	On horizontal cable trunking systems, the cover shall not be on the bottom		N/A
	Where the cable trunking system is furnished in sections, the joints between sections shall fit tightly but need not be gasketed		N/A
	The only openings permitted shall be those required for wiring or for drainage		N/A
	Cable trunking systems shall not have opened but unused knockouts		N/A
13.5.7	Machines compartments and cable trunking systems		-
	Are isolated from coolant or oil reservoirs and are entirely enclosed		N/A
	Conductors run in enclosed compartment and cable trunking systems shall be so secured and arranged that they are not subject to damage		N/A
13.5.8	Connection boxes and other boxes		-
	Shall be readily accessible for maintenance	They are readily accessible for maintenance.	Pass.
	Shall provide protection against the ingress of solid bodies and liquids	Adequate protection is provided.	Pass.
	Shall not have opened but unused knockouts nor any other opening and shall be so constructed as to exclude materials such as dust, flying, oil, and coolant	These requirements have been complied with.	Pass.
13.5.9	Motor connection boxes		-
	Shall enclose only connections to the motor and motor-mounted devices	They enclose only connections to the motor and motor-mounted devices.	Pass.
14	Electric motors and associated equipment		-
14.1	General requirements		-
	Electric motor should conform to the requirements of IEC 60034-1	The electric motor is in conformity with the requirements of IEC 60034 series.	Pass.
14.2	Motor enclosures		-
	Protection degree shall be at least IP 23	At least IP23.	Pass.
14.3	Motor dimensions		-

	As far as is practicable, the dimensions of the motors shall comply with IEC 60072 series.	It is in compliance with IEC 60072 series.	Pass.
14.4	Motor mounting and compartments		-
	Each motor and its associated couplings, belts and pulleys, or chains, shall be so mounted that they are adequately protected and are easily for inspection	They have adequate protection and are easily for inspection.	Pass.
	Shall be such that all motor hold-down means can be removed and all terminal boxes are accessible.	This requirement has been complied with.	Pass.
	The proper cooling shall be ensured and the temperature rise remains within the limits of the insulation class.	This requirement has been complied with.	Pass.
	Motor compartment should be clean and dry, and shall be ventilated directly to the exterior of the machine	No motor compartment is found.	N/A
	The vents shall be such that ingress of swarf, dust, or water spray is at an acceptable level	Adequate vents are provided.	Pass.
	There shall be no opening between the motor compartment and any other compartment that does not meet the motor compartment requirements	No this kind of opening.	Pass.
	If a conduit or pipe is run into the motor compartment from another compartment not meet the motor compartment requirements, any clearance around the conduit or pipe shall be sealed	No this kind of situation.	N/A
14.5	Criteria for motor selection		-
	Shall be selected according to the anticipated service and physical environment conditions	They are selected according to the anticipated service and physical environment conditions.	Pass.
14.6	Protective devices for mechanical brakes		-
	Operation of the overload and over current protective devices for mechanical brake actuators shall initiate the simultaneous de-energization (release) of the associated machine actuators	No this kind of device.	N/A
15	Accessories and lighting		-
15.1	Accessories		-
	Where the machine or its associated equipment is provided with socket-outlets that are intended to be used for accessory equipment (for example hand-held power tools, test equipment), the following apply:		-
	– the socket-outlets should conform to IEC 60309-1. Where that is not practicable, they should be clearly marked with the voltage and current ratings;		N/A
	– the continuity of the protective bonding circuit to the socket-outlet shall be ensured except where protection is provided by PELV;		N/A
	– all unearthed conductors connected to the socket-outlet shall be protected against overcurrent and, when required, against overload in accordance with 7.2 and 7.3		N/A

	separately from the protection of other circuits;		
	–where the power supply to the socket-outlet is not disconnected by the supply disconnecting device for the machine or the section of the machine, the requirements of 5.3.5 apply.		N/A
15.2	Local lighting of the machine and equipment		-
15.2.1	General		-
	Connections to the protective bonding circuit shall be in accordance with 8.2.2.	It is in accordance with 8.2.2.	Pass.
	The ON/OFF switch shall not be incorporated in the lampholder or in the flexible connecting cords.	A switch has provided in the front of the machine.	Pass.
	Stroboscopic effects from lights shall be avoided by the selection of appropriate luminaires.		Pass.
	Where fixed lighting is provided in an enclosure, electromagnetic compatibility should be taken into account using the principles outlined in 4.4.2.	This requirement has been considered.	Pass.
15.2.2	Supply		-
	The nominal voltage of the local lighting circuit shall not exceed 250 V between conductors. A voltage not exceeding 50 V between conductors is recommended.	The voltage of the lighting circuit is 220V.	Pass.
	Lighting circuits shall be supplied from one of the following sources (see also 7.2.6) in this clause.		Pass.
15.2.3	Protection		-
	Local lighting circuits shall be protected in accordance with 7.2.6.	Please see the relative clause.	Pass.
15.2.4	Fittings		-
	Adjustable lighting fittings shall be suitable for the physical environment.		Pass.
	The lampholders shall be: – in accordance with the relevant IEC standard; – constructed with an insulating material protecting the lamp cap so as to prevent unintentional contact	These requirements have been met.	Pass.
	Reflectors shall be supported by a bracket and not by the lampholder.		Pass.
16	Marking, warning signs and reference designations		-
16.1	General		-
	Warning signs, nameplates, markings, and identification plates shall be of sufficient durability to withstand the physical environment involved.	They can withstand the physical environment involved.	Pass.
16.2	Warning signs		-
16.2.1	Electric shock hazard		-
	Enclosures that do not otherwise clearly show that they contain electrical equipment that can give rise to a risk of electric shock shall be marked with the graphical symbol IEC 60417-5036 (DB:2002-10).	This warning sign has been used.	Pass.
16.2.2	Hot surfaces hazard		-
	Where the risk assessment shows the need to warn	See the risk assessment report.	Pass.

	against the possibility of hazardous surface temperatures of the electrical equipment, the graphical symbol IEC 60417-5041 (DB:2002-10) shall be used.		
16.3	Functional identification		-
	Control devices, visual indicators, and displays (particularly those related to safety) shall be clearly and durably marked with regard to their functions either on or adjacent to the item. Such markings may be as agreed between the user and the supplier of the equipment (see Annex B).	Appropriate markings have been provided for these devices.	Pass.
	Preference should be given to the use of standard symbols given in IEC 60417- DB:2002 and ISO 7000.	Preference should be given to the use of standard symbols given in IEC 60417- DB:2002 and ISO 7000.	Pass.
16.4	Marking of equipment		
	Equipment (for example controlgear assemblies) shall be legibly and durably marked in a way that is plainly visible after the equipment is installed. adjacent to each incoming supply:	They have been marked legibly and durably.	Pass.
	The full-load current shown on the nameplate shall be not less than the running currents for all motors and other equipment that can be in operation at the same time under normal conditions.	This requirement has been met.	Pass.
	Where only a single motor controller is used, that information may instead be provided on the machine nameplate where it is plainly visible.		Pass.
16.5	Reference designations		-
	All enclosures, assemblies, control devices, and components shall be plainly identified with the same reference designation as shown in the technical documentation.	These information has been provided within the instruction manual.	Pass.
17	Technical documentation		-
17.1	General		-
	The information necessary for installation, operation, and maintenance of the electrical equipment of a machine shall be supplied in the appropriate forms, for example, drawings, diagrams, charts, tables, instructions.	All the information has been provided by many forms.	Pass.
	The information shall be in an agreed language (see also Annex B).	In English.	Pass.
	The information provided may vary with the complexity of the electrical equipment. For very simple equipment, the relevant information may be contained in one document, provided that the document shows all the devices of the electrical equipment and enables the connections to the supply network to be made.		-
17.2	Information to be provided		-
	The information provided with the electrical equipment shall include the requirements specified in this clause.	All of these information has been provided.	Pass.
17.3	Requirements applicable to all documentation		-
	Unless otherwise agreed between manufacturer and		-

	user:		
	– the documentation shall be in accordance with relevant parts of IEC 61082;	This requirement has been met.	Pass.
	– reference designations shall be in accordance with relevant parts of IEC 61346;	This requirement has been met	Pass.
	– instructions/manuals shall be in accordance with IEC 62079.	This requirement has been met	Pass.
	– parts lists where provided shall be in accordance with IEC 62027, class B.	This requirement has been met	Pass.
	For referencing of the different documents, the supplier shall select one of the following methods:		-
	– where the documentation consists of a small number of documents (for example less than 5) each of the documents shall carry as a cross-reference the document numbers of all other documents belonging to the electrical equipment; or	No this condition exist.	N/A
	– for single level main documents only (see IEC 62023), all documents shall be listed with document numbers and titles in a drawing or document list; or		N/A
	– all documents of a certain level (see IEC 62023) of the document structure shall be listed, with document numbers and titles, in a parts list belonging to the same level.		N/A
17.4	Installation documents		
	Use and requirements for installation diagram	Installation diagrams are provided.	Pass.
17.5	Overview diagrams and function diagrams		-
	Use and requirements for Overview diagrams and function (block) diagram	Overview diagrams are provided.	Pass.
17.6	Circuit diagrams		-
	Use and requirements for circuit diagrams	Circuit diagrams are provided.	Pass.
17.7	Operating manual		-
	The technical documentation shall contain an operating manual detailing proper procedures for set-up and use of the electrical equipment. Particular attention should be given to the safety measures provided.	Operating manual is provided.	Pass.
	Where the operation of the equipment can be programmed, detailed information on methods of programming, equipment required, program verification, and additional safety procedures (where required) shall be provided.		N/A
17.8	Maintenance manual		-
	The technical documentation shall contain a maintenance manual detailing proper procedures for adjustment, servicing and preventive inspection, and repair. Recommendations on maintenance/service intervals and records should be part of that manual. Where methods for the verification of proper operation are provided (for example software testing programs),	Maintenance manual is provided.	Pass.

	the use of those methods shall be detailed.		
17.9	Parts list		-
	The parts list, where provided, shall comprise, as a minimum, information necessary for ordering spare or replacement parts (for example components, devices, software, test equipment, technical documentation) required for preventive or corrective maintenance including those that are recommended to be carried in stock by the user of the equipment.	Parts list is provided.	Pass.
18	Verification		-
18.1	General		-
	This part of IEC 60204 gives general requirements for the electrical equipment of machines.		-
	The extent of verification will be given in the dedicated product standard for a particular machine. Where there is no dedicated product standard for the machine, the verifications shall always include the items a), b) and f) and may include one or more of the items c) to e) in this clause.	Relative tests have been carried out according to this clause.	Pass.
	When the electrical equipment is modified, the requirements stated in 18.7 shall apply.		Pass.
	For tests in accordance with 18.2 and 18.3, measuring equipment in accordance with the EN 61557 series is applicable.	Measuring equipment in accordance with the EN 61557 series is applicable.	Pass.
	The results of the verification shall be documented.	The result has been documented.	Pass.
18.2	Verification of conditions for protection by automatic disconnection of supply		-
18.2.1	General		-
	The conditions for automatic disconnection of supply (see 6.3.3) shall be verified by tests.	Please see the follow clauses.	Pass.
	For TN-systems, those test methods are described in 18.2.2; their applications for different conditions of supply are specified in 18.2.3.	Please see the relative clauses.	Pass.
	For TT and IT systems, see IEC 60364-6-61.		N/A
18.2.2	Test methods in TN-systems		-
	Test 1 verifies the continuity of the protective bonding circuit. Test 2 verifies the conditions for protection by automatic disconnection of the supply.		-
	Test 1 – Verification of the continuity of the protective bonding circuit		-
	The resistance of each protective bonding circuit between the PE terminal (see 5.2 and Figure 2) and relevant points that are part of each protective bonding circuit shall be measured with a current between at least 0,2 A and approximately 10 A derived from an electrically separated supply source (for example SELV, see 413.1 of IEC 60364-4-41) having a maximum no-load voltage of 24 V AC or DC.	Please see the test report.	Pass.

	Test 2 – Fault loop impedance verification and suitability of the associated overcurrent protective device		-
	The connections of the power supply and of the incoming external protective conductor to the PE terminal of the machine, shall be verified by inspection.	They have been verified by inspection.	Pass.
	The conditions for the protection by automatic disconnection of supply in accordance with 6.3.3 and Annex A shall be verified by both:		-
1)	verification of the fault loop impedance by: – calculation, or – measurement in accordance with A.4, and	Please see the test report.	Pass.
2)	confirmation that the setting and characteristics of the associated overcurrent protective device are in accordance with the requirements of Annex A.		Pass.
18.2.3	Application of the test methods for TN-systems		-
	Test 1 of 18.2.2 shall be carried out on each protective bonding circuit of a machine.	Each protective bonding circuit have been tested.	Pass.
	When Test 2 of 18.2.2 is carried out by measurement, it shall always be preceded by Test 1.		Pass.
18.3	Insulation resistance tests		-
	Test conditions : 500 V d.c.		Pass.
	The measured values shall not less than 1 MΩ	Please see the test report in detail.	Pass.
18.4	Voltage tests		-
	- Test conditions : at least 1 second test voltage is twice the rated supply voltage of the equipment or 1000 V, whichever is greater frequency of 50/60 Hz supplied from a transformer with a min. rating of 500 VA		Pass.
	Shall not breakdown	Please see the test report in detail.	Pass.
18.5	Protection against residual voltages		-
	Where appropriate, tests shall be performed to ensure compliance with 6.2.4.		N/A
18.6	Functional tests		-
	The functions of electrical equipment shall be tested.	The functions of electrical equipment equipped with this machine have been tested.	Pass.
	The function of circuits for electrical safety (for example earth fault detection) shall be tested.	The functions of electrical safety equipped with this machine have been tested.	Pass.
18.7	Retesting		-
	Where a portion of the machine and its associated equipment is changed or modified, that portion shall be reverified and retested, as appropriate (see 18.1).		N/A

4.2	TABLE: list of critical components				P
Object/Part No.	Manufacturer/ Trademark	Type/Model	Technical data	Standard	Mark(s) of conformity ¹⁾
Circuit Breaker	Schneider	OSMC32N2C32	32A, 50/60Hz, Ui:400V, Uimp:6KV	EN 60947-2	CE
DC Contactor	Nader	NDZ3-5010 -DC24V	25KW/500V	IEC60947-4-1 IEC60947-5-1	CE
Safety relay	PILZ	PNOZ X2.8P	/	EN 60947-4-2	CE
Braking Resistor	LAIF	RXLG-300W 66R	300W	EN45545-2	CE
Axial Fan	SUNON	EE80252B1-000C-A99	DC24V 1.8W	EN 60950-1	CE
Fuse and seat	MRO	RO15-20 RT18-32X/2P	20A	EN 60947-7-1	CE
Emergency Stop Switch	Schneider	XB2-BS442C	3A	IEC 60947-1	CE
indicator light	Tayee	AD17-16-DC24	24V DC	EN60598	CE
Electrical Wire	ECHU	RVV	2.5mm ² 300/500V	IEC53	CE
Electrical Wire	ECHU	RVV	0.5mm ² 300/500V	IEC53	CE
high-frequency transformer	TAMURA	02368X3T	/	EN 61558-1 EN61558-2-6	CE
Y2 capacitance	Songtian	G09F1E332MN0B0S0N0	332M/250VAC	EN60384-14	CE
Y1 capacitance	Songtian	Q12F1D472MN0B0S0N0	472M/400VAC	EN60384-14	CE
X2 capacitance	Songtian	X2Q2105KT1B0265200110ES0	105K/305VAC	EN60384-14	CE
RELAY	SONGLE RELAY	SLA-12VDC-SL-C	30A/250VAC	EN 61810- 1:2004	CE

1) an asterisk indicates a mark which assures the agreed level of surveillance

Test item	Continuity of protective bonding circuit			
Clause of standard	Clause 18.2			
Test requirements	The resistance of each protective bonding circuit between the PE terminal and relevant points that are part of each protective bonding circuit shall be measured with a current between at least 0.2A and approximately 10 A derived from an electrically separated supply source (for example SELV, see having a maximum no-load voltage of 24 V AC or DC. The resistance measured shall be in the expected range according to the length, the cross sectional area and the material of the related protective bonding conductor(s).			
Points tested to:		Test Current	Test requirement	Measured value

1:Elec.cabinet-PE	PE $\Phi > 1.0 \text{ mm}^2$	10A	$\leq 3.3\text{V}$	N/A
	PE $\Phi > 1.5 \text{ mm}^2$	10A	$\leq 2.6\text{V}$	0.13V
	PE $\Phi > 2.5 \text{ mm}^2$	10A	$\leq 1.9\text{V}$	0.32V
	PE $\Phi > 4.0 \text{ mm}^2$	10A	$\leq 1.4\text{V}$	0.11V
	PE $\Phi > 6.0 \text{ mm}^2$	10A	$\leq 1.0\text{V}$	N/A
Conclusion	Pass			

Test item	Fault loop impedance verification and suitability of the associated overcurrent protective device.
Clause of standard	Clause 18.2
Test requirements	The connections of the power supply and of the incoming external protective conductor to the PE terminal of the machine, shall be verified by inspection.
conclusion	Pass.

Test item	Insulation resistance test		
Clause of standard	Clause 18.3		
Test requirements	The insulation resistance measured at 500V dc between the power circuit conductors and the protective bonding circuit is to be not less than the limits.		
Points tested	Limit value/ Resistance(Ω)	Measured value (Ω)	Test result
1:L/N-PE	$\geq 1\text{M}\Omega$	277M Ω	Pass.
Conclusion	Pass.		

Test Item	Electric strength test	
Clause of standard	Clause 18.4	
Test requirements	The electrical equipment shall withstand a test voltage applied for a period of at least one second between the conductors of all circuits and the protective bonding circuit	
Points tested	Voltage	Test result
1:L/N-PE	1000V	Pass.
Conclusion	Pass.	

Test item	Functional tests	
Clause of standard	Clause 18.6	
Test requirements	The function of electrical equipment shall be tested, particularly those related to safety and safeguarding.	
Points tested	Requirements	Test result
Function of button	Function is verified in accordance with the requirements	Pass
Conclusion	Pass	

Noise Test Report

Reference Standards

2006/42/EC, Clause 1.7.4.2(u)

Test Procedure

- 1) Measure and record the ambient noise level
- 2) Measure and record the sound pressure level under simulated operating conditions

Test Result.

Sound Pressure Level Test

Location	Measured sound level(dBA)
Front side	65.3 dBA
Right side	64.2 dBA
Left side	66.6 dBA
Rear side	67.1 dBA
Ambient Sound Level was measured 59.7 dBA	

EN ISO 12100 test report

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
5	Risk assessment		Pass
5.1	General Risk assessment comprises (see Figure 1)	See risk assessment report	Pass
	- Risk analysis, comprising	See risk assessment report	Pass
	1) determination of the limits of the machinery (see 5.3),	See risk assessment report	Pass
	2) hazard identification (5.4 and Annex B), and	See risk assessment report	Pass
	3) risk estimation (see 5.5), and	See risk assessment report	Pass
	- Risk evaluation (see 5.6).	See risk assessment report	Pass
	Risk analysis provides information required for the risk evaluation, which in turn allows judgments to be made about whether or not risk reduction is required.	See risk assessment report	Pass
	These judgments shall be supported by a qualitative or, where appropriate, quantitative estimate of the risk associated with the hazards present on the machinery.	See risk assessment report	Pass
	NOTE A quantitative approach can be appropriate when useful data is available. However, a quantitative approach is restricted by the useful data that are available and/or the limited resources of those conducting the risk assessment. Therefore, in many applications only qualitative risk estimation will be possible.	Noted	Pass
	The risk assessment shall be documented according to Clause 7.	See risk assessment report	Pass
5.2	Information for risk assessment	-	-
	The information for risk assessment should include the following.	See risk assessment report	Pass
	a) Related to machinery description:	See risk assessment report	Pass
	1) user specifications;	See risk assessment report	Pass
	2) anticipated machinery specifications, including	See risk assessment report	Pass
	i) a description of the various phases of the whole life cycle of the machinery,	See risk assessment report	Pass
	ii) design drawings or other means of establishing the nature of the machinery, and	See risk assessment report	Pass
	iii) required energy sources and how they are supplied;	See risk assessment report	Pass
	3) documentation on previous designs of similar machinery, if relevant;	See risk assessment report	Pass
	4) Information for use of the machinery, as available.	See risk assessment report	Pass
	b) Related to regulations, standards and other applicable documents:	See risk assessment report	Pass
	1) applicable regulations;	See risk assessment report	Pass
	2) relevant standards;	See risk assessment report	Pass
	3) relevant technical specifications;	See risk assessment report	Pass
	4) Relevant safety data sheets.	See risk assessment report	Pass
	c) Related to experience of use:	See risk assessment report	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	1) any accident, incident or malfunction history of the actual or similar machinery;	Considered	Pass
	2) the history of damage to health resulting, for example, from emissions (noise, vibration, dust, fumes, etc.), chemicals used or materials processed by the machinery;	Considered	Pass
	3) the experience of users of similar machines and, whenever practicable, an exchange of information with the potential users.	Considered	Pass
	NOTE An incident that has occurred and resulted in harm can be referred to as an "accident", whereas an incident that has occurred and that did not result in harm can be referred to as a "near miss" or "dangerous occurrence" .	Noted	Pass
	d) Relevant ergonomic principles.	Considered	Pass
	The information shall be updated as the design develops or when modifications to the machine are required.	Considered	Pass
	Comparisons between similar hazardous situations associated with different types of machinery are often possible, provided that sufficient information about hazards and accident circumstances in those situations is available.	Considered	Pass
	NOTE The absence of an accident history, a small number of accidents or low severity of accidents ought not to be taken as a presumption of a low risk.	Noted	Pass
	For quantitative analysis, data from databases, handbooks, laboratories or manufacturers' specifications may be used, provided that there is confidence in the suitability of the data. Uncertainty associated with these data shall be indicated in the documentation (see Clause 7).	Considered	Pass
5.3	Determination of limits of machinery	-	-
5.3.1	General Risk assessment begins with the determination of the limits of the machinery, taking into account all the phases of the machinery life. This means that the characteristics and performances of the machine or a series of machines in an integrated process, and the related people, environment and products should be identified in terms of the limits of machinery as given in 5.3.2 to 5.3.5.	All the limits have been considered	Pass
5.3.2	Use limits. Use limits include the intended use and the reasonably foreseeable misuse. Aspects to be taken into account include the following:	C	Pass
	a) the different machine operating modes and different intervention procedures for the users, including interventions required by malfunctions of the machine;	Considered	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	b) the use of the machinery (for example, industrial, non-industrial and domestic) by persons identified by sex, age, dominant hand usage, or limiting physical abilities (visual or hearing impairment, size, strength, etc.);	Considered	Pass
	c) the anticipated levels of training, experience or ability of users including	Considered	Pass
	1) operators,	Considered	Pass
	2) maintenance personnel or technicians,	Considered	Pass
	3) trainees and apprentices, and	Considered	Pass
	4) the general public;	Not used for general public	N/A
	d) exposure of other persons to the hazards associated with the machinery where it can be reasonably foreseen:	Considered	Pass
	1) persons likely to have a good awareness of the specific hazards, such as operators of adjacent machinery;	Considered	Pass
	2) persons with little awareness of the specific hazards but likely to have a good awareness of site safety procedures, authorized routes, etc., such as administration staff;	Considered	Pass
	3) persons likely to have very little awareness of the machine hazards or the site safety procedures, such as visitors or members of the general public, including children.	Considered	Pass
	If specific information is not available in relation to b), above, the manufacturer should take into account general information on the intended user population (for example, appropriate anthropometric data).	The information has been stated in manual	N/A
5.3.3	Space limits Aspects of space limits to be taken into account include	Considered	Pass
	a) the range of movement,	Considered	Pass
	b) space requirements for persons interacting with the machine, such as during operation and maintenance,	The space has been considered during design, see installation diagram.	Pass
	c) human interaction such as the operator– machine interface, and	Considered, see operator position diagram	Pass
	d) the machine–power supply interface.	The position of power supply is according to EN 60204-1	Pass
5.3.4	Time limits Aspects of time limits to be taken into account include	Considered, see below	Pass
	a) the life limit of the machinery and/or of some of its components (tooling, parts that can wear, electromechanical components, etc.), taking into account its intended use and reasonably foreseeable misuse, and	The life limit has been stated in manual	Pass
	b) Recommended service intervals.	See manual	Pass
5.3.5	Other limits Examples of other limits include	See below	Pass
	a) properties of the material(s) to be processed,	For wood only, see manual .	Pass
	b) housekeeping — the level of cleanliness required, and	Considered	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	c) environmental — the recommended minimum and maximum temperatures, whether the machine can be operated indoors or outdoors, in dry or wet weather, in direct sunlight, tolerance to dust and wet, etc.	The information has been stated in manual.	Pass
5.4	Hazard identification After determination of the limits of the machinery, the essential step in any risk assessment of the machinery is the systematic identification of reasonably foreseeable hazards (permanent hazards and those which can appear unexpectedly), hazardous situations and/or hazardous events during all phases of the machine life cycle, i.e.:	All the phases of the machine life cycle have been considered. See risk assessment report.	Pass
	Installation;	See above	Pass
	– commissioning;	See above	Pass
	– use;	See above	Pass
	– dismantling, disabling and scrapping.	See above	Pass
	Only when hazards have been identified can steps be taken to eliminate them or to reduce risks. To accomplish this hazard identification, it is necessary to identify the operations to be performed by the machinery and the tasks to be performed by persons who interact with it, taking into account the different parts, mechanisms or functions of the machine, the materials to be processed, if any, and the environment in which the machine can be used.	Considered	Pass
	The designer shall identify hazards taking into account the following.	All the hazards have been taking into account	Pass
	a) Human interaction during the whole life cycle of the machine	Considered	Pass
	Task identification should consider all tasks associated with every phase of the machine life cycle as given above. Task identification should also take into account, but not be limited to, the following task categories:	All phases of the machine life cycle have been considered	Pass
	– setting; – testing; – teaching/programming; – process/tool changeover; – start-up; – all modes of operation; – feeding the machine; – removal of product from machine; – stopping the machine; – stopping the machine in case of emergency; – recovery of operation from jam or blockage; – restart after unscheduled stop; – fault-finding/trouble-shooting (operator intervention) ; – cleaning and housekeeping; – preventive maintenance; – corrective maintenance.	All the phases of this clause has been considered	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	All reasonably foreseeable hazards, hazardous situations or hazardous events associated with the various tasks shall then be identified. Annex B gives examples of hazards, hazardous situations and hazardous events to assist in this process. Several methods are available for the systematic identification of hazards. See also ISO/TR 14121-2.	All the hazards stated in annex B have been considered, and the risk assessment has been carried out according to ISO/TR 14121-2, in which the factors Se-CI(Fr, Pr, Av) and diagram are used to evaluate the level of risk.	Pass
	In addition, reasonably foreseeable hazards, hazardous situations or hazardous events not directly related to tasks shall be identified.	Considered	Pass
	EXAMPLE Seismic events, lightning, excessive snow loads, noise, break-up of machinery, hydraulic hose burst.	noted	Pass
	b) Possible states of the machine	The possible states of the machine have been considered.	Pass
	These are as follows:	See below	Pass
	1) the machine performs the intended function (the machine operates normally);	Considered	Pass
	2) the machine does not perform the intended function (i.e. it malfunctions) due to a variety of reasons, including	Considered	Pass
	– variation of a property or of a dimension of the processed material or of the workpiece, – failure of one or more of its component parts or services, – external disturbances (for example, shocks, vibration, electromagnetic interference), – design error or deficiency (for example, software errors), – disturbance of its power supply, and – surrounding conditions (for example, damaged floor surfaces).	Considered	Pass
	c) Unintended behaviour of the operator or reasonably foreseeable misuse of the machine	The	Pass
	Examples include	See below	Pass
	– loss of control of the machine by the operator (especially for hand-held or mobile machines), – reflex behaviour of a person in case of malfunction, incident or failure during the use of the machine, – behaviour resulting from lack of concentration or carelessness, – behaviour resulting from taking the “line of least resistance” in carrying out a task, – behaviour resulting from pressures to keep the machine running in all circumstances, and – behaviour of certain persons (for example, children, disabled persons).	All the hazards have been taken into account during design.	Pass
	NOTE Examination of the available design documentation can be a useful means of identifying hazards related to the machinery,	Noted	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	particularly those associated with moving elements such as motors or hydraulic cylinders.		
5.5	Risk estimation	-	-
5.5.1	General	-	-
	After hazard identification, risk estimation shall be carried out for each hazardous situation by determining the elements of risk given in 5.5.2. When determining these elements, it is necessary to take into account the aspects given in 5.5.3.	Risk estimation has been carried out according to ISO 14121-2	Pass
	If standardized (or other suitable) measurement methods exist for an emission, they should be used, in conjunction with existing machinery or prototypes, to determine emission values and comparative emission data. This makes it possible for the designer to – estimate the risk associated with the emissions, – evaluate the effectiveness of the protective measures implemented at the design stage, – provide potential buyers with quantitative information on emissions in the technical documentation, and – provide users with quantitative information on emissions in the information for use. Hazards other than emissions that are described by measurable parameters can be dealt with in a similar manner.	Noise emission has been tested according to EN ISO 11202.	Pass
5.5.2	Elements of risk	-	-
5.5.2.1	General	-	-
	The risk associated with a particular hazardous situation depends on the following elements: a) the severity of harm; b) the probability of occurrence of that harm, which is a function of 1) the exposure of person(s) to the hazard, 2) the occurrence of a hazardous event, and 3) the technical and human possibilities to avoid or limit the harm. The elements of risk are shown in Figure 3. Additional details are given in 5.5.2.2, 5.5.2.3 and 5.5.3.	All the elements have been considered, see risk assessment report.	Pass
5.5.2.2	Severity of harm	-	-
	The severity can be estimated by taking into account the following:	Considered, see risk assessment report	Pass
	a) the severity of injuries or damage to health, for example, – slight, – serious, – death.	See above	Pass
	b) the extent of harm, for example, to – one person, – several persons.	See above	Pass
	When carrying out a risk assessment, the risk from the most likely severity of the harm that is likely to occur from each identified hazard shall	This requirement has been taken into account during risk assessment.	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	be considered, but the highest foreseeable severity shall also be taken into account, even if the probability of such an occurrence is not high.		
5.5.2.3	Probability of occurrence of harm	-	-
5.5.2.3.1	Exposure of persons to the hazard	-	-
	The exposure of a person to the hazard influences the probability of the occurrence of harm. Factors to be taken into account when estimating the exposure are, among others,	Considered, see risk assessment report.	Pass
	a) the need for access to the hazard zone (for normal operation, correction of malfunction, maintenance or repair, etc.),	See above	Pass
	b) the nature of access (for example, manual feeding of materials),	See above	Pass
	c) the time spent in the hazard zone,	See above	Pass
	d) the number of persons requiring access, and	See above	Pass
	e) the frequency of access.	See above	Pass
5.5.2.3.2	Occurrence of a hazardous event	-	-
	The occurrence of a hazardous event influences the probability of occurrence of harm. Factors to be taken into account when estimating the occurrence of a hazardous event are, among others,	Considered, see risk assessment report.	Pass
	a) reliability and other statistical data,	See above	Pass
	b) accident history,	See above	Pass
	c) history of damage to health, and	See above	Pass
	d) comparison of risks (see 5.6.3).	See above	Pass
	NOTE The occurrence of a hazardous event can be of a technical or human origin.	Noted	Pass
5.5.2.3.3	Possibility of avoiding or limiting harm	-	-
	The possibility of avoiding or limiting harm influences the probability of occurrence of harm. Factors to be taken into account when estimating the possibility of avoiding or limiting harm are, among others, the following:	Considered, see risk assessment report.	Pass
	a) different persons who can be exposed to the hazard(s), for example, – skilled, – unskilled;	See above	Pass
	b) how quickly the hazardous situation could lead to harm, for example, – suddenly, – quickly, – slowly;	See above	Pass
	c) any awareness of risk, for example, – by general information, in particular, information for use, – by direct observation, – through warning signs and indicating devices, in particular, on the machinery;	See above	Pass
	d) the human ability to avoid or limit harm (for example, reflex, agility, possibility of escape);	See above	Pass
	e) practical experience and knowledge, for example,	See above	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	– of the machinery, – of similar machinery, – no experience.		
5.5.3	Aspects to be considered during risk estimation	-	-
5.5.3.1	Persons exposed	-	-
	Risk estimation shall take into account all persons (operators and others) for whom exposure to the hazard is reasonably foreseeable.	Considered	Pass
5.5.3.2	Type, frequency and duration of exposure	-	-
	The estimation of the exposure to the hazard under consideration (including long-term damage to health) requires analysis of, and shall account for, all modes of operation of the machinery and methods of working. In particular, the analysis shall account for the needs for access during loading/unloading, setting, teaching, process changeover or correction, cleaning, fault-finding and maintenance.	All the situations have been taken into account	Pass
	The risk estimation shall also take into account tasks, for which it is necessary to suspend protective measures.	Considered	Pass
5.5.3.3	Relationship between exposure and effects	-	-
	The relationship between an exposure to a hazard and its effects shall be taken into account for each hazardous situation considered. The effects of accumulated exposure and combinations of hazards shall also be considered. When considering these effects, risk estimation shall, as far as practicable, be based on appropriate recognized data.	Considered	Pass
	NOTE 1 Accident data can assist in establishing the probability and severity of injury associated with the use of a particular type of machinery with a particular type of protective measure.	Noted	Pass
	NOTE 2 Zero accident data is, however, no guarantee of the low probability and severity of an injury.	Noted	Pass
5.5.3.4	Human factors	-	-
	Human factors can affect risk and shall be taken into account in the risk estimation, including, for example,	Considered	Pass
	a) the interaction of person(s) with the machinery, including correction of malfunction,	Considered	Pass
	b) interaction between persons,	Considered	Pass
	c) stress-related aspects,	Considered	Pass
	d) ergonomic aspects,	Considered	Pass
	e) the capacity of persons to be aware of risks in a given situation depending on their training, experience and ability,	Considered	Pass
	f) fatigue aspects, and	Considered	Pass
	g) aspects of limited abilities (due to disability,	Considered	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	age, etc.).		
	Training, experience and ability can affect risk; nevertheless, none of these factors shall be used as a substitute for hazard elimination, risk reduction by inherently safe design measure or safeguarding, wherever these protective measures can be practicably implemented.	Considered	Pass
5.5.3.5	Suitability of protective measures	-	-
	Risk estimation shall take into account the suitability of protective measures and shall	Considered, see risk assessment report	Pass
	a) identify the circumstances which can result in harm,	Identified	Pass
	b) whenever appropriate, be carried out using quantitative methods to compare alternative protective measures (see ISO/TR 14121-2), and	See risk assessment report	Pass
	c) provide information that can assist with the selection of appropriate protective measures.	Appropriate information has been provided.	Pass
	When estimating risk, those components and systems identified as immediately increasing the risk in case of failure need special attention.	Considered	Pass
	When protective measures include work organization, correct behaviour, attention, application of personal protective equipment (PPE), skill or training, the relatively low reliability of such measures compared with proven technical protective measures shall be taken into account in the risk estimation.	Considered	Pass
5.5.3.6	Possibility of defeating or circumventing protective measures	-	-
	For the continued safe operation of a machine, it is important that the protective measures allow its easy use and do not hinder its intended use. Otherwise, there is a possibility that protective measures might be bypassed in order for maximum utility of the machine to be achieved.	Assemble the safety components according to EN 1088.	Pass
	Risk estimation shall take account of the possibility of defeating or circumventing protective measures. It shall also take account of the incentive to defeat or circumvent protective measures when, for example,	Considered	Pass
	a) the protective measure slows down production or interferes with another activity or preference of the user,	No protective measure will slow down production or interferes with another activity	N/A
	b) the protective measure is difficult to use,	No this kind of situation	N/A
	c) persons other than the operator are involved, or	Considered	Pass
	d) the protective measure is not recognized by the user or not accepted as being suitable for its function.	No this kind of situation	N/A
	Whether or not a protective measure can be defeated depends on both the type of protective measure, such as an adjustable guard or	considered	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	programmable trip device, and its design details.		
	Protective measures that use programmable electronic systems introduce additional possibilities of defeat or circumvention if access to safety-related software is not appropriately restricted by design and monitoring methods. Risk estimation shall identify where safety-related functions are not separated from other machine functions and shall determine the extent to which access is possible. This is particularly important when remote access for diagnostic or process correction purposes is required.	Not use programmable electronic system as Protective measure.	N/A
5.5.3.7	Ability to maintain protective measures	-	-
	Risk estimation shall consider whether the protective measures can be maintained in the condition necessary to provide the required level of protection.	Considered	Pass
	NOTE If the protective measure cannot easily be maintained in correct working order, this can encourage the defeat or circumvention of the protective measure in order to allow continued use of the machinery.	Noted	Pass
5.5.3.8	Information for use	-	-
	Risk estimation shall take into account the information for use, as available. See also 6.4.	Appropriate information has been provided, see manual.	Pass
5.6	Risk evaluation	-	-
5.6.1	General	-	-
	After risk estimation has been completed, risk evaluation shall be carried out to determine if risk reduction is required. If risk reduction is required, then appropriate protective measures shall be selected and applied (see Clause 6). As shown in Figure 1, the adequacy of the risk reduction shall be determined after applying each of the three steps of risk reduction described in Clause 6. As part of this iterative process, the designer shall also check whether additional hazards are introduced or other risks increased when new protective measures are applied. If additional hazards do occur, they shall be added to the list of identified hazards and appropriate protective measures will be required to address them.	Comply with the requirement, see risk assessment report.	Pass
	Achieving the objectives of risk r	The risk has been reduced to acceptable level after correction	Pass
5.6.2	Adequate risk reduction	-	-
	Application of the three-step method described in 6.1 is essential in achieving adequate risk reduction.	applied	Pass
	Following the application of the three-step method, adequate risk reduction is achieved	Comply with the requirement.	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	when – all operating conditions and all intervention procedures have been considered, – the hazards have been eliminated or risks reduced to the lowest practicable level, – any new hazards introduced by the protective measures have been properly addressed, – users are sufficiently informed and warned about the residual risks (see 6.1, step 3), – protective measures are compatible with one another, – sufficient consideration has been given to the consequences that can arise from the use in a non- professional/ non- industrial context of a machine designed for professional/ industrial use, and – the protective measures do not adversely affect the operator's working conditions or the usability of the machine.		
5.6.3	Comparison of risks	-	-
	As part of the process of risk evaluation, the risks associated with the machinery or parts of machinery can be compared with those of similar machinery or parts of machinery, provided the following criteria apply:	No similar machine used to comparison of this machine.	N/A
	– the similar machinery is in accordance with the relevant type- C standard(s) ;	See above	N/A
	– the intended use, reasonably foreseeable misuse and the way both machines are designed and constructed are comparable;	See above	N/A
	– the hazards and the elements of risk are comparable;	See above	N/A
	– the technical specifications are comparable;	See above	N/A
	– the conditions for use are comparable.	See above	N/A
	The use of this comparison method does not eliminate the need to follow the risk assessment process as described in this International Standard for the specific conditions of use. For example, when a band saw used for cutting meat is compared with a band saw used for cutting wood, the risks associated with the different material shall be assessed.	See above	N/A
6	Risk reduction	-	-
6.1	General	-	-
	The objective of risk reduction can be achieved by the elimination of hazards, or by separately or simultaneously reducing each of the two elements that determine the associated risk:	Considered, see risk assessment report	Pass
	– severity of harm from the hazard under consideration;	See above	Pass
	– probability of occurrence of that harm .	See above	Pass
	All protective measures intended for reaching this objective shall be applied in the following sequence, referred to as the three-step method	Protective measures have been used according to three-step method.	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	(see also Figures 1 and 2).		
	Step 1 : Inherently safe design measures	considered	Pass
	Inherently safe design measures eliminate hazards or reduce the associated risks by a suitable choice of design features of the machine itself and/or interaction between the exposed persons and the machine. See 6.2.	considered	Pass
	NOTE 1 This stage is the only one at which hazards can be eliminated, thus avoiding the need for additional protective measures such as safeguarding or complementary protective measures.	noted	Pass
	Step 2 : Safeguarding and/ or complementary protective measures	considered	Pass
	Taking into account the intended use and the reasonably foreseeable misuse, appropriately selected safeguarding and complementary protective measures can be used to reduce risk when it is not practicable to eliminate a hazard, or reduce its associated risk sufficiently, using inherently safe design measures. See 6.3.	Appropriate guarding have been provided	Pass
	Step 3 : Information for use		Pass
	Where risks remain despite inherently safe design measures, safeguarding and the adoption of complementary protective measures, the residual risks shall be identified in the information for use. The information for use shall include, but not be limited to, the following:	Appropriate information has been provided.	Pass
	– operating procedures for the use of the machinery consistent with the expected ability of personnel who use the machinery or other persons who can be exposed to the hazards associated with the machinery;	See manual	Pass
	– the recommended safe working practices for the use of the machinery and the related training requirements adequately described;	See manual	Pass
	– sufficient information, including warning of residual risks for the different phases of the life of the machinery;	See manual and warning label	Pass
	– the description of any recommended personal protective equipment, including detail as to its need as well as to training needed for its use.	See manual	Pass
	Information for use shall not be a substitute for the correct application of inherently safe design measures, safeguarding or complementary protective measures.	See manual	Pass
	NOTE 2 Adequate protective measures associated with each of the operating modes and intervention procedures reduce the	noted	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	possibility of operators being induced to use hazardous intervention techniques in case of technical difficulties.		
6.2	Inherently safe design measures	-	-
6.2.1	General	-	-
	Inherently safe design measures are the first and most important step in the risk reduction process. This is because protective measures inherent to the characteristics of the machine are likely to remain effective, whereas experience has shown that even well-designed safeguarding can fail or be violated and information for use may not be followed.	Inherently safe design has been considered first	Pass
	Inherently safe design measures are achieved by avoiding hazards or reducing risks by a suitable choice of design features for the machine itself and/or interaction between the exposed persons and the machine.		Pass
	NOTE See 6.3 for safeguarding and complementary measures that can be used to achieve the risk reduction objectives in the case where inherently safe design measures are not sufficient (see 6.1 for the three-step method).	Considered	Pass
6.2.2	Consideration of geometrical factors and physical aspects	-	-
6.2.2.1	Geometrical factors	-	-
	Such factors include the following.	See below	Pass
	a) The form of machinery is designed to maximize direct visibility of the working areas and hazard zones from the control position — reducing blind spots, for example — and choosing and locating means of indirect vision where necessary (mirrors, etc.) so as to take into account the characteristics of human vision, particularly when safe operation requires permanent direct control by the operator, for example:	The working area can be seen from the control position	Pass
		Not mobile machine	N/A
	– the zone of movement of lifted loads or of the carrier of machinery for lifting persons;	Not this kind of machine	N/A
	– the area of contact of the tool of a hand-held or hand-guided machine with the material being worked.	Not this kind of machine	N/A
	The design of the machine shall be such that, from the main control position, the operator is able to ensure that there are no exposed persons in the danger zones.	This requirement has been considered during design.	Pass
	b) The form and the relative location of the mechanical components parts: for instance, crushing and shearing hazards are avoided by increasing the minimum gap between the moving parts, such that the part of the body under consideration can enter the gap safely, or	Safety distance has been considered according to ISO 13857.	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	by reducing the gap so that no part of the body can enter it (see ISO 13854 and ISO 13857).		
	c) Avoiding sharp edges and corners, protruding parts: in so far as their purpose allows, accessible parts of the machinery shall have no sharp edges, no sharp angles, no rough surfaces, no protruding parts likely to cause injury, and no openings which can “trap” parts of the body or clothing. In particular, sheet metal edges shall be deburred, flanged or trimmed, and open ends of tubes which can cause a “trap” shall be capped.	All edges and corners have been rounded. No trap hazard is found on this machine.	Pass
	d) The form of the machine is d	This requirement has been considered during design.	Pass
6.2.2.2	Physical aspects	-	-
	Such aspects include the following:	See below	Pass
	a) limiting the actuating force to a sufficiently low value so that the actuated part does not generate a mechanical hazard;	This requirement has been considered during design.	Pass
	b) limiting the mass and/or velocity of the movable elements, and hence their kinetic energy;	This requirement has been considered during design. esigned so as to	Pass
	c) limiting the emissions by acting on the characteristics of the source using measures for reducing	This requirement has been considered during design.	Pass
	1) noise emission at source (see ISO/TR 11688- 1),	This requirement has been considered during design.	Pass
	2) the emission of vibration at source, such as redistribution or addition of mass and changes of process parameters [for example, frequency and/or amplitude of movements (for hand-held and hand-guided machinery, see CR 1030- 1)], achieve a suitable working position and provide accessible manual controls (actuators).	This requirement has been considered during design.	Pass
	3) the emission of hazardous substances, including the use of less hazardous substances or dust-reducing processes (granules instead of powders, milling instead of grinding), and	This requirement has been considered during design.	Pass
	4) radiation emissions, including, for example, avoiding the use of hazardous radiation sources, limiting the power of radiation to the lowest level sufficient for the proper functioning of the machine, designing the source so that the beam is concentrated on the target, increasing the distance between the source and the operator or providing for remote operation of the machinery [measures for reducing emission of non-ionizing radiation are given in 6.3.4.5 (see also EN 12198- 1 and EN 12198-3)].	No this kind of risk	N/A
6.2.3	Taking into account general technical knowledge of machine design	-	-

	This general technical knowledge can be derived from technical specifications for design (standards, design codes, calculation rules, etc.), which should be used to cover	This requirement has been considered during design.	Pass
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EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	a) mechanical stresses such as	See below	Pass
	– stress limitation by implementation of correct calculation, construction and fastening methods as regards, for example, bolted assemblies and welded assemblies,	This requirement has been considered during design.	Pass
	– stress limitation by overload prevention (bursting disk, pressure-limiting valves, breakage points, torque-limiting devices, etc.),	This requirement has been considered during design.	Pass
	– avoiding fatigue in elements under variable stresses (notably cyclic stresses), and	This requirement has been considered during design.	Pass
	– static and dynamic balancing of rotating elements,	This requirement has been considered during design.	Pass
	b) materials and their properties such as	See below	Pass
	– resistance to corrosion, ageing, abrasion and wear,	Considered	Pass
	– hardness, ductility, brittleness,		Pass
	– homogeneity,	Considered	Pass
	– toxicity, and	Considered	Pass
	– flammability, and	Considered	Pass
	c) emission values for	See below	Pass
	– noise,	The noise is less than 80 dB	Pass
	– vibration,	considered	Pass
	– hazardous substances, and	No this kind of risk	Pass
	– radiation.	No this kind of risk	Pass
	When the reliability of particular components or assemblies is critical for safety (for example, ropes, chains, lifting accessories for lifting loads or persons), stress limits shall be multiplied by appropriate working coefficients.	No this kind of risk	N/A
6.2.4	Choice of appropriate technology	Considered	Pass
	One or more hazards can be eliminated or risks reduced by the choice of the technology to be used in certain applications such as the following:	See below	Pass
	a) on machines intended for use in explosive atmospheres, using	Not used in explosive atmospheres	N/A
	– appropriately selected pneumatic or hydraulic control system and machine actuators,	See above	N/A
	– intrinsically safe electrical equipment (see IEC 60079-11);	See above	N/A
	b) for particular products to be processed (for example, by a solvent), by using equipment that ensures the temperature will remain far below the flash point;	No this kind of risk	N/A
	c) the use of alternative equipment to avoid high noise levels, such as	Considered	Pass
	– electrical instead of pneumatic equipment,	pneumatic equipment used	Pass
	– in certain conditions, water-cutting instead of mechanical equipment.	Not applicable	N/A
6.2.5	Applying principle of positive mechanical action	-	-
	Positive mechanical action is achieved when a moving mechanical component inevitably moves another component along with it, either by direct contact or via rigid elements. An	Not applicable	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	example of this is positive opening operation of switching devices in an electrical circuit (see IEC 60947-5- 1 and ISO 14119).		
	NOTE Where a mechanical component moves and thus allows a second component to move freely (for example, by gravity or spring force), there is no positive mechanical action of the first component on the second.	noted	Pass
6.2.6	Provisions for stability.	-	-
	Machines shall be designed so that they have sufficient stability to allow them to be used safely in their specified conditions of use. Factors to be taken into account include	This requirement has been considered during design.	Pass
	– the geometry of the base,	Considered	Pass
	– the weight distribution, including loading,	Considered	Pass
	– the dynamic forces due to movements of parts of the machine, of the machine itself or of elements held by the machine which can result in an overturning moment,	Considered	Pass
	– vibration,	Considered	Pass
	– oscillations of the centre of gravity,	Considered	Pass
	– characteristics of the supporting surface in case of travelling or installation on different sites (ground conditions, slope, etc.), and	Considered	Pass
	– external forces, such as wind pressure and manual forces.	manual force has been considered	Pass
	Stability shall be considered in all phases of the life cycle of the machine, including handling, travelling, installation, use, dismantling, disabling and scrapping.	Considered	Pass
	Other protective measures for stability relevant to safeguarding are given in 6.3.2.6.	Considered	Pass
6.2.7	Provisions for maintainability	-	-
	When designing a machine, the following maintainability factors shall be taken into account to enable maintenance of the machine:	This requirement has been considered during design.	Pass
	– accessibility, taking into account the environment and the human body measurements, including the dimensions of the working clothes and tools used;	Considered	Pass
	– ease of handling, taking into account human capabilities;	Considered	Pass
	– limitation of the number of special tools and equipment.	Considered	Pass
6.2.8	Observing ergonomic principles	-	-
	Ergonomic principles shall be taken into account in designing machinery so as to reduce the mental or physical stress of, and strain on, the operator. These principles shall be considered when allocating functions to operator and machine (degree of automation) in the basic design.	This requirement has been considered during design.	Pass
	NOTE Also improved are the performance and reliability of operation and hence the reduction	noted	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	in the probability of errors at all stages of machine use.		
	Account shall be taken of body sizes likely to be found in the intended user population, strengths and postures, movement amplitudes, frequency of cyclic actions (see ISO 10075 and ISO 10075-2).		
	All elements of the operator-machine interface, such as controls, signalling or data display elements, shall be designed to be easily understood so that clear and unambiguous interaction between the operator and the machine is possible. See EN 614- 1, EN 13861 and IEC 61310- 1.	Considered	Pass
	The designer's attention is particularly drawn to following ergonomic aspects of machine design.	Considered	Pass
	a) Avoid the necessity for stressful postures and movements during the use of the machine (for example, providing facilities to adjust the machine to suit the various operators).	Considered	Pass
	b) Design machines, especially hand-held and mobile machines, so as to enable them to be operated easily, taking into account human effort, actuation of controls and hand, arm and leg anatomy.	Considered	Pass
	c) Limit as far as possible noise, vibration and thermal effects such as extreme temperatures.	Considered	Pass
	d) Avoid linking the operator's working rhythm to an automatic succession of cycles.	Considered	Pass
	e) Provide local lighting on or in the machine for the illumination of the working area and of adjusting, setting-up and frequent maintenance zones when the design features of the machine and/or its guards render the ambient lighting inadequate. Flicker, dazzling, shadows and stroboscopic effects shall be avoided if they can cause a risk. If the position or the lighting source has to be adjusted, its location shall be such that it does not cause any risk to persons making the adjustment.	No need	N/A
	f) Select, locate and identify manual controls (actuators) so that	Considered	Pass
	– they are clearly visible and identifiable, and appropriately marked where necessary (see 6.4.4),	This requirement has been considered during design.	Pass
	– they can be safely operated without hesitation or loss of time and without ambiguity (for example, a standard layout of controls reduces the possibility of error when an operator changes from a machine to another one of similar type having the same pattern of operation),	This requirement has been considered during design.	Pass
	– their location (for push-buttons) and their movement (for levers and hand wheels) are consistent with their effect (see IEC 61310-3), and	According to IEC 61310-3	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	– their operation cannot cause additional risk . See also ISO 9355-3.	No additional risk is found.	Pass
	Where a control is designed and constructed to perform several different actions — namely, where there is no one-to-one correspondence (for example, keyboards) — the action to be performed shall be clearly displayed and subject to confirmation where necessary.	Marked with words.	Pass
	Controls shall be so arranged that their layout, travel and resistance to operation are compatible with the action to be performed, taking account of ergonomic principles. Constraints due to the necessary or foreseeable use of personal protective equipment (such as footwear, gloves) shall be taken into account.	This requirement has been considered during design.	Pass
	g) Select, design and locate indicators, dials and visual display units so that	See below	Pass
	– they fit within the parameters and characteristics of human perception,	Considered	Pass
	– information displayed can be detected, identified and interpreted conveniently, i.e. long-lasting, distinct, unambiguous and understandable with respect to the operator's requirements and the intended use, and	Considered	Pass
	– the operator is able to perceive them from the control position.	Considered	Pass
6.2.9	Electrical hazards	-	-
	For the design of the electrical equipment of machines, IEC 60204-1 gives general provisions about disconnection and switching of electrical circuits and for protection against electric shock. For requirements related to specific machines, see corresponding IEC standards (for example, IEC 61029, IEC 60745 or IEC 60335).	See EN 60204- 1 report	Pass
6.2.10	Pneumatic and hydraulic hazards	-	-
	Pneumatic and hydraulic equipment of machinery shall be designed so that	Pneumatic equipment has been used, See below	Pass
	– the maximum rated pressure cannot be exceeded in the circuits (using, for example, pressure-limiting devices),	By user	Pass
	– no hazard results from pressure fluctuations or increases, or from loss of pressure or vacuum,	No this kind of risk	Pass
	– no hazardous fluid jet or sudden hazardous movement of the hose (whiplash) results from leakage or component failures,	No this kind of risk	Pass
	– air receivers, air reservoirs or similar vessels (such as in gas-loaded accumulators) comply with the applicable design standard codes or regulations for these elements,	Not used	N/A
	– all elements of the equipment, especially pipes and hoses, are protected against harmful external effects,	protected	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	– as far as possible, reservoirs and similar vessels (for example, gas-loaded accumulators) are automatically depressurized when isolating the machine from its power supply (see 6.3.5.4) and, if not possible, means are provided for their isolation, local depressurizing and pressure indication (see also ISO 14118:2000, Clause 5), and	No this kind of equipment used on this machine.	N/A
	– all elements which remain under pressure after isolation of the machine from its power supply are provided with clearly identified exhaust devices, and there is a warning label drawing attention to the necessity of depressurizing those elements before any setting or maintenance activity on the machine.	No this kind of situation	N/A
	NOTE See also ISO 4413 and ISO 4414.	Noted	N/A
6.2.11	Applying inherently safe design measures to control systems	-	-
6.2.11.1	General	-	-
	The design measures of the control system shall be chosen so that their safety-related performance provides a sufficient amount of risk reduction (see ISO 13849- 1 or IEC 62061).	No this kind of situation	N/A
	The correct design of machine control systems can avoid unforeseen and potentially hazardous machine behaviour.	This requirement has been considered during design.	Pass
	Typical causes of hazardous machine behaviour are	See below	Pass
	– an unsuitable design or modification (accidental or deliberate) of the control system logic,	considered	Pass
	– a temporary or permanent defect or failure of one or several components of the control system,	No need according to risk assessment	N/A
	– a variation or a failure in the power supply of the control system, and	considered	Pass
	– inappropriate selection, design and location of the control devices.	considered	Pass
	Typical examples of hazardous machine behaviour are	See below	Pass
	– unexpected start-up (see ISO 14118),	Comply with ISO14118	Pass
	– uncontrolled speed change,	No this kind of risk	N/A
	– failure to stop moving parts,	No this kind of risk .	Pass
	– dropping or ejection of part of the machine or of a workpiece clamped by the machine, and	Considered	Pass
	– machine action resulting from inhibition (defeating or failure) of protective devices.	Considered	Pass
	In order to prevent hazardous machine behaviour and to achieve safety functions, the design of control systems shall comply with the principles and methods presented in this subclause (6.2.11) and in 6.2.12. These principles and methods shall be applied singly or in combination as appropriate to the circumstances	The design of control systems shall comply with the principles and methods presented in 6.2.11 and in 6.2.12	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	(see ISO 13849- 1, IEC 60204- 1 and IEC 62061).		
	Control systems shall be designed to enable the operator to interact with the machine safely and easily. This requires one or several of the following solutions:	Considered.	Pass
	– systematic analysis of start stop and conditions;	Analysis has been carried out by designer.	Pass
	– provision for specific operating modes (for example, start-up after normal stop, restart after cycle interruption or after emergency stop, removal of the workpieces contained in the machine, operation of a part of the machine in case of a failure of a machine element);	Considered, see EN 60204- 1 report for detail	Pass
	– clear display of the faults;	No need.	N/A
	– measures to prevent accidental generation of unexpected start commands (for example, shrouded start device) likely to cause dangerous machine behaviour (see ISO 14118:2000, Figure 1);	Design according to ISO 14118:2000, Figure 1.	Pass
	– maintained stop commands (for example, interlock) to prevent restarting that could result in dangerous machine behaviour (see ISO 14118:2000, Figure 1).	Design according to ISO 14118:2000, Figure 1.	Pass
	An assembly of machines may be divided into several zones for emergency stopping, for stopping as a result of protective devices and/or for isolation and energy dissipation. The different zones shall be clearly defined and it shall be obvious which parts of the machine belong to which zone. Likewise, it shall be obvious which control devices (for example, emergency stop devices, supply disconnecting devices) and/or protective devices belong to which zone. The interfaces between zones shall be designed such that no function in one zone creates hazards in another zone which has been stopped for an intervention.	Just one emergency stop is provided.	N/A
	For example:	-	-
	– the travelling speed of mobile pedestrian controlled machinery other than remote- controlled shall be compatible with walking speed;	No this kind of situation	N/A
	– the range, speed, acceleration and deceleration of movements of the person-carrier and carrying vehicle for lifting persons shall be limited to non-hazardous values, taking into	No this kind of situation	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	account the total reaction time of the operator and the machine;		
	– the range of movements of parts of machinery for lifting loads shall be kept within specified limits.	No this kind of situation	N/A
	When the machinery contains various elements that can be operated independently, the control system shall be designed to prevent risks arising out of a lack of coordination (for example, collision prevention system).	This requirement has been taken into account during design.	Pass
6.2.11.2	Starting of an internal power source/ switching on an external power supply	-	-
	The starting of an internal power source or switching-on of an external power supply shall not result in a hazardous situation.	No hazardous situation is found	Pass
	For example:	See below	Pass
	– starting the internal combustion engine shall not lead to movement of a mobile machine;	No internal combustion engine used	N/A
	– connection to mains electricity supply shall not result in the starting of working parts of a machine.	Start the machine shall actuate the start button	Pass
	See IEC 60204-1:2005, 7.5 (see also Annexes A and B).	See EN 60204- 1 report	Pass
6.2.11.3	Starting/ stopping of a mechanism	-	-
	The primary action for starting or accelerating the movement of a mechanism should be performed by the application or an increase of voltage or fluid pressure, or — if binary logic elements are considered — by passage from state 0 to state 1 (where state 1 represents the highest energy state).	By increase of voltage.	Pass
	The primary action for stopping or slowing down should be performed by removal or reduction of voltage or fluid pressure, or — if binary logic elements are considered — by passage from state 1 to state 0 (where state 1 represents the highest energy state) .	By removal the voltage	Pass
	In certain applications, such as high-voltage switchgear, this principle cannot be followed, in which case other measures should be applied to achieve the same level of confidence for the stopping or slowing down.	No this kind of situation	N/A
	When, in order for the operator to maintain permanent control of deceleration, this principle is not observed (for example, a hydraulic braking device of a self-propelled mobile machine), the machine shall be equipped with a means of slowing and stopping in case of failure of the main braking system.	No this kind of risk	N/A
6.2.11.4	Restart after power interruption	-	-
	If a hazard could be generated, the spontaneous restart of a machine when it is	Restart the machine shall re- actuate the start manual	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	re- energized after power interruption shall be prevented (for example, by use of a self- maintained relay, contactor or valve) .		
6.2.11.5	Interruption of power supply	-	-
	Machinery shall be designed to prevent hazardous situations resulting from interruption or excessive fluctuation of the power supply. At least the following requirements shall be met:	See below	Pass
	– the stopping function of the machinery shall remain;	Comply with the requirement	Pass
	– all devices whose permanent operation is required for safety shall operate in an effective way to maintain safety (for example, locking, clamping devices, cooling or heating devices, power- assisted steering of self- propelled mobile machinery) ;	Comply with the requirement	Pass
	– parts of machinery or workpieces and/or loads held by machinery which are liable to move as a result of potential energy shall be retained for the time necessary to allow them to be safely lowered.	Comply with the requirement	Pass
6.2.11.6	Use of automatic monitoring	-	-
	Automatic monitoring is intended to ensure that a safety function or functions implemented by a protective measure do not fail to be performed if the ability of a component or an element to perform its function is diminished, or if the process conditions are changed such that hazards are generated.	No need.	N/A
	Automatic monitoring either detects a fault immediately or carries out periodic checks so that a fault is detected before the next demand upon the safety function. In either case, the protective measure can be initiated immediately or delayed until a specific event occurs (for example, the beginning of the machine cycle).	No need.	N/A
	The protective measure may be, for example,	See above	N/ A
	– the stopping of the hazardous process,	See above	N/ A
	– preventing the restart of this process after the first stop following the failure, or	See above	N/A
	– the triggering of an alarm .	See above	N/ A
6.2.11.7	Safety functions implemented by programmable electronic control systems	No safety function implemented by programmable electronic control system	N/A
6.2.11.7.1	General	See above	N/ A
	A control system that includes programmable electronic equipment (for example, programmable controllers) can, where appropriate, be used to implement safety functions at machinery. Where a programmable electronic control system is used, it is necessary to consider its performance requirements in relation to the requirements for the safety functions. The design of the programmable		

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	electronic control system shall be such that the probability of random hardware failures and the likelihood of systematic failures that can adversely affect the performance of the safety-related control function(s) is sufficiently low. Where a programmable electronic control system performs a monitoring function, the system behaviour on detection of a fault shall be considered (see also the IEC 61508 series for further guidance).		
	NOTE Both ISO 13849- 1 and IEC 62061, specific to machinery safety, provide guidance applicable to programmable electronic control systems.	See above	N/A
	The programmable electronic control system should be installed and validated to ensure that the specified performance [for example, safety integrity level (SIL) in IEC 61508] for each safety function has been achieved. Validation comprises testing and analysis (for example, static, dynamic or failure analysis) to show that all parts interact correctly to perform the safety function and that unintended functions do not occur.	See above	N/A
6.2.11.7.2	Hardware aspects	See above	N/A
	The hardware (including, for example, sensors, actuators and logic solvers) shall be selected, and/or designed and installed, to meet both the functional and performance requirements of the safety function(s) to be performed, in particular, by means of	See above	N/A
	– architectural constraints (the configuration of the system, its ability to tolerate faults, its behaviour on detection of a fault, etc.),	See above	N/A
	– selection, and/or design, of equipment and devices with an appropriate probability of dangerous random hardware failure, and	See above	N/A
	– the incorporation of measures and techniques within the hardware so as to avoid systematic failures and control systematic faults.		
6.2.11.7.3	Software aspects	See above	N/A
	The software, including internal operating software (or system software) and application software, shall be designed so as to satisfy the performance specification for the safety functions (see also IEC 61508-3).	See above	N/A
	Application software should not be reprogrammable by the user. This may be achieved by use of embedded software in a non-reprogrammable memory [for example, micro-controller, application-specific integrated circuit (ASIC)].	See above	N/A
	When the application requires reprogramming by the user, the access to the software dealing with safety functions should be restricted (for example, by locks or passwords for the	See above	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	authorized persons) .		
6.2.11.8	Principles relating to manual control	-	-
	These are as follows.	See below	Pass
	a) Manual control devices shall be designed and located according to the relevant ergonomic principles given in 6.2.8, item f).	See related clause	Pass
	b) A stop control device shall be placed near each start control device. Where the start/stop function is performed by means of a hold-to-run control, a separate stop control device shall be provided when a risk can result from the hold-to-run control device failing to deliver a stop command when released.	Stop control device is placed near each start control device	Pass
	c) Manual controls shall be located out of reach of the danger zones (see IEC 61310-3), except for certain controls where, of necessity, they are located within a danger zone, such as emergency stop or teach pendant.	All manual controls are located out of reach of the danger zone.	Pass
	d) Whenever possible, control devices and control positions shall be located so that the operator is able to observe the working area or hazard zone.	Operator can observe the working area from the control position	Pass
	1) The driver of a ride-on mobile machine shall be able to actuate all control devices required to operate the machine from the driving position, except for functions which can be controlled more safely from other positions.	Not this kind of machine.	N/A
	2) On machinery intended for lifting persons, controls for lifting and lowering and, if appropriate, for moving the carrier shall generally be located in the carrier. If safe operation requires controls to be situated outside the carrier, the operator in the carrier shall be provided with the means of preventing hazardous movements.	Not this kind of machine.	N/A
	e) If it is possible to start the same hazardous element by means of several controls, the control circuit shall be so arranged that only one control is effective at a given time. This applies especially to machines which can be manually controlled by means of, among others, a portable control unit (such as a teach pendant), with which the operator can enter danger zones.	no this kind of situation	N/A
	f) Control actuators shall be designed or guarded so that their effect, where a risk is involved, cannot occur without intentional operation (see ISO 9355- 1, ISO 9355-3 and ISO 447).	All the hazards have been guarded.	Pass
	g) For machine functions whose safe operation depends on permanent, direct control by the operator, measures shall be implemented to ensure the presence of the operator at the control position (for example, by the design and location of control devices).	Not depends on operator.	N/A
	h) For cableless control, an automatic stop shall be performed when correct control signals are	No cableless control used	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	not received, including loss of communication (see IEC 60204- 1).		
6.2.11.9	Control mode for setting, teaching, process changeover, fault- finding, cleaning or maintenance	-	-
	Where, for setting, teaching, process changeover, fault-finding, cleaning or maintenance of machinery, a guard has to be displaced or removed and/or a protective device has to be disabled, and where it is necessary for the purpose of these operations for the machinery or part of the machinery to be put into operation, the safety of the operator shall be achieved using a specific control mode which simultaneously	For this kind of mode, the power to machine shall cut off or no need displaced safety protective device.	N/A
	a) disables all other control modes,	See above	N/A
	b) permits operation of the hazardous elements only by continuous actuation of an enabling device, a two-hand control device or a hold- to- run control device,	See above	N/A
	c) permits operation of the hazardous elements only in reduced risk conditions (for example, reduced speed, reduced power/force, step- by- step, for example, with a limited movement control device) , and	See above	N/A
	d) prevents any operation of hazardous functions by voluntary or involuntary action on the machine's sensors.	See above	N/A
	NOTE For some special machinery other protective measures can be appropriate.	noted	N/A
	This control mode shall be associated with one or more of the following measures:	See above	N/A
	– restriction of access to the danger zone as far as possible;	See above	N/A
	– emergency stop control within immediate reach of the operator;	See above	N/A
	– portable control unit (teach pendant) and/or local controls (allowing sight of the controlled elements).	See above	N/A
	See IEC 60204-1.	See above	N/A
6.2.11.10	Selection of control and operating modes	-	-
	If machinery has been designed and built to allow for its use in several control or operating modes requiring different protective measures and/or work procedures (for example, to allow for adjustment, setting, maintenance, inspection), it shall be fitted with a mode selector which can be locked in each position. Each position of the selector shall be clearly identifiable and shall exclusively allow one control or operating mode.	Key switch provided for setting use.	Pass
	The selector may be replaced by another selection means which restricts the use of certain functions of the machinery to certain categories of operators (for example, access	No this kind of function.	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	codes for certain numerically controlled functions) .		
6.2.11.11	Applying measures to achieve electromagnetic compatibility (EMC)	Covered by EMC directive	N/A
	For guidance on electromagnetic compatibility, see IEC 60204- 1 and IEC 61000-6.	Covered by EMC directive	N/A
6.2.11.12	Provision of diagnostic systems to aid fault- finding	-	-
	Diagnostic systems to aid fault-finding should be included in the control system so that there is no need to disable any protective measure.	No need to disable any protective measure	Pass
	NOTE Such systems not only improve availability and maintainability of machinery, they also reduce the exposure of maintenance staff to hazards.	noted	Pass
6.2.12	Minimizing probability of failure of safety functions	-	-
6.2.12.1	General	-	-
	Safety of machinery is not only dependent on the reliability of the control systems but also on the reliability of all parts of the machine.	considered	Pass
	The continued operation of the safety functions is essential for the safe use of the machine. This can be achieved by the measures given in 6.2.12.2 to 6.2.12.4.	See related clause.	Pass
6.2.12.2	Use of reliable components	-	-
	“ Reliable components” means components which are capable of withstanding all disturbances and stresses associated with the usage of the equipment in the conditions of intended use (including the environmental conditions), for the period of time or the number of operations fixed for the use, with a low probability of failures generating a hazardous malfunctioning of the machine. Components shall be selected taking into account all factors mentioned above (see also 6.2.13).	All safety function component has Passed CE	Pass
	NOTE 1 “Reliable components”is not a synonym for “well-tried components”(see ISO 13849- 1:2006, 6.2.4).		Pass
	NOTE 2 Environmental conditions for consideration include impact, vibration, cold, heat, moisture, dust, corrosive and/or abrasive substances, static electricity and magnetic and electric fields. Disturbances which can be generated by those conditions include insulation failures and temporary or permanent failures in the function of control system components.	noted	Pass
6.2.12.3	Use of “ oriented failure mode” components	-	-
	“Oriented failure mode” components or systems are those in which the predominant failure mode is known in advance and which can be used so that the effect of such a failure on the machine function can be predicted.	No need according to risk assessment	N/A
	NOTE In some cases, it will be necessary to	noted	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	take additional measures to limit the negative effects of such a failure.		
	The use of such components should always be considered, particularly in cases where redundancy (see 6.2.12.4) is not employed.	noted	N/A
6.2.12.4	Duplication (or redundancy) of components or subsystems	-	-
	In the design of safety-related parts of the machine, duplication (or redundancy) of components may be used so that, if one component fails, another component or components continue to perform the respective function(s), thereby ensuring that the safety function remains available.	No need.	N/A
	In order to allow the proper action to be initiated, component failure shall be detected by automatic monitoring (see 6.2.11.6) or in some circumstances by regular inspection, provided that the inspection interval is shorter than the expected lifetime of the components.	No need.	N/A
	Diversity of design and/or technology can be used to avoid common cause failures (for example, from electromagnetic disturbance) or common mode failures.	No need.	N/A
6.2.13	Limiting exposure to hazards through reliability of equipment	-	-
	Increased reliability of all component parts of machinery reduces the frequency of incidents requiring intervention, thereby reducing exposure to hazards.	Considered	Pass
	This applies to power systems (operative part, see Annex A) as well as to control systems, and to safety functions as well as to other functions of machinery.	Applied	Pass
	Safety-related components (for example, certain sensors) of known reliability shall be used.	Applied	Pass
	The elements of guards and of protective devices shall be especially reliable, as their failure can expose persons to hazards, and also because poor reliability would encourage attempts to defeat them.	Comply with the requirement	Pass
6.2.14	Limiting exposure to hazards through mechanization or automation of loading (feeding) / unloading (removal) operations	--	-
	Mechanization and automation of machine loading/unloading operations and, more generally, of handling operations — of workpieces, materials or substances — limits the risk generated by these operations by reducing the exposure of persons to hazards at the operating points.	Loading and unloading manually	N/A
	Automation can be achieved by, for example, robots, handling devices, transfer mechanisms	See above	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	and air-blast equipment. Mechanization can be achieved by, for example, feeding slides, push-rods and hand-operated indexing tables.		
	While automatic feeding and removal devices have much to offer in preventing accidents to machine operators, they can create danger when any faults are being corrected. Care shall be taken to ensure that the use of these devices does not introduce further hazards, such as trapping or crushing, between the devices and parts of the machine or workpieces/materials being processed. Suitable safeguards (see 6.3) shall be provided if this cannot be ensured.	See above	N/A
	Automatic feeding and removal devices with their own control systems and the control system of the associated machine shall be interconnected after thorough study of how all safety functions are performed in all the control and operation modes of the entire equipment.	See above	N/A
6.2.15	Limiting exposure to hazards through location of setting and maintenance points outside danger zones	No need according to risk assessment	N/A
	The need for access to danger zones shall be minimized by locating maintenance, lubrication and setting points outside these zones.	See above	N/A
6.3	Safeguarding and complementary protective measures	-	-
6.3.1	General	-	-
	Guards and protective devices shall be used to protect persons whenever an inherently safe design measure does not reasonably make it possible either to remove hazards or to sufficiently reduce risks. Complementary protective measures involving additional equipment (for example, emergency stop equipment) may have to be implemented.	Fixed guards are provided.	Pass
	NOTE The different kinds of guards and protective devices are defined in 3.27 and 3.28.	noted	Pass
	Certain safeguards may be used to avoid exposure to more than one hazard.	Fixed guards are provided.	Pass
6.3.2	Selection and implementation of guards and protective devices	-	-
6.3.2.1	General	-	-
	This subclause gives guidelines for the selection and the implementation of guards and protective devices the primary purpose of which is to protect persons against hazards generated by moving parts, according to the nature of those parts (see Figure 4) and to the need for access to the danger zone(s).	The guards have been selected according to the subclause.	Pass
	The exact choice of a safeguard for a particular machine shall be made on the basis of the risk assessment for that machine.	See risk assessment report.	Pass
	In selecting an appropriate safeguard for a particular type of machinery or hazard zone, it	Fixed guards are used.	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	shall be borne in mind that a fixed guard is simple and shall be used where the access of an operator into a danger zone is not required during the normal operation (operation without malfunction) of the machinery.		
	As the need for frequency of access increases, this inevitably leads to the fixed guard not being replaced. This requires the use of an alternative protective measure (movable interlocking guard, sensitive protective equipment).	No this kind of situation	N/A
	A combination of safeguards can sometimes be required. For example, where, in conjunction with a fixed guard, a mechanical loading (feeding) device is used to feed a workpiece into a machine, thereby removing the need for access to the primary hazard zone, a trip device can be required to protect against the secondary drawing-in or shearing hazard between the mechanical loading (feeding) device, when reachable, and the fixed guard.	No this kind of situation	N/A
	Consideration shall be given to the enclosure of control positions or intervention zones to provide combined protection against several hazards including	No this kind of hazard	N/A
	a) hazards from falling or ejected objects, using, for example, protection in the form of a falling object protection structure (FOPS),	No this kind of hazard	N/A
	b) emission hazards (protection against noise, vibration, radiation, substances hazardous to health, etc.),	No this kind of hazard	N/A
	c) hazards due to the environment (protection against heat, cold, foul weather, etc.),	No this kind of hazard	N/A
	d) hazards due to tipping over or rolling over of machinery, using, for example, protection in the form of roll-over or tip-over protection structures (ROPS and TOPS).	No this kind of hazard	N/A
	The design of enclosed work stations, such as cabs and cabins, shall take into account ergonomic principles concerning visibility, lighting, atmospheric conditions, access, posture.	No enclosed work station provided on this machine.	N/A
6.3.2.2	Where access to the hazard zone is not required during normal operation	-	-
	Where access to the hazard zone is not required during normal operation of the machinery, safeguards should be selected from the following:	See below	Pass
	a) fixed guards (see also ISO 14120);	Fixed guards are provided.	Pass
	b) interlocking guards with or without guard locking (see also 6.3.3.2.3, ISO 14119 and ISO 14120);	No this kind of situation	N/A
	c) self-closing guards (see ISO 14120:2002, 3.3.2);	No this kind of guard used	N/A
	d) sensitive protective equipment, such as electrosensitive protective equipment (see IEC	Not used	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	61496) or pressure-sensitive protective devices (see ISO 13856).		
6.3.2.3	Where access to the hazard zone is required during normal operation	-	-
	Where access to the hazard zone is required during normal operation of the machinery, safeguards should be selected from the following:	No this kind of situation	N/A
	a) interlocking guards with or without guard locking (see also ISO 14119, ISO 14120 and 6.3.3.2.3 of this document);	Not used.	N/A
	b) sensitive protective equipment, such as electrosensitive protective equipment (see IEC 61496);	Not used.	N/A
	c) adjustable guards;	Not used.	N/A
	d) self-closing guards (see ISO 14120:2002, 3.3.2);	Not used.	N/A
	e) two-hand control devices (see ISO 13851);	Not used.	N/A
	f) interlocking guards with a start function (control guard) (see 6.3.3.2.5).	Not used.	N/A
6.3.2.4	Where access to the hazard zone is required for machine setting, teaching, process changeover, fault-finding, cleaning or maintenance	-	-
	As far as possible, machines shall be designed so that the safeguards provided for the protection of the production operator also ensure the protection of personnel carrying out setting, teaching, process changeover, fault-finding, cleaning or maintenance, without hindering them in the performance of their task . Such tasks shall be identified and considered in the risk assessment as parts of the use of the machine (see 5.2).	No this kind of situation	N/A
	NOTE Isolation and energy dissipation for machine shut-down (see 6.3.5.4, and also ISO 14118:2000, 4.1 and Clause 5) ensure the highest level of safety when carrying out tasks (especially maintenance and repair tasks) that do not require the machine to remain connected to its power supply.	No this kind of situation	N/A
6.3.2.5	Selection and implementation of sensitive protective equipment	-	-
6.3.2.5.1	Selection	-	-
	Due to the great diversity of the technologies on which their detection function is based, all types of sensitive protective equipment are far from being equally suitable for safety applications. The following provisions are intended to provide the designer with criteria for selecting, for each application, the most suitable device(s).	No sensitive protective equipment used on this machine.	N/A
	Types of sensitive protective equipment include	No sensitive protective equipment used on this machine.	N/A
	– light curtains,	No sensitive protective	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
		equipment used on this machine.	
	– scanning devices, for example, laser scanners,	No sensitive protective equipment used on this machine.	N/A
	– pressure-sensitive mats, and	No sensitive protective equipment used on this machine.	N/A
	– trip bars, trip wires.	No sensitive protective equipment used on this machine.	N/A
	Sensitive protective equipment can be used	No sensitive protective equipment used on this machine.	N/A
	– for tripping purposes,	No sensitive protective equipment used on this machine.	N/A
	– for presence sensing,	No sensitive protective equipment used on this machine.	N/A
	– for both tripping and presence sensing, or	No sensitive protective equipment used on this machine.	N/A
	– to re-initiate machine operation — a practice subject to stringent conditions.	No sensitive protective equipment used on this machine.	N/A
	NOTE Some types of sensitive protective equipment can be unsuitable either for presence sensing or for tripping purposes.	No sensitive protective equipment used on this machine.	N/A
	The following characteristics of the machinery, among others, can preclude the sole use of sensitive protective equipment:	No sensitive protective equipment used on this machine.	N/A
	– tendency for the machinery to eject materials or component parts;	No sensitive protective equipment used on this machine.	N/A
	– necessity to guard against emissions (noise, radiation, dust, etc.);	No sensitive protective equipment used on this machine.	N/A
	– erratic or excessive machine stopping time;	No sensitive protective equipment used on this machine.	N/A
	– inability of a machine to stop part-way through a cycle.	No sensitive protective equipment used on this machine.	N/A
6.3.2.5.2	Implementation	-	-
	Consideration should be given to	-	-
	a) the size, characteristics and positioning of the detection zone (see ISO 13855, which deals with the positioning of some types of sensitive protective equipment),	No sensitive protective equipment used on this machine.	N/A
	b) the reaction of the device to fault conditions (see IEC 61496 for electrosensitive protective equipment),	No sensitive protective equipment used on this machine.	N/A
	c) the possibility of circumvention, and	No sensitive protective equipment used on this	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
		machine.	
	d) detection capability and its variation over the course of time (as a result, for example, of its susceptibility to different environmental conditions such as the presence of reflecting surfaces, other artificial light sources and sunlight or impurities in the air).	No sensitive protective equipment used on this machine.	N/A
	NOTE 1 IEC 61496 defines the detection capability of electrosensitive protective equipment.	No sensitive protective equipment used on this machine.	N/A
	Sensitive protective equipment shall be integrated in the operative part and associated with the control system of the machine so that	No sensitive protective equipment used on this machine.	N/A
	– a command is given as soon as a person or part of a person is detected,	No sensitive protective equipment used on this machine.	N/A
	– the withdrawal of the person or part of a person detected does not, by itself, restart the hazardous machine function(s), and therefore the command given by the sensitive protective equipment is maintained by the control system until a new command is given,	No sensitive protective equipment used on this machine.	N/A
	– restarting the hazardous machine function(s) results from the voluntary actuation by the operator of a control device placed outside the hazard zone, where this zone can be observed by the operator,	No sensitive protective equipment used on this machine.	N/A
	– the machine cannot operate during interruption of the detection function of the sensitive protective equipment, except during muting phases, and	No sensitive protective equipment used on this machine.	N/A
	– the position and the shape of the detection field prevents, possibly together with fixed guards, a person or part of a person from entering or being present in the hazard zone without being detected.	No sensitive protective equipment used on this machine.	N/A
	NOTE 2 Muting is the temporary automatic suspension of a safety function(s) by safety-related parts of the control system (see ISO 13849- 1).	No sensitive protective equipment used on this machine.	N/A
	For detailed consideration of the fault behaviour of, for example, active optoelectronic protective devices, IEC 61496 should be taken into account.	No sensitive protective equipment used on this machine.	N/A
6.3.2.5.3	Additional requirements for sensitive protective equipment when used for cycle initiation	-	-

	In this exceptional application, the starting of the machine cycle is initiated by the withdrawal of a person or of the detected part of a person from the sensing field of the sensitive protective equipment, without any additional start command, hence deviating from the general requirement given in the second point of the dashed list in 6.3.2.5.2, above. After switching on the power supply, or when the machine has	No sensitive protective equipment used on this machine.	N/A
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EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	been stopped by the tripping function of the sensitive protective equipment, the machine cycle shall be initiated only by voluntary actuation of a start control.		
	Cycle initiation by sensitive protective equipment shall be subject to the following conditions:	No sensitive protective equipment used on this machine.	N/A
	a) only active optoelectronic protective devices (AOPDs) complying with IEC 61496 series shall be used;	No sensitive protective equipment used on this machine.	N/A
	b) the requirements for an AOPD used as a tripping and presence-sensing device (see IEC 61496) are satisfied — in particular, location, minimum distance (see ISO 13855), detection capability, reliability and monitoring of control and braking systems;	No sensitive protective equipment used on this machine.	N/A
	c) the cycle time of the machine is short and the facility to re-initiate the machine upon clearing of the sensing field is limited to a period commensurate with a single normal cycle;	No sensitive protective equipment used on this machine.	N/A
	d) entering the sensing field of the AOPD(s) or opening interlocking guards is the only way to enter the hazard zone;	No sensitive protective equipment used on this machine.	N/A
	e) if there is more than one AOPD safeguarding the machine, only one of the AOPDs is capable of cycle re-initiation;	No sensitive protective equipment used on this machine.	N/A
	f) with regard to the higher risk resulting from automatic cycle initiation, the AOPD and the associated control system comply with a higher safety-related performance than under normal conditions.	No sensitive protective equipment used on this machine.	N/A
	NOTE 1 The hazard zone as referred to in d) is any zone where the hazardous function (including ancillary equipment and transmission elements) is initiated by clearing of the sensing field.	No sensitive protective equipment used on this machine.	N/A
	NOTE 2 See also IEC/TS 62046.	No sensitive protective equipment used on this machine.	N/A
6.3.2.6	Protective measures for stability	-	-
	If stability cannot be achieved by inherently safe design measures such as weight distribution (see 6.2.6), it shall be maintained by the use of protective measures such as	By inherently safe design.	Pass
	– anchorage bolts,	provided	Pass
	– locking devices,	Not use	N/A
	– movement limiters or mechanical stops,	Not use	N/A
	– acceleration or deceleration limiters,	Not use	N/A
	– load limiters, and	Not use	N/A
	– alarms warning of the approach to stability or tipping limits.	Not use	N/A
6.3.2.7	Other protective devices	-	-
	When a machine requires continuous control by the operator (for example, mobile machines, cranes) and an error of the operator can	No need to continuous control of this machine.	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	generate a hazardous situation, this machine shall be equipped with the necessary devices to enable the operation to remain within specified limits, in particular		
	– when the operator has insufficient visibility of the hazard zone,	See above	N/A
	– when the operator lacks knowledge of the actual value of a safety-related parameter (distance, speed, mass, angle, etc.), and	See above	N/A
	– when hazards can result from operations other than those controlled by the operator.	See above	N/A
	The necessary devices include	See above	N/A
	a) devices for limiting parameters of movement (distance, angle, velocity, acceleration),	See above	N/A
	b) overloading and moment limiting devices,	See above	N/A
	c) devices to prevent collisions or interference with other machines,	See above	N/A
	d) devices for preventing hazards to pedestrian operators of mobile machinery or other pedestrians,	See above	N/A
	e) torque limiting devices, and breakage points to prevent excessive stress of components and assemblies,	See above	N/A
	f) devices for limiting pressure or temperature,	See above	N/A
	g) devices for monitoring emissions,	See above	N/A
	h) devices to prevent operation in the absence of the operator at the control position,	See above	N/A
	i) devices to prevent lifting operations unless stabilizers are in place,	See above	N/A
	j) devices to limit inclination of the machine on a slope, and	See above	N/A
	k) devices to ensure that components are in a safe position before travelling.	See above	N/A
	Automatic protective measures triggered by such devices that take operation of the machinery out of the control of the operator (for example, automatic stop of hazardous movement) should be preceded or accompanied by a warning signal to enable the operator to take appropriate action (see 6.4.3).	See above	N/A
6.3.3	Requirements for design of guards and protective devices	-	-
6.3.3.1	General requirements	-	-
	Guards and protective devices shall be designed to be suitable for the intended use, taking into account mechanical and other hazards involved. Guards and protective devices shall be compatible with the working environment of the machine and designed so that they cannot be easily defeated. They shall provide the minimum possible interference with activities during operation and other phases of machine life, in order to reduce any incentive to defeat them.	Fixed guards have been designed according to this clause.	Pass

	NOTE For additional information, see ISO	ISO 14120 has been	Pass
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EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	14120, ISO 13849- 1, ISO 13851, ISO 14119, ISO 13856, IEC 61496 and IEC 62061.	considered.	
	Guards and protective devices shall	See below	Pass
	a) be of robust construction,	Considered during design.	Pass
	b) not give rise to any additional hazard,	No additional hazard exists.	Pass
	c) not be easy to bypass or render non- operational,	Comply with the requirement	Pass
	d) be located at an adequate distance from the danger zone (see ISO 13855 and ISO 13857),	Comply with the requirement	Pass
	e) cause minimum obstruction to the view of the production process, and	Not obstruction to the view of production process.	Pass
	f) enable essential work to be carried out for the installation and/or replacement of tools and for maintenance by allowing access only to the area where the work has to be carried out — if possible, without the guard having to be removed or protective device having to be disabled.	Comply with the requirement.	Pass
	For openings in the guards, see ISO 13857.	considered	Pass
6.3.3.2	Requirements for guards	-	-
6.3.3.2.1	Functions of guards	-	-
	The functions that guards can achieve are	See below	Pass
	– prevention of access to the space enclosed by the guard, and/or	Fixed guards are provided for this function	Pass
	– containment/capture of materials, workpieces, chips, liquids which can be ejected or dropped by the machine, and reduction of emissions (noise, radiation, hazardous substances such as dust, fumes, gases) that can be generated by the machine.	Fixed guards are provided for this function	Pass
	Additionally, they could need to have particular properties relating to electricity, temperature, fire, explosion, vibration, visibility (see ISO 14120) and operator position ergonomics (for example, usability, operator's movements, postures, repetitive movements) .	Fixed guards are provided for this function	Pass
6.3.3.2.2	Requirements for fixed guards	-	-
	Fixed guards shall be securely held in place either	Fastener provided	Pass
	– permanently (for example by welding) , or	By fastener	N/A
	– by means of fasteners (screws, nuts) making removal/opening impossible without using tools; they should not remain closed without their fasteners (see ISO 14120).	Screws and nuts are provided to fix the guards.	Pass
	NOTE A fixed guard can be hinged to assist in its opening.	Hinge is provided.	Pass
6.3.3.2.3	Requirements for movable guards	-	-
	Movable guards which provide protection against hazards generated by moving transmission parts shall	No this kind of situation	N/A
	a) as far as possible when open remain fixed to the machinery or other structure (generally by means of hinges or guides), and	See above.	Pass
	b) be interlocking (with guard locking when necessary) (see ISO 14119).	See above.	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	Movable guards against hazards generated by non-transmission moving parts shall be designed and associated with the machine control system so that	See above.	Pass
	– moving parts cannot start up while they are within the operator's reach and the operator cannot reach moving parts once they have started up, with this able to be achieved by interlocking guards, with guard locking when necessary,	See above.	Pass
	– they can be adjusted only by an intentional action, such as the use of a tool or a key, and	See above.	Pass
	– the absence or failure of one of their components either prevents starting of the moving parts or stops them, with this able to be achieved by automatic monitoring (see 6.2.11.6).	See above.	Pass
	See Figure 4 and ISO 14119.	See above.	Pass
6.3.3.2.4	Requirements for adjustable guards	-	-
	Adjustable guards may only be used where the hazard zone cannot for operational reasons be completely enclosed.	No this kind of situation.	N/A
	Manually adjustable guards shall be	See above	N/A
	– designed so that the adjustment remains fixed during a given operation, and	See above	N/A
	– readily adjustable without the use of tools.	See above	N/A
6.3.3.2.5	Requirements for interlocking guards with a start function (control guards)	-	-
	An interlocking guard with a start function may only be used provided that	No this kind of situation.	N/A
	a) all requirements for interlocking guards are satisfied (see ISO 14119),	No this kind of situation.	N/A
	b) the cycle time of the machine is short,	No this kind of situation.	N/A
	c) the maximum opening time of the guard is preset to a low value (for example, equal to the cycle time) and, when this time is exceeded, the hazardous function(s) cannot be initiated by the closing of the interlocking guard with a start function and resetting is necessary before restarting the machine,	No this kind of situation.	N/A
	d) the dimensions or shape of the machine do not allow a person, or part of a person, to stay in the hazard zone or between the hazard zone and the guard while the guard is closed (see ISO 14120),	No this kind of situation.	N/A
	e) all other guards, whether fixed (removable type) or movable, are interlocking guards,	No this kind of situation.	N/A
	f) the interlocking device associated with the interlocking guard with a start function is designed such that — for example, by duplication of position detectors and use of automatic monitoring (see 6.2.11.6) — its failure cannot lead to an unintended/unexpected start-up, and	No this kind of situation.	N/A
	g) the guard is securely held open (for	No this kind of situation.	N/A

	example,		
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EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	by a spring or counterweight) such that it cannot initiate a start while falling by its own weight.		
6.3.3.2.6	Hazards from guards	-	-
	Care shall be taken to prevent hazards which could be generated by	See below	Pass
	– the guard construction (sharp edges or corners, material, noise emission, etc.),	No this kind of risk	Pass
	– the movements of the guards (shearing or crushing zones generated by power-operated guards and by heavy guards which are liable to fall).	No this kind of risk	Pass
6.3.3.3	Technical characteristics protective of devices	-	-
	Protective devices shall be selected or designed and connected to the control system such that correct implementation of their safety function(s) is ensured.	Considered during design	Pass
	Protective devices shall be selected on the basis of their having met the appropriate product standard (for example, IEC 61496 for active optoelectronic protective devices) or shall be designed according to one or several of the principles formulated in ISO 13849- 1 or IEC 62061.	Fixed guards comply with EN 953	Pass
	Protective devices shall be installed and connected to the control system so that they cannot be easily defeated.	Comply with the requirement	pass
6.3.3.4	Provisions for alternative types of safeguards	-	-
	Provisions should be made to facilitate the fitting of alternative types of safeguards on machinery where it is known that it will be necessary to change the safeguards because of the range of work to be carried out.	No this kind of situation	N/A
6.3.4	Safeguarding to reduce emissions	-	-
6.3.4.1	General	-	-
	If the measures for the reduction of emissions at source specified in 6.2.2.2 are not adequate, the machine shall be provided with additional protective measures (see 6.3.4.2 to 6.3.4.5).	See below	Pass
6.3.4.2	Noise	-	-
	Additional protective measures against noise include	See below	Pass
	– enclosures (see ISO 15667),		Pass
	– screens fitted to the machine, and	Not used	N/A
	– silencers (see ISO 14163).	Not used	N/A
6.3.4.3	Vibration	-	-
	Additional protective measures against vibration include	Not used	N/A
	– vibration isolators, such as damping devices placed between the source and the exposed person,	Not used	N/A
	– resilient mounting, and	Not used	N/A
	– suspended seats.	Not used	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	For measures for vibration isolation of stationary industrial machinery see EN 1299.	Not used	N/A
6.3.4.4	Hazardous substances	-	-
	Additional protective measures against hazardous substances include	See below	N/A
	– encapsulation of the machine (enclosure with negative pressure),	Not used	N/A
	– local exhaust ventilation with filtration,	Not used	N/A
	– wetting with liquids, and	Not used	N/A
	– special ventilation in the area of the machine (air curtains, cabins for operators).	Not used	N/A
	See ISO 14123- 1.	Not used	N/A
6.3.4.5	Radiation	-	-
	Additional protective measures against radiation include	See below	N/A
	– use of filtering and absorption, and	Covered by EMC	N/A
	– use of attenuating screens or guards.	Covered by EMC	N/A
6.3.5	Complementary protective measures	-	-
6.3.5.1	General	-	-
	Protective measures which are neither inherently safe design measures, nor safeguarding (implementation of guards and/or protective devices), nor information for use, could have to be implemented as required by the intended use and the reasonably foreseeable misuse of the machine. Such measures include, but are not limited to, those dealt with in 6.3.5.2 to 6.3.5.6.	Comply with the requirement	Pass
6.3.5.2	Components and elements to achieve emergency stop function	-	-
	If, following a risk assessment, a machine needs to be fitted with components and elements to achieve an emergency stop function for enabling actual or impending emergency situations to be averted, the following requirements apply:	No this kind of situation.	N/A
	– the actuators shall be clearly identifiable, clearly visible and readily accessible;	No this kind of situation.	N/A
	– the hazardous process shall be stopped as quickly as possible without creating additional hazards, but if this is not possible or the risk cannot be reduced, it should be questioned whether implementation of an emergency stop function is the best solution;	No this kind of situation.	N/A
	– the emergency stop control shall trigger or permit the triggering of certain safeguard movements where necessary.	No this kind of situation.	N/A
	NOTE For more detailed provisions, see ISO 13850.	No this kind of situation.	N/A
	Once active operation of the emergency stop device has ceased following an emergency stop command, the effect of this command shall be sustained until it is reset. This reset shall be possible only at the location where the emergency stop command has been initiated.	No this kind of situation.	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	The reset of the device shall not restart the machinery, but shall only permit restarting.		
	More details for the design and selection of electrical components and elements to achieve the emergency stop function are provided in IEC 60204.	No this kind of situation.	N/A
6.3.5.3	Measures for the escape and rescue of trapped persons	-	-
	Measures for the escape and rescue of trapped persons may consist, among others, of	No this kind of risk	N/A
	– escape routes and shelters in installations generating operator- trapping hazards,	No this kind of risk	N/A
	– arrangements for moving some elements by hand, after an emergency stop,	No this kind of risk	N/A
	– arrangements for reversing the movement of some elements,	No this kind of risk	N/A
	– anchorage points for descender devices,	No this kind of risk	N/A
	– means of communication to enable trapped operators to call for help.	No this kind of risk	N/A
6.3.5.4	Measures for isolation energy and dissipation	-	-
	Machines shall be equipped with the technical means to achieve isolation from power supply(ies) and dissipation of stored energy by means of the following actions:	Main switch has been provided for this kind of application	Pass
	a) isolating (disconnecting, separating) the machine (or defined parts of the machine) from all power supplies;	Main switch has been provided for this kind of application	Pass
	b) locking (or otherwise securing) all the isolating units in the isolating position;	The main switch can be locked by pad lock .	Pass
	c) dissipating or, if this is not possible or practicable, restraining (containing) any stored energy which can give rise to a hazard;	No hazard was found.	N/A
	d) verifying, by means of safe working procedures, that the actions taken according to a), b) and c) above have produced the desired effect.	considered	Pass
	See ISO 14118:2000, Clause 5, and IEC 60204- 1:2005, 5.5 and 5.6.	The requirements have been considered.	Pass
6.3.5.5	Provisions for easy and safe handling of machines and their heavy component parts	-	-
	Machines and their component parts which cannot be moved or transported by hand shall be provided or be capable of being provided with suitable attachment devices for transport by means of lifting gear.	Lifting gear has been provided, see manual.	Pass
	These attachments may be, among others,	See below	Pass
	– standardized lifting appliances with slings, hooks, eyebolts, or tapped holes for appliance fixing,	Tapped holes are provided.	Pass
	– appliances for automatic grabbing with a lifting hook when attachment is not possible from the ground,	No this kind of situation	N/A
	– fork locating devices for machines to be transported by a lift truck,	Not design for lifting by fork lift.	N/A

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	– lifting and stowing gear and appliances integrated into the machine.	Comply with the requirement	Pass
	Parts of machinery which can be removed manually in operation shall be provided with means for their safe removal and replacement.	Comply with the requirement	Pass
	See also 6.4.4 c), item 3).	See related clause.	Pass
6.3.5.6	Measures for safe access to machinery	-	-
	Machinery shall be so designed as to enable operation and all routine tasks relating to setting and/or maintenance to be carried out as far as possible by a person remaining at ground level.	All the setting and maintenance can be carried out at ground level	Pass
	Where this is not possible, machines shall have built-in platforms, stairs or other facilities to provide safe access for those tasks; however, care should be taken to ensure that such platforms or stairs do not give access to danger zones of machinery.	No this kind of situation	N/A
	The walking areas shall be made from materials which remain as slip resistant as practicable under working conditions and, depending on the height from the ground, shall be provided with suitable guard-rails (see ISO 14122-3).	No this kind of situation	N/A
	In large automated installations, particular attention shall be given to safe means of access, such as walkways, conveyor bridges or crossover points.	No this kind of situation	N/A
	Means of access to parts of machinery located at height shall be provided with collective means of protection against falls (for example, guard-rails for stairways, stepladders and platforms and/or safety cages for ladders). As necessary, anchorage points for personal protective equipment against falls from height shall also be provided (for example, in carriers of machinery for lifting persons or with elevating control stations).	No this kind of situation	N/A
	Openings shall, whenever possible, open towards a safe position. They shall be designed to prevent hazards due to unintended opening.	No this kind of situation	N/A
	The necessary aids for access shall be provided (steps, handholds, etc.). Control devices shall be designed and located to prevent their being used as aids for access.	No this kind of situation	N/A
	When machinery for lifting goods and/or persons includes landings at fixed levels, these shall be equipped with interlocking guards for preventing falls when the platform is not present at a level. Movement of the lifting platform shall be prevented while the guards are open.	Not for such use	N/A
	For detailed provisions see ISO 14122.	No this kind of situation	N/A
6.4	Information for use	-	-
6.4.1	General requirements	-	-
6.4.1.1	Drafting information for use is an integral part of the design of a machine (see Figure 2). Information for use consists of communication	Appropriate information has provided.	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	links, such as texts, words, signs, signals, symbols or diagrams, used separately or in combination to convey information to the user. Information for use is intended for professional and/or non-professional users.		
	NOTE See also IEC 62079 for structuring and presentation of information for use.	noted	Pass
6.4.1.2	Information shall be provided to the user about the intended use of the machine, taking into account, notably, all its operating modes.	Appropriate information has provided.	Pass
	The information shall contain all directions required to ensure safe and correct use of the machine. With this in view, it shall inform and warn the user about residual risk.	Appropriate information has provided.	Pass
	The information shall indicate, as appropriate,	See below	Pass
	– the need for training,	No need	N/A
	– the need for personal protective equipment, and	No need	N/A
	– the possible need for additional guards or protective devices (see Figure 2, Footnote d).	No need	N/A
	It shall not exclude uses of the machine that can reasonably be expected from its designation and description and shall also warn about the risk which would result from using the machine in other ways than the ones described in the information, especially considering its reasonably foreseeable misuse.	Appropriate information has provided.	Pass
6.4.1.3	Information for use shall cover, separately or in combination, transport, assembly and installation, commissioning, use of the machine (setting, teaching/programming or process changeover, operation, cleaning, fault-finding and maintenance) and, if necessary, dismantling, disabling and scrapping.	Appropriate information has provided.	Pass
6.4.2	Location and nature of information for use	-	-
	Depending on the risk, the time when the information is needed by the user and the machine design, it shall be decided whether the information — or parts thereof — are to be given	Appropriate information has provided.	Pass
	a) in/on the machine itself (see 6.4.3 and 6.4.4),	See related clause	Pass
	b) in accompanying documents (in particular instruction handbook, see 6.4.5),	Manual is provided.	Pass
	c) on the packaging,	Provided.	Pass
	d) by other means such as signals and warnings outside the machine.	Labels are provided	Pass
	Standardized phrases shall be considered where important messages such as warnings are given (see also IEC 62079).	Comply with the requirement	Pass
6.4.3	Signals and warning devices	-	-

	Visual signals, such as flashing lights and audible signals such as sirens may be used to warn of an impending hazardous event such as machine start-up or overspeed. Such signals may also be used to warn the operator before	Not used	N/A
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EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	the triggering of automatic protective measures (see 6.3.2.7).		
	It is essential that these signals	See above	N/A
	a) be emitted before the occurrence of the hazardous event,	See above	N/A
	b) be unambiguous,	See above	N/A
	c) be clearly perceived and differentiated from all other signals used, and	See above	N/A
	d) be clearly recognized by the operator and other persons.	See above	N/A
	The warning devices shall be designed and located such that checking is easy. The information for use shall prescribe regular checking of warning devices.	See above	N/A
	The attention of designers is drawn to the possibility of “sensorial saturation”, which can result from too many visual and/or acoustic signals and which can also lead to defeating the warning devices.	See above	N/A
	NOTE Consultation of the user on this subject is often necessary.	See above	N/A
6.4.4	Markings, signs (pictograms) and written warnings	-	-
	Machinery shall bear all markings which are necessary	Appropriate markings are provided.	Pass
	a) for its unambiguous identification, including at least	provided	Pass
	1) the name and address of the manufacturer,	provided	Pass
	2) the designation of series or type, and	provided	Pass
	3) the serial number, if any,	provided	Pass
	b) in order to indicate its compliance with mandatory requirements, comprising	provided	Pass
	1) marking, and	provided	Pass
	2) written indications, such as the authorized representative of the manufacturer, designation of the machinery, year of construction, and intended use in potentially explosive atmospheres),	Designation of the machinery, year of construction is provide.	Pass
	c) for its safe use, for example,	See below	Pass
	1) maximum speed of rotating parts,2) maximum diameter of tools,3) mass (in kilograms) of the machine itself and/or of removable parts,4) maximum working load,5) necessity of wearing personal protective equipment,6) guard adjustment data, and7) frequency of inspection.	Appropriate markings are provided.	Pass
	Information printed directly on the machine should be permanent and remain legible throughout the expected life of the machine.	Comply with the requirement	Pass
	Signs or written warnings indicating only “ Danger” shall not be used.	No used	Pass
	Markings, signs and written warnings shall be readily understandable and unambiguous, especially as regards the part of the function(s) of the machine to which they are related.	Comply with the requirement.	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	Readily understandable signs (pictograms) should be used in preference to written warnings.		
	Signs and pictograms should only be used if they are understood in the culture in which the machinery is to be used.	Comply with the requirement.	Pass
	Written warnings shall be drawn up in the language(s) of the country in which the machine will be used for the first time and, on request, in the language(s) understood by operators.	No written warnings.	N/A
	NOTE In some countries the use of specific language(s) is covered by legal requirements.	No written warnings.	N/A
	Markings shall comply with recognized standards (for example, ISO 2972 or ISO 7000, for pictograms, symbols and colours in particular).	Comply with the requirement	Pass
	See IEC 60204-1 as regards marking of electrical equipment.	See EN 60204- 1 report.	Pass
	See ISO 4413 and ISO 4414 for hydraulic and pneumatic equipment.	Pneumatic equipment complies with the requirement.	Pass
6.4.5	Accompanying documents (in particular — instruction handbook)	-	-
6.4.5.1	Contents	-	-
	The instruction handbook or other written instructions (for example, on the packaging) shall contain, among others, the following:	See below	Pass
	a) information relating to transport, handling and storage of the machine, such as	See manual.	Pass
	1) storage conditions for the machine,	See manual .	Pass
	2) dimensions, mass value(s), position of the centre(s) of gravity, and	See manual.	Pass
	3) indications for handling (for example, drawings indicating application points for lifting equipment);	See manual.	Pass
	b) information relating to installation and commissioning of the machine, such as	See manual.	Pass
	1) fixing/anchoring and dampening of noise and vibration requirements,	See manual.	Pass
	2) assembly and mounting conditions,	See manual .	Pass
	3) space needed for use and maintenance,	See manual .	Pass
	4) permissible environmental conditions (for example, temperature, moisture, vibration, electromagnetic radiation),	See manual.	Pass
	5) instructions for connecting the machine to power supply (particularly on protection against electrical overloading),	See manual.	Pass
	6) advice on waste removal/disposal, and	See manual .	Pass
	7) if necessary, recommendations related to protective measures which have to be implemented by the user — for example, additional safeguards (see Figure 2, Footnote d), safety distances, safety signs and signals;	See manual.	Pass
	c) information relating to the machine itself, such as	See manual.	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	1) detailed description of the machine, its fittings, guards and/ or protective devices,	See manual.	Pass
	2) the comprehensive range of applications for which the machine is intended, including prohibited usages, if any, taking into account variations of the original machine if appropriate,	See manual.	Pass
	3) diagrams (especially schematic representation of safety functions) ,	See manual.	Pass
	4) data on noise and vibration generated by the machine, and on radiation, gases, vapours and dust emitted by it, with reference to the measuring methods (including measurement uncertainties) used,	See manual.	Pass
	5) technical documentation of electrical equipment (see IEC 60204), and	See manual.	Pass
	6) documents attesting that the machine complies with mandatory requirements;	See manual.	Pass
	d) information relating to the use of the machine, such as that related to or describing	See manual.	Pass
	1) intended use,	See manual .	Pass
	2) manual controls (actuators) ,	See manual .	Pass
	3) setting and adjustment,	See manual .	Pass
	4) modes and means for stopping (especially emergency stop) ,	See manual.	Pass
	5) risks which could not be eliminated by the protective measures implemented by the designer,	See manual.	Pass
	6) particular risks which can be generated by certain applications, by the use of certain fittings, and about specific safeguards necessary for such applications,	See manual.	Pass
	7) reasonably foreseeable misuse and prohibited applications,	See manual.	Pass
	8) fault identification and location, for repair and for restarting after an intervention, and	See manual.	Pass
	9) personal protective equipment needed to be used and the training that is required;	See manual.	Pass
	e) information for maintenance, such as	See manual .	Pass
	1) the nature and frequency of inspections for safety functions,	See manual.	Pass
	2) specification of the spare parts to be used when these can affect the health and safety of operators,	See manual.	Pass
	3) instructions relating to maintenance operations which require a definite technical knowledge or particular skills and hence need to be carried out exclusively by skilled persons (for example, maintenance staff, specialists) ,	See manual.	Pass
	4) instructions relating to maintenance actions (replacement of parts, etc.) which do not require specific skills and hence may be carried out by users (for example, operators), and	See manual.	Pass
	5) drawings and diagrams enabling maintenance personnel to carry out their task rationally (especially fault-finding tasks);	See manual.	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	f) information relating to dismantling, disabling and scrapping;	See manual.	Pass
	g) information for emergency situations, such as	See below	Pass
	1) the operating method to be followed in the event of accident or breakdown,	No this kind of risk	N/A
	2) the type of fire-fighting equipment to be used, and	No this kind of risk	N/A
	3) a warning of possible emission or leakage of hazardous substance(s) and, if possible, an indication of means for fighting their effects;	No this kind of risk	N/A
	h) maintenance instructions provided for skilled persons [item e) 3) above] and maintenance instructions provided for unskilled persons [item e) 4) above], that need to appear clearly separated from each other.	See manual.	Pass
6.4.5.2	Production of instruction handbook	-	-
	The following applies to the production and presentation of the instruction handbook .	See below	Pass
	a) The type font and size of print shall ensure the best possible legibility. Safety warnings and/or cautions should be emphasized by the use of colours, symbols and/or large print.	used	Pass
	b) The information for use shall be given in the language(s) of the country in which the machine will be used for the first time and in the original version. If more than one language is to be used, each should be readily distinguished from another, and efforts should be made to keep the translated text and relevant illustration together.	English	Pass
	NOTE In some countries the use of specific language(s) is covered by legal requirements.	Noted	Pass
	c) Whenever helpful to the understanding, text should be supported by illustrations. These illustrations should be supplemented with written details enabling, for example, manual controls (actuators) to be located and identified. They should not be separated from the accompanying text and should follow sequential operations.	Appropriate illustrations are used	Pass
	d) Consideration should be given to presenting information in tabular form where this will aid understanding. Tables should be adjacent to the relevant text.	considered	Pass
	e) The use of colours should be considered, particularly in relation to components requiring quick identification.	considered	Pass
	f) When information for use is lengthy, a table of contents and/ or an index should be provided.	Provided.	Pass
	g) Safety-relevant instructions which involve immediate action should be provided in a form readily available to the operator.	Comply with the requirement	Pass
6.4.5.3	Drafting and editing information for use	-	-
	The following applies to the drafting and editing of information for use.	See below	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	a) Relationship to model: the information shall clearly relate to the specific model of machine and, if necessary, other appropriate identification (for example, by serial number).	Identified by model number	Pass
	b) Communication principles: when information for use is being prepared, the communication process "see – think – use" should be followed in order to achieve the maximum effect and should follow sequential operations. The questions, "How?" and "Why?" should be anticipated and the answers provided.	Comply with the requirement	Pass
	c) Information for use shall be as simple and as brief as possible, and should be expressed in consistent terms and units with a clear explanation of unusual technical terms.	Comply with the requirement	Pass
	d) When it is foreseen that a machine will be put to non-professional use, the instructions should be written in a form that is readily understood by the non-professional user. If personal protective equipment is required for the safe use of the machine, clear advice should be given, for example, on the packaging as well as on the machine, so that this information is prominently displayed at the point of sale.	Comply with the requirement	Pass
	e) Durability and availability of the documents: documents giving instructions for use should be produced in durable form (i.e. they should be able to survive frequent handling by the user). It can be useful to mark them "keep for future reference". Where information for use is kept in electronic form (CD, DVD, tape, hard disk, etc.), information on safety-related issues that need immediate action shall always be backed up with a hard copy that is readily available.	Comply with the requirement	Pass
7	Documentation of risk assessment and risk reduction	-	-
	The documentation shall demonstrate the procedure that has been followed and the results that have been achieved. This includes, when relevant, documentation of	See risk assessment report	Pass
	a) the machinery for which the risk assessment has been made (for example, specifications, limits, intended use);	See above	Pass
	b) any relevant assumptions that have been made (loads, strengths, safety factors, etc.);	See above	Pass
	c) the hazards and hazardous situations identified and the hazardous events considered in the risk assessment;	See above	Pass
	d) the information on which risk assessment was based (see 5.2):	See above	Pass
	1) the data used and the sources (accident histories, experience gained from risk reduction applied to similar machinery, etc.);	See above	Pass
	2) the uncertainty associated with the data used and its impact on the risk assessment;	See above	Pass

EN ISO 12100:2010			
Clause	Requirement	Result	Verdict
	e) the risk reduction objectives to be achieved by protective measures;	See above	Pass
	f) the protective measures implemented to eliminate identified hazards or to reduce risk;	See above	Pass
	g) residual risks associated with the machinery;	See above	Pass
	h) the result of the risk assessment (see Figure 1);	See above	Pass
	i) any forms completed during the risk assessment.	See above	Pass
	Standards or other specifications used to select protective measures referred to in f) above should be referenced.	See above	Pass
	NOTE No requirement is given in this International Standard to deliver the risk assessment documentation together with the machine. See ISO/TR 14121-2 for information on documentation.	noted	Pass

EN ISO 13849-1:2015 report

SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine

Project name: Foshan Huashu Robotics EN ISO 13849-1 Report

File date: 09/06/2023 11:14:24 Report date: 2023/6/9 Checksum: 97bcb3f479b80b609ba982a1d3c97dd0

PR Project name: Foshan Huashu Robotics EN ISO 13849-1 Report

Project file name:	Foshan Huashu Robotics 2006/42/EC SRP/CS
Creation date:	09/06/2023 09:34:29
Project status:	Done
Project number:	
Project version:	V 1.0
Authors:	EBO
Project managers:	EBO Project Manager
Inspectors:	EBO Project Engineer
Dangerous point/machine:	Industrial Robot
Documentation:	Foshan Huashu Robotics TCF
Document:	
Version of software:	2.0.8 build 4
Version of standard:	ISO 13849-1:2015, ISO 13849-2:2012
Checksum:	97bcb3f479b80b609ba982a1d3c97dd0
Options:	☒ Use DC intermediate levels for calculation of PFHD (more precise) ☐ MTTFD capping for category 4 lower from 2500 to 100 years.
Status:	green
Note:	There are no warnings listed for this project (or it's subordinate basic elements).

Print options

- | | |
|--|---|
| ☒ Show device details | ☒ Show requirements on PL and Category |
| ☒ Show documentations on SF, SB, BL and EL | ☒ Show parameter documentations on PLr, PL, Category, CCF, MTTFD and DC |
| ☒ Show CCF and DC measures in detail | ☒ Show messages |

Contained safety functions

SF Name: Emergency stop [SF1]

Required: PLr d

Reached: PL e

PFHD [1/h]: 5.2E-8

Status: green

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SF Safety function: Emergency stop

Identifier of the Safety function:	SF1
Safety function type:	Emergency stop function
Triggering event:	Push the emergency stop button or Receive the external emergency stop signal
Reaction and Behaviour on power failure:	Power off to all motor driver, and all moving parts stop.
Safe state:	Cut off the power supply to all motor drivers and the robot come to stop.
Operation mode:	All mode
Demand rate:	24 cycles per year
Running-on time:	All time
Priority:	Top priority
Documentation:	EN ISO 10218-1 test report
Document:	
<i>Required Performance Level Safety function</i>	
PLr (by direct input):	d
Documentation:	EN ISO 10218-1 test report
Document:	
Source (e.g. standard):	EN ISO 10218-1:2011
File:	

Performance Level Safety function

Reached PL: e PFHD [1/h]: 5.2E-8

Status / Messages Safety function

Status: green

Subsystems (1 / 3)**SB Name: Input**

Reference designator: SB1 Inventory number: S1, S2

Device details Subsystem

Device Manufacturer:	Schneider electric
Device Identifier:	XB2-BS442C
Device group:	Input device
Part number: XB2-BS442C	Revision: XB2-BS442C
Function:	☒ Input ☐ Logic ☐ Output ☐ unknown
Use case:	Actuation of emergency stop input signal
Description of the use case:	Push the emergency stop button to generate emergency stop input

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SF Safety function: Emergency stop

Description of the use case:	signal to logic.
<i>Documentation Subsystem</i>	
Documentation:	Hardware block diagram
Document:	
<i>Performance Level Subsystem</i>	
PL determination:	Determine PL/PFHD from Category, MTTFD and DCavg
Software suitable up to PL:	n.a.
PL requirements:	fulfilled
The PL shall be determined by the estimation of the following aspects:	- Behaviour of the safety function under fault conditions (see clause 6) [fulfilled] - safety-related software according to clause 4.6 or no software included [fulfilled] - systematic failure (see Annex G) [fulfilled] - Ability to perform a safety function under expected environmental conditions [fulfilled]
Reached PL: e	PFHD [1/h]: 2.5E-8
Documentation:	Hardware block diagram
<i>Category Subsystem</i>	
Cat.:	3
Category requirements:	fulfilled
Requirements of the Category:	- Accordance with relevant standards to withstand the expected influences. [fulfilled] - Basic safety principles are being used. [fulfilled] - Well-trieed safety principles are being used. [fulfilled] - A single fault tolerance and reasonable fault detection are given. [fulfilled] - MTTFD is at least Low or Medium or High. [fulfilled] - DCavg is at least Low or Medium; [fulfilled] - The achieved score of the CCF-rating is at least 65. [fulfilled]
Documentation:	Hardware block diagram
Source (e.g. standard) Category:	EN ISO 13849-1:2015
File:	
<i>MTTFD and Mission time Subsystem</i>	
MTTFD [a]:	100 (High)
Mission time [a]: 20	Shortest mission time [a]: 20
<i>Diagnostic coverage Subsystem</i>	
DCavg [%]:	99 (High)

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SF Safety function: Emergency stop*Common cause failure Subsystem*

CCF Points:	75 (fulfilled)
CCF Measures:	- Separation / Segregation (15 Points) Physical separation between signal paths, for example: i^a separation in wiring/piping; i^a detection of short circuits and open circuits in cables by dynamic test; i^a separate shielding for the signal path of each channel; i^a sufficient clearances and creepage distances on printed-circuit boards. - Design / application / experience (15 Points) Protection against over-voltage, over-pressure, over-current, over-temperature, etc. - Design / application / experience (5 Points) Components used are well-tried. - Competence / training (5 Points) Training of designers to understand the causes and consequences of common cause failures. - Environmental (10 Points) Other influences Consideration of the requirements for immunity to all relevant environmental influences such as, temperature, shock, vibration, humidity (e.g. as specified in relevant standards). - Environmental (25 Points) For electrical/electronic systems, prevention of contamination and electromagnetic disturbances (EMC) to protect against common cause failures in accordance with appropriate standards (e.g. IEC 61326~C3-1). Fluidic systems: filtration of the pressure medium, prevention of dirt intake, drainage of compressed air, e.g. in compliance with the component manufacturers' requirements concerning purity of the pressure medium. NOTE For combined fluidic and electric systems, both aspects should be considered.

Documentation: Hardware block diagram

Document:

Status / Messages Subsystem

Status: green

Channels / Test channels (1 / 2)

CH Name: Channel 1

MTTFD [a]: 100

SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine



Project name: Foshan Huashu Robotics EN ISO 13849-1 Report

File date: 09/06/2023 11:14:24 Report date: 2023/6/9 Checksum: 97bcb3f479b80b609ba982a1d3c97dd0

SF Safety function: Emergency stop**Blocks (1 / 1)****BL** Name: E-stop switch

Reference designator: BL1-1

Inventory number: S1

Device details Block

Device Manufacturer: Schneider electric

Device Identifier: XB2-BS442C

Device group: Input device

Part number: XB2-BS442C

Revision: XB2-BS442C

Function:

☒ Input☐ Logic☐ Output☐ unknown

Technology: electromechanic

Category: 1

Use case: Actuation of emergency stop input signal

Description of the use case: Push the emergency stop button to generate emergency stop input signal to logic.

Documentation Block

Documentation: Hardware block diagram

Document:

MTTFD and Mission time Block

MTTFD [a]: 625000 (High)

Mission time [a]: 20

Shortest mission time [a]: 20

Diagnostic coverage Block

DC [%]: 99 (High)

Status / Messages Block

Status: green

Elements (1 / 1)**EL** Name: E-stop switch contact

Reference designator: EL1-1

Inventory number: S1

Device details Element

Device Manufacturer: Schneider electric

Device Identifier: XB2-BS442C

Device group: Input device

Part number: XB2-BS442C

Revision: XB2-BS442C

SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine

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SF Safety function: Emergency stop

Function:	☒ Input ☐ Output	☐ Logic ☐ unknown
Technology:	electromechanic	
Category:	1	
Use case:	Actuation of emergency stop input signal	
Description of the use case:	Push the emergency stop button to generate emergency stop input signal to logic.	

Documentation Element

Documentation:	Hardware block diagram
Document:	

MTTFD and Mission time Element

MTTFD [a]: 625000 (High)	
Mission time [a]: 20	
B10D [cycles]: 1500000	nop [cycles/a]: 24
Documentation:	Schneider electric b10d data sheet

Diagnostic coverage Element

DC [%]: 99 (High)	
Measure:	Cross monitoring of input signals and intermediate results within the logic (L), and temporal and logical software monitor of the program flow and detection of static faults and short circuits (for multiple I/O) (Input devices) (99 %)
Documentation:	PILZ Safety relay unit manual

Status / Messages Element

Status:	green
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Channels / Test channels (2 / 2)**CH** Name: Channel 2

MTTFD [a]: 100

Blocks (1 / 1)**BL** Name: E-stop switch

Reference designator: BL1-2	Inventory number: S2
<i>Device details Block</i>	
Device Manufacturer:	Schneider electric
Device Identifier:	XB2-BS442C
Device group:	Input device

SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine

Project name: Foshan Huashu Robotics EN ISO 13849-1 Report

File date: 09/06/2023 11:14:24 Report date: 2023/6/9 Checksum: 97bcb3f479b80b609ba982a1d3c97dd0

SF Safety function: Emergency stop

Part number: XB2-BS442C		Revision: XB2-BS442C	
Function:	☒ Input	☐ Logic	
	☐ Output	☐ unknown	
Technology:	electromechanic		
Category:	1		
Use case:	Actuation of emergency stop input signal		
Description of the use case:	Push the emergency stop button to generate emergency stop input signal to logic.		

Documentation Block

Documentation:	Hardware block diagram
Document:	

MTTFD and Mission time Block

MTTFD [a]: 625000 (High)	
Mission time [a]: 20	Shortest mission time [a]: 20

Diagnostic coverage Block

DC [%]: 99 (High)

Status / Messages Block

Status:	green
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Elements (1 / 1)**EL** Name: E-stop switch contact

Reference designator: EL1-2		Inventory number: S2	
Device details Element			
Device Manufacturer:		Schneider electric	
Device Identifier:		XB2-BS442C	
Device group:		Input device	
Part number: XB2-BS442C		Revision: XB2-BS442C	
Function:		☒ Input	☐ Logic
		☐ Output	☐ unknown
Technology:		electromechanic	
Category:		1	
Use case:		Actuation of emergency stop input signal	
Description of the use case:		Push the emergency stop button to generate emergency stop input signal to logic.	

SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine

Project name: Foshan Huashu Robotics EN ISO 13849-1 Report

File date: 09/06/2023 11:14:24 Report date: 2023/6/9 Checksum: 97bcb3f479b80b609ba982a1d3c97dd0

SF Safety function: Emergency stop*Documentation Element*

Documentation: Hardware block diagram

Document:

MTTFD and Mission time Element

MTTFD [a]: 625000 (High)

Mission time [a]: 20

B10D [cycles]: 1500000

nop [cycles/a]: 24

Documentation: Schneider electric b10d data sheet

Diagnostic coverage Element

DC [%]: 99 (High)

Measure: Cross monitoring of input signals and intermediate results within the logic (L), and temporal and logical software monitor of the program flow and detection of static faults and short circuits (for multiple I/O) (Input devices) (99 %)

Documentation: PILZ Safety relay unit manual

Status / Messages Element

Status: green

Subsystems (2 / 3)**SB Name: Logic**

Reference designator: SB2

Inventory number: Safety relay unit

Device details Subsystem

Device Manufacturer: PILZ

Device Identifier: PNOZ X2.8P

Device group: Logic

Part number: PNOZ X2.8P

Revision: PNOZ X2.8P

Function: ☐ Input ☒ Logic ☐ Output ☐ unknown

Use case: Receive the emergency stop input signal and generate the safety output control signal

Description of the use case: Receive the emergency stop input signal and generate the safety output control signal

Documentation Subsystem

Documentation: Hardware block diagram
PILZ PNOZ X2.8P data sheet and manual

Document:

SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine

Project name: Foshan Huashu Robotics EN ISO 13849-1 Report

File date: 09/06/2023 11:14:24 Report date: 2023/6/9 Checksum: 97bcb3f479b80b609ba982a1d3c97dd0

SF Safety function: Emergency stop*Performance Level Subsystem*

PL determination: Enter PL/PFHD directly (manufacturer ensures compliance with the requirements of the Category and of the PL)

PL: e **Software suitable up to PL: e**

Reached PL: e **PFHD [1/h]: 2.3E-9**

Documentation: Hardware block diagram
PILZ PNOZ X2.8P data sheet and manual

Mission time [a]: 20 **Shortest mission time [a]: 20**

Category Subsystem

Cat.: 4

Category requirements: fulfilled

Requirements of the Category: Since the category is given by the manufacturer he is responsible to satisfy the requirements.

Documentation: Hardware block diagram
PILZ PNOZ X2.8P data sheet and manual

Source (e.g. standard) Category: EN ISO 13849-1:2015

File:

Status / Messages Subsystem

Status: green

Subsystems (3 / 3)**SB Name: Output**

Reference designator: SB3 **Inventory number: K2, K3**

Device details Subsystem

Device Manufacturer: OMRON

Device Identifier: G7S-E

Device group: Output device

Part number: G7S-E **Revision: G7S-E**

Function: ☐ Input ☐ Logic
☒ Output ☐ unknown

Use case: Receive the safety output control signal from logic and cut off the power supply to relay coil to acuate the contact to cut off the power supply to motor drivers.

Description of the use case: Receive the safety output control signal from logic and cut off the power supply to relay coil to acuate the contact to cut off the power supply to motor drivers.

Documentation Subsystem

Documentation: Hardware block diagram

SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine

Project name: Foshan Huashu Robotics EN ISO 13849-1 Report

File date: 09/06/2023 11:14:24 Report date: 2023/6/9 Checksum: 97bcb3f479b80b609ba982a1d3c97dd0

SF Safety function: Emergency stop

Documentation: OMRON G7S-E datasheet and manual

Document:

Performance Level Subsystem

PL determination: Determine PL/PFHD from Category, MTTFD and DCavg

Software suitable up to PL: n.a.

PL requirements: fulfilled

The PL shall be determined by the estimation of the following aspects:

- Behaviour of the safety function under fault conditions (see clause 6) [fulfilled]
- safety-related software according to clause 4.6 or no software included [fulfilled]
- systematic failure (see Annex G) [fulfilled]
- Ability to perform a safety function under expected environmental conditions [fulfilled]

Reached PL: e PFHD [1/h]: 2.5E-8

Documentation: Hardware block diagram
OMRON G7S-E datasheet and manual*Category Subsystem*

Cat.: 3

Category requirements: fulfilled

Requirements of the Category:

- Accordance with relevant standards to withstand the expected influences. [fulfilled]
- Basic safety principles are being used. [fulfilled]
- Well-tried safety principles are being used. [fulfilled]
- A single fault tolerance and reasonable fault detection are given. [fulfilled]
- MTTFD is at least Low or Medium or High. [fulfilled]
- DCavg is at least Low or Medium; [fulfilled]
- The achieved score of the CCF-rating is at least 65. [fulfilled]

Documentation: Hardware block diagram
OMRON G7S-E datasheet and manual

Source (e.g. standard) Category: EN ISO 13849-1:2015

File:

MTTFD and Mission time Subsystem

MTTFD [a]: 100 (High)

Mission time [a]: 20 Shortest mission time [a]: 20

Diagnostic coverage Subsystem

DCavg [%]: 99 (High)

Common cause failure Subsystem

CCF Points: 75 (fulfilled)

CCF Measures: - Separation / Segregation (15 Points)

SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine

Project name: Foshan Huashu Robotics EN ISO 13849-1 Report

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SF Safety function: Emergency stop**CCF Measures:**

Physical separation between signal paths, for example:

- i^a separation in wiring/piping;
- i^a detection of short circuits and open circuits in cables by dynamic test;
- i^a separate shielding for the signal path of each channel;
- i^a sufficient clearances and creepage distances on printed-circuit boards.

- Design / application / experience (15 Points)

Protection against over-voltage, over-pressure, over-current, over-temperature, etc.

- Design / application / experience (5 Points)

Components used are well-tried.

- Competence / training (5 Points)

Training of designers to understand the causes and consequences of common cause failures.

- Environmental (25 Points)

For electrical/electronic systems, prevention of contamination and electromagnetic disturbances (EMC) to protect against common cause failures in accordance with appropriate standards (e.g. IEC 61326“C3-1).

Fluidic systems: filtration of the pressure medium, prevention of dirt intake, drainage of compressed air, e.g. in compliance with the component manufacturers' requirements concerning purity of the pressure medium.

NOTE For combined fluidic and electric systems, both aspects should be considered.

- Environmental (10 Points)

Other influences

Consideration of the requirements for immunity to all relevant environmental influences such as, temperature, shock, vibration, humidity (e.g. as specified in relevant standards).

Documentation:**Document:****Status / Messages Subsystem**

Status: green

Channels / Test channels (1 / 2)

CH Name: Channel 1

MTTFD [a]: 100

Blocks (1 / 1)

BL Name: Safety relay

Reference designator: BL3-1

Inventory number: K2

SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine



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SF Safety function: Emergency stop*Device details Block*

Device Manufacturer:	OMRON		
Device Identifier:	G7S-E		
Device group:	Output device		
Part number: G7S-E	Revision: G7S-E		
Function:	☐ Input ☒ Output	☐ Logic ☐ unknown	
Technology:	electromechanic		
Category:	1		
Use case:	Receive the safety output control signal from logic and cut off the power supply to relay coil to acuate the contact to cut off the power supply to motor drivers.		
Description of the use case:	Receive the safety output control signal from logic and cut off the power supply to relay coil to acuate the contact to cut off the power supply to motor drivers.		

Documentation Block

Documentation:	Hardware block diagram OMRON G7S-E datasheet and manual
Document:	

MTTFD and Mission time Block

MTTFD [a]: 446.4 (High)	
Mission time [a]: 20	Shortest mission time [a]: 20

Diagnostic coverage Block

DC [%]: 99 (High)

Status / Messages Block

Status:	green
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Elements (1 / 1)**EL** Name: Safety relay contact

Reference designator: EL3-1	Inventory number: K2
<i>Device details Element</i>	
Device Manufacturer:	OMRON
Device Identifier:	G7S-E
Device group:	Output device
Part number: G7S-E	Revision: G7S-E
Function:	☐ Input ☒ Output
	☐ Logic ☐ unknown

SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine

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SF Safety function: Emergency stop

Technology:	electromechanic
Category:	1
Use case:	Receive the safety output control signal from logic and cut off the power supply to relay coil to acuate the contact to cut off the power supply to motor drivers.
Description of the use case:	Receive the safety output control signal from logic and cut off the power supply to relay coil to acuate the contact to cut off the power supply to motor drivers.

Documentation Element

Documentation:	Hardware block diagram OMRON G7S-E datasheet and manual
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*Document:**MTTFD and Mission time Element*

MTTFD [a]: 446.4 (High)

Mission time [a]: 20

B10D [cycles]: 200000

nop [cycles/a]: 4480

Nop parameter:	Days: 280	Hours: 16	Seconds: 3600
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*Documentation:**Diagnostic coverage Element*

DC [%]: 99 (High)

Measure:	Direct monitoring (e.g. electrical position monitoring of control valves, monitoring of electromechanical devices by mechanically linked contact elements) (Output device) (99 %)
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*Documentation:**Status / Messages Element*

Status:	green
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Channels / Test channels (2 / 2)**CH** Name: Channel 2

MTTFD [a]: 100

Blocks (1 / 1)**BL** Name: Safety relay

Reference designator: BL3-1

Inventory number: K3

Device details Block

Device Manufacturer:	OMRON
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SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine



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SF Safety function: Emergency stop

Device Identifier:	G7S-E
Device group:	Output device
Part number: G7S-E	Revision: G7S-E
Function:	☐ Input ☒ Output ☐ Logic ☐ unknown
Technology:	electromechanic
Category:	1
Use case:	Receive the safety output control signal from logic and cut off the power supply to relay coil to acuate the contact to cut off the power supply to motor drivers.
Description of the use case:	Receive the safety output control signal from logic and cut off the power supply to relay coil to acuate the contact to cut off the power supply to motor drivers.

Documentation Block

Documentation:	Hardware block diagram OMRON G7S-E datasheet and manual
Document:	

MTTFD and Mission time Block

MTTFD [a]: 446.4 (High)	
Mission time [a]: 20	Shortest mission time [a]: 20

Diagnostic coverage Block

DC [%]: 99 (High)	
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Status / Messages Block

Status:	green
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Elements (1 / 1)**EL** Name: Safety relay contact

Reference designator: EL3-1	Inventory number: K3
<i>Device details Element</i>	
Device Manufacturer:	OMRON
Device Identifier:	G7S-E
Device group:	Output device
Part number: G7S-E	Revision: G7S-E
Function:	☐ Input ☒ Output ☐ Logic ☐ unknown
Technology:	electromechanic
Category:	1

SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine

Project name: Foshan Huashu Robotics EN ISO 13849-1 Report

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SF Safety function: Emergency stop

Use case:	Receive the safety output control signal from logic and cut off the power supply to relay coil to acuate the contact to cut off the power supply to motor drivers.
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Description of the use case:	Receive the safety output control signal from logic and cut off the power supply to relay coil to acuate the contact to cut off the power supply to motor drivers.
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Documentation Element

Documentation:	Hardware block diagram OMRON G7S-E datasheet and manual
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Document:	
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MTTFD and Mission time Element

MTTFD [a]: 446.4 (High)

Mission time [a]: 20

B10D [cycles]: 200000	nop [cycles/a]: 4480
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Nop parameter:	Days: 280	Hours: 16	Seconds: 3600
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Documentation:	
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Diagnostic coverage Element

DC [%]: 99 (High)

Measure:	Direct monitoring (e.g. electrical position monitoring of control valves, monitoring of electromechanical devices by mechanically linked contact elements) (Output device) (99 %)
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Documentation:	
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Status / Messages Element

Status:	green
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SISTEMA - Safety Integrity Software Tool for the Evaluation of Machine Applications

Project name: Foshan Huashu Robotics EN ISO 13849-1 Report

File date: 09/06/2023 11:14:24 Report date: 2023/6/9 Checksum: 97bcb3f479b80b609ba982a1d3c97dd0

EXCLUSION OF LIABILITY

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Die Software wurde gemäß dem Stand von Wissenschaft und Technik sorgfältig erstellt. Sie wird dem Nutzer unentgeltlich zur Verfügung gestellt.

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EN ISO 10218-1:2011 report

5	Design requirements and protective measures		–
5.1	General		–
	The robot shall be designed in accordance with the principles of ISO 12100 for relevant hazards. Significant hazards, such as sharp edges, are not dealt with by this part of ISO 10218.	Sharp edges were reduced in design stage.	P
	Robots shall be designed and constructed to comply with the requirements in 5.2 to 5.15.		P
5.2	General requirements		–
5.2.1	Power transmission components		–
	Exposure to hazards caused by components such as motor shafts, gears, drive belts, or linkages which are not protected by integral covers (e.g. panel over a gear box) shall be prevented either by fixed guards or movable guards. The fixing systems of the fixed guards which are intended to be removed for routine service actions shall remain attached to the machine or the guard. Movable guards shall be interlocked with the hazardous movements in such a way that the hazardous machine functions cease before they can be reached.	Fixed guards are provided.	P
	The safety-related control system performance of an interlocking system shall conform to the requirements of 5.4.	No interlocking guard for power transmission components.	N/A
5.2.2	Power loss or change		–
	Loss of, or variations in power shall not result in a hazard.		P
	Re-initiation of power shall not lead to any motion.		P
	Robots shall be designed and constructed so that loss or change of electrical, hydraulic, pneumatic or vacuum power does not result in a hazard. If hazards exist that are not protected by design, then other protective measures shall be taken to protect against those hazards. Unprotected hazards of the expected use shall be identified in the information for use.		P
5.2.3	Component malfunction		–
	Robot components shall be designed, constructed, secured, or contained so that hazards caused by breaking or loosening, or releasing stored energy are minimized.		P
5.2.4	Sources of energy		–
	A means of isolating any hazardous energy source to the robot shall be provided. This means shall be provided with capability of locking or otherwise securing in the de-energized position.	Supply cord with plug is the disconnecting device for power supply isolating.	P
5.2.5	Stored energy		–
	A means shall be provided for the controlled release of stored hazardous energy. A label shall be affixed to identify the stored energy hazard.		P
5.2.6	Electromagnetic compatibility (EMC)		–

	The design and construction of the robot shall prevent hazardous motion or situations due to the expected effects of electromagnetic interference (EMI), radio frequency interference (RFI) and electrostatic discharge (ESD).	Refer to EMC test report.	P
5.2.7	Electrical equipment		–
	The robot electrical equipment shall be designed and constructed in accordance with the relevant requirements of IEC 60204-1.	Compliance with IEC 60204-1.	P
5.3	Actuating controls		–
5.3.1	General		–
	Actuating controls that initiate power or motion shall be designed and constructed to meet the performance criteria mentioned in 5.3.2 to 5.3.5.	Compliance with 5.3.2 to 5.3.5	P
5.3.2	Protection from unintended operation		–
	Actuating controls shall be constructed or located so as to prevent unintended operation. For example, appropriately designed push-buttons or key selector switches in appropriate locations can be used.	Unintended operation is prevented by appropriately designed push-buttons	P
5.3.3	Status indication		–
	The status of the actuating controls shall be clearly indicated, e.g. power on, fault detected, automatic operation.		P
	If an indicator light is used, it shall be suitable for its installed location and its colour shall meet the requirements of IEC 60204-1.		P
5.3.4	Labelling		–
	Actuating controls shall be labelled to clearly indicate their function.	Actuating controls are labelled clearly	P
5.3.5	Single point of control		–
	The robot control system shall be designed and constructed so that when the robot is placed under local pendant control or other teaching device control, initiation of robot motion or change of local control selection from any other source is prevented.	Compliance with this requirement	P
5.4	Safety-related control system performance (hardware/software)		–
5.4.1	General		–
	Safety-related control systems (electric, hydraulic, pneumatic and software) shall comply with 5.4.2, unless the results of the risk assessment determine that an alternative performance criterion as described in 5.4.3 is appropriate. The safety-related control system performance of the robot and any furnished equipment shall be clearly stated in the information for use.		P
	For the purposes of this part of ISO 10218, safety-related control system performance is stated as: - Performance Levels (PL) and categories as described in ISO 13849-1:2006, 4.5.1; - Safety Integrity Levels (SIL) and hardware fault tolerance requirements as described in IEC 62061:2005, 5.2.4.		--

	Those two standards address functional safety using similar but different methods. Requirements in those standards should be used for the respective safety-related control systems for which they are intended. The designer may choose to use either of the two standards. The data and criteria necessary to determine the safety-related control system performance shall be included in the information for use.		--
	Other standards offering alternative performance requirements, such as the term "control reliability" used in North America, may also be used. When using these alternative standards to design safety-related control systems, an equivalent level of risk reduction shall be achieved.		N/A
	Any failure of the safety-related control system shall result in a stop category 0 or 1 in accordance with IEC 60204-1.		P
5.4.2	Performance requirement		–
	Safety-related parts of control systems shall be designed so that they comply with PL=d with structure category 3 as described in ISO 13849-1:2006, or so that they comply with SIL 2 with a hardware fault tolerance of 1 with a proof test interval of not less than 20 years, as described in IEC 62061:2005.		P
	This means in particular: a) a single fault in any of these parts does not lead to the loss of the safety function; b) whenever reasonably practicable, the single fault shall be detected at or before the next demand upon the safety function; c) when the single fault occurs, the safety function is always performed and a safe state shall be maintained until the detected fault is corrected; and d) all reasonably foreseeable faults shall be detected.		P
	The requirements a) to d) are considered to be equivalent to structure category 3 as described in ISO 13849-1:2006.		
5.4.3	Other control system performance criteria		–
	The results of a comprehensive risk assessment performed on the robot and its intended application may determine that a safety-related control system performance other than that stated in 5.4.2 is warranted for the application.		N/A
	Selection of one of these other safety-related performance criteria shall be specifically identified, and appropriate limitations and cautions shall be included in the information for use provided with the affected equipment.		N/A
5.5	Robot stopping functions		–
5.5.1	General		–

	Every robot shall have a protective stop function and an independent emergency stop function. These functions shall have provision for the connection of external protective devices. Optionally, an emergency stop output signal may be provided. Table 1 shows a comparison of the emergency stop and protective stop functions.		P
5.5.2	Emergency stop		–
	The robot shall have one or more emergency stop functions (stop category 0 or 1, in accordance with IEC 60204-1).	Category 0 stop	P
	Each control station capable of initiating robot motion or other hazardous situation shall have a manually initiated emergency stop function that: a) complies with the requirements of 5.4 and IEC 60204-1; b) takes precedence over all other robot controls; c) causes all controlled hazards to stop; d) removes drive power from the robot actuators; e) provides capability for controlling hazards controlled by the robot system; f) remains active until it is reset; and g) shall only be reset by manual action that does not cause a restart after resetting, but shall only permit a restart to occur.		P
	Selection of a category 0 or category 1 stop (in accordance with IEC 60204-1) function shall be determined from the risk assessment.		P
	When an emergency stop output signal is provided: – the output shall continue to function when the robot power is removed; or – if the output does not continue to function when the robot power supply is removed, an emergency stop signal shall be generated.		N/A
	The emergency stop device shall be in accordance with IEC 60204-1 and ISO 13850.	The emergency stop devices are compliance with IEC 60204-1 and ISO 13850	P
5.5.3	Protective stop		–
	The robot shall have one or more protective stop functions designed for the connection of external protective devices. The protective stop function performance shall comply with the requirements of 5.4.		P
	This stop function shall cause a stop of all robot motion, remove or control power to the robot drive actuators, and allow for the control of any other hazard controlled by the robot. This stop may be initiated manually or by control logic.		P

	At least one protective stop function shall be a stop category 0 or 1, as described in IEC 60204-1. The robot may have an additional protective stop function using stop category 2 as described in IEC 60204-1 that does not result in drive power being removed but does require monitoring of the standstill condition after the robot stops. Any unintended motion of the robot in the monitored standstill condition or detected failure of the protective stop function shall result in a category 0 stop in accordance with IEC 60204-1. The monitored standstill function performance shall comply with 5.4. This function may also be initiated from external devices (input stop signal from protective devices).	Stop category 0	P
	The manufacturer shall include the stop category of every protective stop circuit input in the information for use.		P
5.6	Speed control		–
5.6.1	General		–
	The speed of the robot end-effector mounting flange and of the tool centre point (TCP) shall be controllable at selectable speeds. An off-set feature (defining the location of the TCP relative to the mounting flange) shall be provided to enable the TCP speed to be controlled.		P
5.6.2	Reduced speed control operation		–
	When operating under reduced speed control, the speed of the TCP shall not exceed 250 mm/s. It should be possible to select speeds lower than 250 mm/s as the assigned limit.		P
5.6.3	Safety-rated reduced speed control		–
	When provided, safety-rated reduced speed control shall be designed and constructed in accordance with 5.4.2 so that in the event of a fault, the speed of the TCP does not exceed the limit for reduced speed (see 5.6.2) and a protective stop is issued when a fault occurs.		P
5.6.4	Safety-rated monitored speed		–
	When provided, the speed of the TCP or of an axis shall be monitored in accordance with 5.4.2. If the speed exceeds the limit selected, a protective stop shall be issued.		P
5.7	Operational modes		–
5.7.1	Selection		–
	Operational modes shall be selectable with a mode selector which can be locked in each position (e.g. a key operated switch which can be inserted and extracted in each position). Each position of the selector shall be clearly identifiable and shall exclusively allow one control or operating mode.		N/A

	The selector can be replaced by another selection means which restricts the use of certain functions of the robot (e.g. access codes). These means shall: a) unambiguously indicate the selected operating mode; and b) by themselves not initiate robot motion or other hazards.	By access code	P
	An optional output(s) may be provided to indicate the mode selected. When provided for safety-related purposes, the output(s) shall comply with the requirements of 5.4 (see Annex D).	Mode selected is displayed on the screen of teach pendant.	N/A
5.7.2	Automatic		–
	In automatic mode, the robot shall execute the task programme and the safeguarding measures shall be functioning.		P
	Automatic operation shall be prevented if any stop condition is detected.		P
	Switching from this mode shall result in a stop.		P
5.7.3	Manual reduced speed		–
	Manual reduced-speed mode shall meet the requirements of 5.3.4 and 5.6 and shall allow a robot to be operated by human intervention. Automatic operation is prohibited in this mode. This mode is used for jogging, teaching, programming and programme verification of the robot; it may be the mode selected when performing some maintenance tasks.		P
	Manual control of the robot from inside the safeguarded space shall be performed with a reduced speed in conjunction with either of the following: a) hold-to-run controls in conjunction with an enabling device in accordance with 5.8, or b) for programme verification only, a start/stop control in conjunction with an enabling device in accordance with 5.8.		P
	Information for use shall contain appropriate instructions and warnings that, wherever possible, the manual mode of operation shall be performed with all persons outside the safeguarded space. Information for use shall also instruct that prior to selecting automatic mode, any suspended safeguards shall be returned to their full functionality.	Appropriate instructions and warnings are provide in the manual	P
5.7.4	Manual high speed		–

	If this mode is provided, speeds greater than 250 mm/s can be achieved. This mode is used for programme verification only. In this case, the robot shall: a) have a means to select manual high-speed mode which requires a deliberate action (e.g. a key switch on the robot control panel) and an additional confirming action; b) provide a pendant conforming to 5.8 with a hold-to-run function in addition to the enabling device that permits robot motion to continue; c) set an initial speed limit of up to, but not exceeding, 250 mm/s upon selection of manual high-speed mode; d) provide on the pendant a means for the operator to incrementally adjust the speed from the initial value to the full programmed value in multiple steps; e) provide on the pendant an indication of the adjusted speed; f) ensure that: - its speed is limited to the initial speed limit when the enabling device is re-initiated by placing the switch in the centre-enabled position after either having been released or fully compressed, and - a separate deliberate action is required to return to the higher speed that was selected before the enabling device switch was released or compressed, and - the option to resume the higher speed using the separate action shall become inoperative after no more than five minutes after the release of the enabling device.	No this mode	N/A
	The option to resume the higher speed and the time-out is not safety-rated. Information for use shall contain appropriate instructions and warning that, wherever possible, the manual mode of operation shall be performed with all persons outside the safeguarded space. Information for use shall also instruct that prior to selecting automatic mode, any suspended safeguards shall be returned to their full functionality.		N/A
5.8	Pendant controls		–
5.8.1	General		–
	Where a pendant control or other teaching control device has the capability to control the robot from within the safeguarded space, the requirements in 5.3.5 and 5.8.2 to 5.8.7 shall apply.		P
5.8.2	Motion control		–
	Motion of the robot initiated from the pendant or teaching control device shall be under reduced speed control as described in 5.6. When the controls contain provisions for selecting manual high speed, the robot shall meet the requirements in 5.7.4.	Only under reduced speed	P
5.8.3	Enabling device		–

	The pendant or teaching control device shall have a three-position enabling device in accordance with IEC 60204-1. When continuously held in a centre-enabled position, the enabling device shall permit robot motion and any other hazards controlled by the robot. The enabling device shall have the performance characteristics outlined below.		P
	a) The enabling device may be integral with, or physically separate from (e.g. a grip-type enabling device), the pendant control and shall operate independently from any other motion control function or device. b) Release of or compression past the centre-enabled position of the device shall stop hazards (e.g. robot motion) in accordance with 5.4 and 5.5.3. c) After compression past the centre-enabled position of the enabling device, the enabling device needs to be fully released. Going from fully compressed to the centre position shall not permit robot motion. d) When two or more enabling switches are provided on a single enabling device/pendant to allow alternating left- or right-handed operation, any or all switches can be in the centre-enabled position: 1) when only one of the switches is being used and is in the centre-enabled position it shall function as described in b); 2) when the enabling device design allows both switches to be held in the centre-enabled position to allow changing from left- to right-hand operation, releasing one switch shall not cause a protective stop but fully depressing either switch shall override the control of the other switches and cause a protective stop.		P
	Information for use shall contain a description of this functional operation and a warning that a potential hazard could exist.		P
	e) When more than one enabling device is in operation (i.e. more than one person is in the safeguarded space with an enabling device), motion shall only be possible when each device is held in the centre (enabled) position at the same time. f) Dropping the enabling device shall not result in a failure that would allow motion to be enabled. g) If an enabling output signal is provided, then the output shall signal a stop condition when the safetyrelated system supply is off and shall comply with the requirements of 5.4. h) When the mode is changed while the enabling device is in the centre-enabled position, a protective stop shall be initiated. The control system shall require that the enabling device be released and re-enabled before drive power can be applied. See IEC 60204-1 for guidance on preventing the defeat of an enabling device.		P
5.8.4	Pendant emergency stop function		–
	The pendant or teaching control device shall have an emergency stop function in accordance with 5.5.2.		P
5.8.5	Initiating automatic operation		–

	It shall not be possible to activate robot automatic operation using the pendant or teaching control device exclusively. There shall be a means for a separate confirmation action located outside the safeguarded space prior to activating the automatic mode.		P
5.8.6	Cableless or detachable teach controls		–
	Where pendant or other teaching controls have no cables connecting to the robot control, or where they may be detached, the following shall apply.	Detachable teach controls	P
	a) A visual indication shall be provided to show that the pendant is active, e.g. at the teach pendant display.		P
	b) Loss of communication shall result in a protective stop for all robots being controlled when in manual reduced-speed or manual high-speed modes. Restoration of communication shall not restart robot motion without a separate deliberate action.		P
	c) Confusion between active and inactive emergency stop devices shall be avoided by providing appropriate storage or design. Information for use shall contain a description of the storage or design.		P
	d) When applicable, the maximum response times for data communication (including error correction) and for loss of communication shall be stated in the information for use.		P
5.8.7	Control of multiple robots		–
	Where a pendant control has the capability to control multiple robots, the requirements in 5.9 shall apply.	Single robot	N/A
5.9	Control of simultaneous motion		–
5.9.1	Single pendant control		–
	One or more robot controls may be linked to a single teach pendant. When so configured, the teach pendant shall have the capability to move one or more of the robots independently or in simultaneous motion. When in the manual operational mode, all functions of the robot system shall be under the control of the one pendant.		N/A
5.9.2	Safety design requirements		–
	All robots in a robot system, designed for simultaneous motion, shall normally be in the same operating mode, e.g. manual or automatic, and in the same state, e.g. power on or power off. Capability shall be provided to allow one or more robots to be in a servo-disconnected state for the purpose of troubleshooting or running errors or in test cases. These disconnected robots are then not included in the simultaneous motion.		N/A
	For the robots to be included in simultaneous motion, each robot shall be selected before it can be moved. To be selected, all robots shall be in the same operating mode (e.g. manual reduced speed). An indication shall be provided at the point of selection (e.g. at the pendant, control cabinet, or robot) of the robot(s) that have been selected. Only selected robot(s) shall be moved.		N/A

	It shall also be possible to deactivate any robot, i.e. to have it in a power off state. An indication, clearly visible from within the safeguarded space, of the robot(s) that have been activated shall be provided.		N/A
	Unexpected start-up of any robots not selected shall be prevented. This function shall comply with the requirements of 5.4.		N/A
5.10	Collaborative operation requirements		–
5.10.1	General		–
	Robots designed for collaborative operation shall provide a visual indication when the robot is in collaborative operation and shall comply with one or more of the requirements in 5.10.2 to 5.10.5.		P
5.10.2	Safety-rated monitored stop		–
	The robot shall stop when a human is in the collaborative workspace. The stop function shall comply with 5.4 and 5.5.3. The robot may resume automatic operation when the human leaves the collaborative workspace.		N/A
	Alternatively, the robot may decelerate, resulting in a category 2 stop in accordance with IEC 60204-1. Once stopped, this standstill shall be monitored by the safety-related control system in accordance with 5.4. Fault of the safety-rated monitored stop function shall result in a category 0 stop.		N/A
5.10.3	Hand guiding		–
	When provided, hand guiding equipment shall be located close to the end-effector and shall be equipped with the following: a) an emergency stop complying with 5.5.2 and 5.8.4, and b) an enabling device complying with 5.8.3.		N/A
	The robot shall operate with a safety-rated monitored speed function active (see 5.6.4). The safety-rated monitored speed limit shall be determined by the risk assessment.		N/A
5.10.4	Speed and separation monitoring		–
	The robot shall maintain a determined speed and separation distance from the operator. These functions may be accomplished by integral features or a combination of external inputs. Detection of the failure to maintain the determined speed or separation distance shall result in a protective stop (see 5.5.3). The speed and separation monitoring functions shall comply with 5.4.2.		N/A
	The robot is simply a component in a final collaborative robot system and is not in itself sufficient for a safe collaborative operation. The collaborative operation applications are dynamic and shall be determined by the risk assessment performed during the application system design. Information for use shall contain direction for implementing speed values and separation distances. ISO 10218-2 shall be used for designing collaborative operations. Additional information will be contained in ISO/TS 15066 (currently under preparation).		N/A

	The relative speeds of the operator and robot need to be considered when calculating the minimum safe separation distance. Minimum distance requirements can be found in ISO 13855.		N/A
5.10.5	Power and force limiting by inherent design or control		–
	The power or force limiting function of the robot shall be in compliance with 5.4. If any parameter limit is exceeded, a protective stop shall be issued.		P
	The robot is only a component in a final collaborative robot system and alone is not sufficient for a safe collaborative operation. The collaborative operation application shall be determined by the risk assessment performed during the application system design. Information for use shall include details for setting established parameter limits in the controlled robot. ISO 10218-2 shall be used for designing collaborative operations. Additional information will be contained in ISO/TS 15066 (currently under preparation).		P
5.11	Singularity protection		–
	Motions defined in Cartesian space that pass near singularities can produce high axis speeds. These high speeds can be unexpected to an operator. When in the manual reduced-speed mode or hand guiding (see 5.10.3), the robot control shall do one of the following:		P
	a) stop robot motion and provide a warning prior to the robot passing through or correcting for a singularity during coordinated motion (control wherein the axes of the robot arrive at their respective end points simultaneously, giving a smooth appearance to the motion and control wherein the motions of the axes are such that the TCP moves along a prescribed path) initiated from the teach pendant, or b) generate an audible or visible warning signal and continue to pass through the singularity with the velocity of each link of the robot arm limited to a maximum speed of 250 mm/s, or c) in the case that the singularity can be controlled without creating any hazardous motion, no additional protection is required.	Visible warning signal will be generated on screen of teach pendant.	P
5.12	Axis limiting		–
5.12.1	General		–
	A means shall be provided to establish a restricted space around the robot by using limiting devices. A means for installing adjustable mechanical stops shall be provided to limit the motion of the axis with the greatest displacement motion (primary axis) of the robot. The robot shall comply with either 5.12.2 or 5.12.3, or both.		P
	This does not apply to robots with a limiting structure resulting from construction, e.g. parallel kinematic construction.		N/A

	When the robot reaches an axis limit, the robot shall be stopped. Whether the robot motion can continue at the point of the axis limit or not should be stated in the information for use.		P
5.12.2	Mechanical and electro-mechanical axis limiting devices		–
	Provisions for adjustable mechanical or non-mechanical limiting devices shall be provided for axes two and three (the axes with the second and third largest displacement motions).		N/A
	Mechanical stops shall be capable of stopping robot motion at rated load, maximum speed conditions, and at maximum and minimum extension. Testing of mechanical hard stops shall be without any assisted stopping.		N/A
	Alternative methods of limiting the range of motion may be provided only if they are designed, constructed and installed to meet the performance specified in 5.4.2.		N/A
	The control circuit performance of electro-mechanical limiting devices shall comply with the requirements in 5.4. The robot control and task programmes shall not change electro-mechanical limit device settings.		N/A
	The adjustable devices allow the user to minimize the size of the restricted space. The degree of adjustment should be included in the required information for use as specified in 6.2.		N/A
	Information for use shall include information on stopping time at maximum speed for electro-mechanical limiting devices including monitoring time and distance travelled before full stop is achieved. Additional information is given in Annex B.		N/A
5.12.3	Safety-rated soft axis and space limiting		–
	Soft limits are software-defined limits to robot motion. Space limiting is used to define any geometric shape which may be used as an inclusionary or exclusionary zone, either limiting robot motion within the defined space, or preventing the robot from entering the defined space.		P
	Safety-rated soft limits are permitted as a means to define and reduce the restricted space provided they can effect a stop of the robot at full-rated load and speed. The restricted space shall be defined at the actual expected stopping position that accounts for the stopping distance travel. The manufacturer shall state the capability in the information for use and shall disable safety-rated soft limits if this capability is not supported.		P

	Control programmes that monitor and perform soft axis and space limiting functions based on safety-rated soft limits shall comply with 5.4 and be changeable only by authorized personnel. If the safety-rated soft limit is violated, a protective stop shall be initiated. Motion during a limit violation shall be under reduced speed control as described in 5.6.3. Information on the active settings and configuration of the safety limits shall be capable of being viewed and documented with a unique identifier so that changes to the configuration can be easily identified.		P
	A safety-rated soft limit shall be set as a stationary zone that cannot be changed without re-initialization of the safety-related sub-system and shall not be reconfigured during automatic execution of the task programme. Authorization to change the safety-rated soft limit shall be protected and secure, e.g. require authorized persons to enter a password. Once set, safety-rated soft limits shall always become activated upon power up.		P
	Information for use shall include information on stopping time at maximum speed for safety-rated soft limits including monitoring time and distance travelled before full stop is achieved. Additional information is given in Annex B.		P
	Safety-rated zone outputs for use in dynamic restricted space applications shall comply with 5.4. The hardware configuration of the outputs shall be stated in the information for use.	Same as above	P
5.12.4	Dynamic limiting devices		–
	Dynamic limiting is the automatically controlled change in a robot's restricted space during a portion of the robot system's operation. Control devices such as, but not limited to, cam-operated limit switches, light curtains or control-activated retractable hard stops may be utilized to further limit robot movement within the restricted space while the robot performs its task programme. For this, the device and associated control systems shall be capable of stopping the robot motion under rated load and speed conditions and the associated safety-related control systems shall comply with 5.4.2, unless a risk assessment is performed and determines that another category is required.		N/A
5.13	Movement without drive power		–
	The robot shall be designed so that the axes are capable of being moved without the use of drive power in emergency or abnormal situations. Where practicable, moving the axes shall be carried out by a single person.		P
	Controls shall be readily accessible but protected from unintended operation. Instructions for doing this shall be included in the information for use along with recommendations for training personnel on responding to emergency or abnormal situations.		P

	The information for use shall include warnings that gravity and the release of braking devices can create additional hazards. Where practicable, warning notices shall be posted near to the activating controls.		P
5.14	Provisions for lifting		–
	Instructions and provisions for lifting the robot and its associated components shall be provided and shall be adequate for handling the anticipated load.		P
5.15	Electrical connectors		–
	Electrical connectors that can cause a hazard if they are separated, or if they break away, shall be designed and constructed so as to prevent unintended separation.		P
	Connectors shall be provided with a means to prevent cross-connection.		P
6	Verification and validation of safety requirements and protective measures		–
6.1	General		–
	The robot manufacturer shall provide for the verification and validation of design and construction of robots including appropriate safeguarding devices in accordance with the principles described in Clauses 4 and 5.		P
	The risk assessment should be reviewed to assess if all reasonably foreseeable hazards have been identified and corrective actions taken.		P
6.2	Verification and validation methods		–
-	Verification and validation can be satisfied by methods including but not limited to: - A visual inspection; - B practical tests; - C measurement; - D observation during operation; - E review of application-specific schematics, circuit diagrams and design material; - F review of task-based risk assessment; - G review of specifications and information for use.		P
6.3	Required verification and validation		–
	Annex F lists specific performance requirements that are identified as essential to the safety of the robot that shall be verified or validated, or both. Using appropriate methods, requirements shall be evaluated to determine if they have been adequately met by the design and construction of the robot.		P
7	Information for use		–
7.1	General		–
	Markings (e.g. signs, symbols) and instructional material (e.g. manuals for operation, maintenance) shall be provided by the manufacturer in accordance with ISO 12100 and IEC 60204-1.		P
	When provided, machine warning devices (e.g. audible and visual signals) shall be in accordance with ISO 12100 and IEC 60204-1.		P
7.2	Instruction handbook		–

	In addition to the requirements of 6.1, each robot shall be accompanied by an instruction handbook or appropriate media containing:		P
	a) the business name, full address, and necessary contact information of the manufacturer and if necessary of the authorized representative or authorized supplier; b) instruction for commissioning, programming and restarting procedure including installation requirements such as utility needs, floor loading, environmental conditions, etc.; c) instructions for how the initial test and examination of the robot and its protective measures are to be carried out before first use and being placed into production, including functional testing of reduced speed control; d) instructions for any test or examination necessary after change of component parts or addition of optional equipment (both hardware and software) to the robot which can affect the safety-related functions, including an emergency stop output signal as in 5.5.2 and common enabling circuit as in 5.8.3 d); e) instructions for safe operation, setting and maintenance, including safe working practices, hazardous energy control procedures and the training required to achieve the necessary skill level of persons operating the equipment; f) instructions on location and function of all control systems including diagrams of the interface of electrical, hydraulic, and pneumatic systems necessary for setup and installation;		P
	g) information on the capability of selecting high-speed control using the pendant; h) instructions in order to inform the machine designer that restricted space shall be provided when the robot is foreseen to be used in manual high speed; i) information on installation of limiting devices, including number, location and degree of adjustment of mechanical limiting capability; j) instructions on the number, location and implementation of any non-mechanical limiting devices; k) capabilities of dynamic limiting, when included; l) information on the actual expected stopping position that accounts for the stopping distance travel when using safety-rated soft limiting; m) information on the number and operation of enabling devices and instructions for installation of additional devices including the data and criteria necessary to determine the safety-related control system performance;		P

	n) information on the stopping time and distance or angle from initiation of stop signal of the three axes with the greatest displacement and motion in accordance with the metric in Annex B; o) the safety-related control system performance of the robot safety functions as determined in 5.4; p) the specification for any fluids or lubricants to be used in lubrication, braking, or transmission system internal to the robot, including guidance on correct selection, preparation, application and maintenance of process-unique expendables; q) guidance on the means for the release of persons trapped in or by the machine; r) instructions for movement of robot axes without drive power, including warnings that gravity and the release of braking devices can create additional hazards; s) recommendations for training personnel on responding to emergency or abnormal situations; t) information defining the limits for the range of motion and load capacity, including maximum mass, position of the centre of gravity of the workpiece and work holding fixture; u) procedures to avoid errors of fitting during maintenance of the machine; v) information on relevant standards the robot meets, including any that have been certified by a third party; w) response time of detection of loss of communication signal for cableless pendants; x) information on unprotected hazards associated with expected use of the machine; y) instructions and warnings that manual operation shall be performed with all persons outside the safeguarded space;		P
	z) instructions that prior to selecting automatic mode any suspended safeguards shall be returned to full functionality;az aa) instructions for the proper storage of cableless pendants, if so configured; bb) information on response time and loss of communication of cableless pendants, if so configured; cc) information on the stop category of every protective stop circuit input.		P
	Any changes or additions to the applicable information as provided by the manufacturer shall be provided by the party that makes the change or addition to the robot system.		P
7.3	Marking		–

	Each robot shall be marked in a distinct, legible and durable manner with: a) the manufacturer's and, where appropriate, the authorized supplier's business name and complete address; b) the designation of type of machine (i.e. industrial robot) and model number or reference number (if any); c) the month and year of manufacture; d) the mass and/or weight of machine; e) the maximum reach and load capacity; f) supply data for electrical and, where applicable, hydraulic and pneumatic systems (e.g. minimum and maximum pneumatic pressures); g) lifting points for transportation and installation purposes, where applicable.		P
	Guards, protective devices and other parts that are part of the robot but not fitted shall be clearly identified for their purpose. Any other information needed for fitting shall be provided.		N/A

EN IEC 61000-6-4/EN IEC 61000-6-2 and EN IEC 61000-3-2 Test report

EN IEC 61000-6-4:2019 Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments EN IEC 61000-6-2:2019 Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments EN IEC 61000-3-2:2019+A1:2021 Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) EN 61000-3-3:2013+ A1:2019+A2:2021 Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection		
Tested by(name and signature)..... :	Bernie Xia 	
Approved by(name and signature.... :	Kevin Wang 	
Date of issue..... :	February 11, 2026	
Testing Laboratory	Shenzhen EBO Testing Center	
Address	3/F, 2F, Qiaohongsheng Cultural Creative Park, Yintian Industrial Zone, Xixiang Street, Bao 'an District, Shenzhen	
Applicant's name..... :	Guangzhou Aucotech Automation Technology Ltd	
Address	Room 903, Building E1, Design City, No. 7, Hexian North Street, Helong Street, Baiyun District, Guangzhou City, CHINA	
Test specification:		
Directive..... :	2014/30/EU	
Test procedure	EMC	
Manufacturer..... :	Guangzhou Aucotech Automation Technology Ltd	
Address	Room 903, Building E1, Design City, No. 7, Hexian North Street, Helong Street, Baiyun District, Guangzhou City, CHINA	
Test item description	Industrial Cobot	
Trademark	AUCTECH 	
Main model/Type reference..... :	H5-790, H5-920, H5-1000, H7-890, H10-1400, H10-1500, H16-1100, H16-1200, H25-2000, H5G-790, H5G-920, H5G-1000, H7G-890, H10G-1400, H10G-1500, H16G-1100, H16G-1200, H25G-2000	
Test Model No.:	H5-790	
Rating(s)	Input:220-230V~, 9.3A, 50Hz, 1.95KW	

1 General Information

1.1 Description of EUT

Product:	Industrial Cobot
Brand Name:	AUCTECH 
Model No.:	H5-790, H5-920, H5-1000, H7-890, H10-1400, H10-1500, H16-1100, H16-1200, H25-2000, H5G-790, H5G-920, H5G-1000, H7G-890, H10G-1400, H10G-1500, H16G-1100, H16G-1200, H25G-2000 Remark: All models are identical in the same PCB layout, interior structure and electrical circuits. The only differences are the model name and appearance color for commercial purpose.
Test Model No.:	H5-790
Applicant:	Guangzhou Aucotech Automation Technology Ltd
Applicant Address:	Room 903, Building E1, Design City, No. 7, Hexian North Street, Helong Street, Baiyun District, Guangzhou City, CHINA
Manufacturer:	Guangzhou Aucotech Automation Technology Ltd
Manufacturer Address:	Room 903, Building E1, Design City, No. 7, Hexian North Street, Helong Street, Baiyun District, Guangzhou City, CHINA
Test Standards:	EN IEC 61000-6-4:2019 EN IEC 61000-6-2:2019 EN IEC 61000-3-2:2019+A1:2021 EN 61000-3-3:2013+ A1:2019+A2:2021
Serial No.:	N/A
Rating:	Input:220-230V~, 9.3A, 50Hz, 1.95KW
Accessories:	/
NOTE: (1) For more detailed features description about the EUT, please refer to User's Manual.	

1.2 Objective

Perform ElectroMagnetic Interference (EMI) and ElectroMagnetic Susceptibility (EMS) tests for CE Marking.

1.3 Test Standards and Results

The EUT has been tested according to the following specifications:

EMISSION		
Standard	Test Type	Result
EN IEC 61000-6-4:2019	Mains terminal disturbance voltage	Pass
EN IEC 61000-6-4:2019	Radiated disturbance	Pass
EN IEC 61000-3-2	Harmonics Test	Pass
EN 61000-3-3		Pass
IMMUNITY (EN IEC 61000-6-2 :2019)		
Basic Standard	Test Type	Result
IEC 61000-4-2	Electrostatic discharge immunity	Pass
IEC 61000-4-3	Radiated, radio frequency electromagnetic field immunity	Pass
IEC 61000-4-4	Electrical fast transient/burst immunity	Pass
IEC 61000-4-5	Surge immunity	Pass
IEC 61000-4-6	Immunity to conducted disturbances induced by RF fields	Pass
IEC 61000-4-8	Power Frequency Magnetic Field Immunity	Pass
IEC 61000-4-11	Voltage Dips and Short Interruptions Immunity Test	Pass

Note: The latest versions of basic standards are applied.

1.4 List of Equipments Used

Description	Manufacturer	Model No.	Serial No.
Test Receiver	Schwarzbeck	FCKL1528	A0304230
TEST RECEIVER	ROHDE&SCHWARZ	ESIB7	A0501375
LISN	Schwarzbeck	NSLK8127	A0304233
Broadband Ant.	CHASE	CBL6111A	A9704202
EMS Antenna	Amplifier Research	AR AT1080	A0304249
Power Frequency Test System	CI	15003iX-400-CTS	A0801521
Voltage Dips, Short Interruptions and Variation Test System	HAEFELY	PLine 1610	A0103106
ESD Test System	EM TEST	ESD30C	A0712513
EFT Test System	HAEFELY	PEFT JUNIOR	A0103110
Surge Test System	EM TEST	VCS500M10	A0712509
CDN	ROHDE&SCHWARZ	M2	---
Signal Generator	ROHDE&SCHWARZ	SML02	A0304261
Power Amplifier	Amplifier Research	AR 150W1000	A0304247
Power Amplifier	Amplifier Research	AR 75A250M	A0304255
Field Monitor	Amplifier Research	AR FM5004	305128
Magnetic Field Tester	HAEFELY	MAG 100.1	A0103109
Shield Room	Nanbo Tech	Site 3	A9901141
SHIELD ROOM	NANBO TECH	Site 1	A0304210
Anechoic Chamber	Albatross	B83117-B1482-T161	A0412372
Anechoic Chamber	Albatross	H-249	A0304210
Power Analyzer H/F	EMTEST	DPA500	---
AC POWER SUPPLY	EMTEST	ACS500	---
Thermo meter	KTJ	TA328	---

NOTE: Equipments above have been calibrated and are in the period of validation.

2 Emission Test

2.1 EUT Setup and Operating Conditions

The EUT was power by AC 230V Mains and operated in continuous test condition.

2.2 Mains Terminal Disturbance Voltage Measurement

2.2.1 Limits of Mains Terminal Disturbance Voltage

Frequency range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 - 0.50	79	66
0.50 - 30	73	60

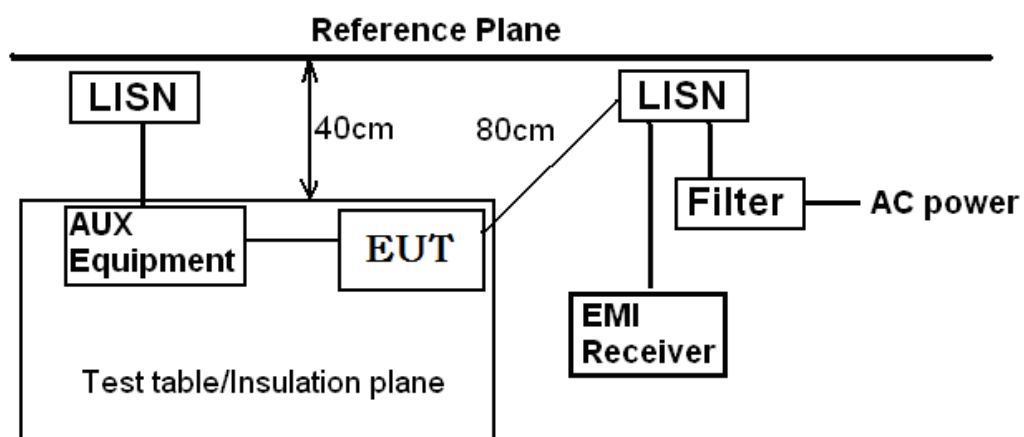
NOTE:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz

2.2.2 Test Procedure

- a. The EUT was placed 0.4 meters from the conducting wall of shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). The LISN provide 50 Ω /50 μ H of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30MHz was searched. Emission levels over 10dB under the prescribed limits are not reported.

2.2.3 Test Setup



Remark:

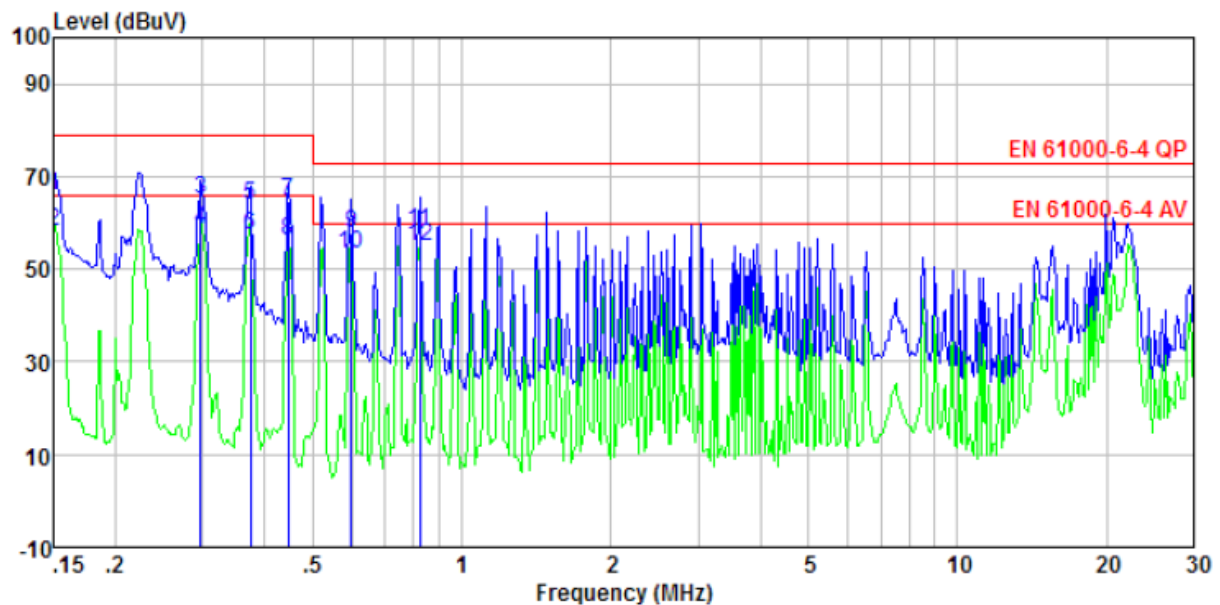
EUT: Equipment Under Test

LISN: Line Impedance Stabilization Network

Test table height=0.8m

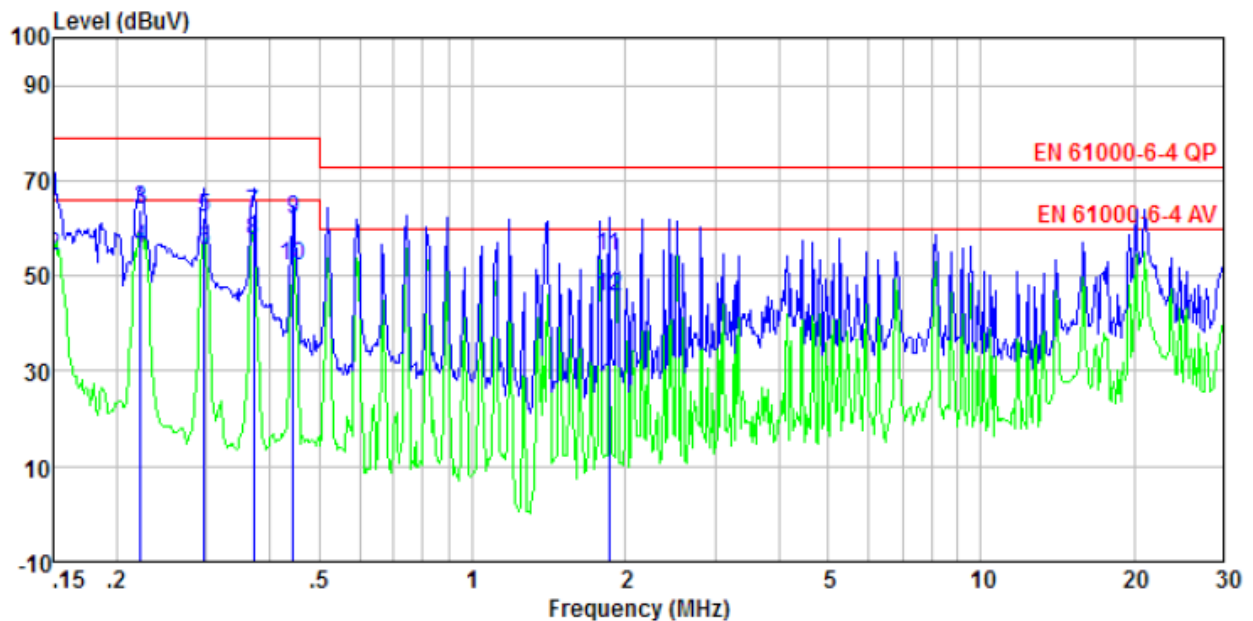
2.2.4 Test Result

1. Mains terminal disturbance voltage, L



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.15	65.54	0.40	0.07	66.01	79.00	-12.99	QP
0.15	57.75	0.40	0.07	58.22	66.00	-7.78	Average
0.30	64.77	0.40	0.10	65.27	79.00	-13.73	QP
0.30	57.97	0.40	0.10	58.47	66.00	-7.53	Average
0.38	63.39	0.36	0.10	63.85	79.00	-15.15	QP
0.38	56.82	0.36	0.10	57.28	66.00	-8.72	Average
0.45	64.19	0.33	0.11	64.63	79.00	-14.37	QP
0.45	55.81	0.33	0.11	56.25	66.00	-9.75	Average
0.60	57.31	0.29	0.12	57.72	73.00	-15.28	QP
0.60	52.75	0.29	0.12	53.16	60.00	-6.84	Average
0.82	57.86	0.23	0.14	58.23	73.00	-14.77	QP
0.82	54.51	0.23	0.14	54.88	60.00	-5.12	Average

2. Mains terminal disturbance voltage, N



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.15	64.88	0.40	0.07	65.35	79.00	-13.65	QP
0.15	53.79	0.40	0.07	54.26	66.00	-11.74	Average
0.22	63.47	0.40	0.11	63.98	79.00	-15.02	QP
0.22	55.41	0.40	0.11	55.92	66.00	-10.08	Average
0.30	61.83	0.40	0.10	62.33	79.00	-16.67	QP
0.30	55.03	0.40	0.10	55.53	66.00	-10.47	Average
0.37	62.51	0.36	0.10	62.97	79.00	-16.03	QP
0.37	56.86	0.36	0.10	57.32	66.00	-8.68	Average
0.44	61.32	0.33	0.11	61.76	79.00	-17.24	QP
0.44	51.87	0.33	0.11	52.31	66.00	-13.69	Average
1.86	53.66	0.20	0.17	54.03	73.00	-18.97	QP
1.86	45.24	0.20	0.17	45.61	60.00	-14.39	Average

2.3 Radiated Disturbance Measurement

2.3.1 Limits of Radiated Disturbance

Frequency range (MHz)	Quasi peak limits(dB μ V/m), at 10m measurement distance
30 – 230	40
230 - 1000	57

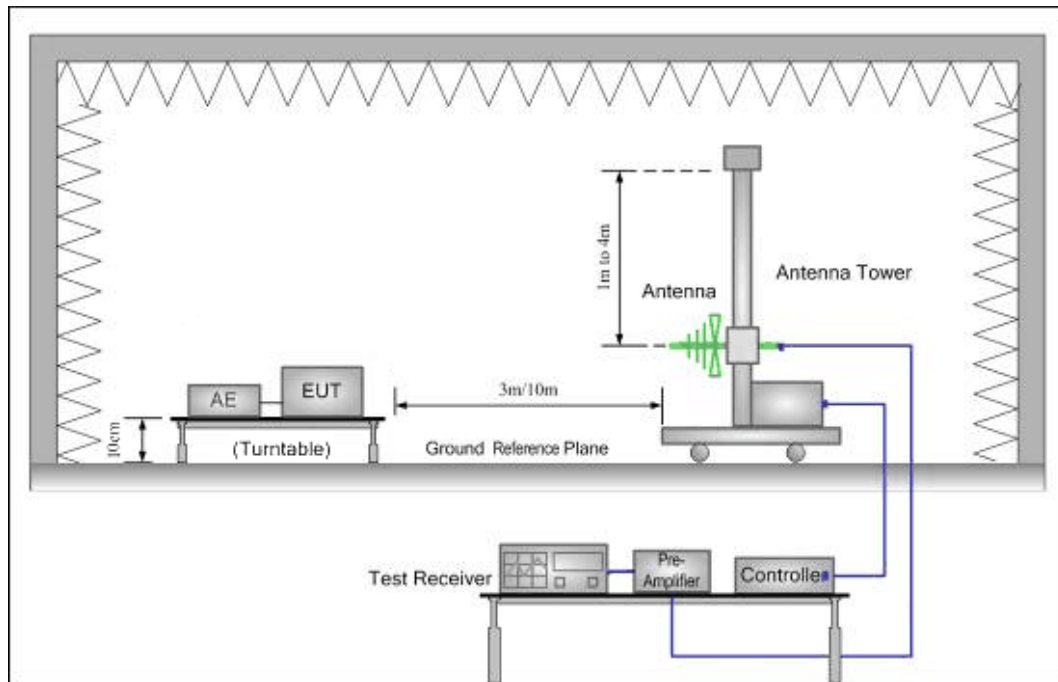
Notes:

- (1) The lower limit shall apply at the transition frequency.
- (2) Additional provisions may be required for cases where interference occurs.

2.3.2 Test Procedure

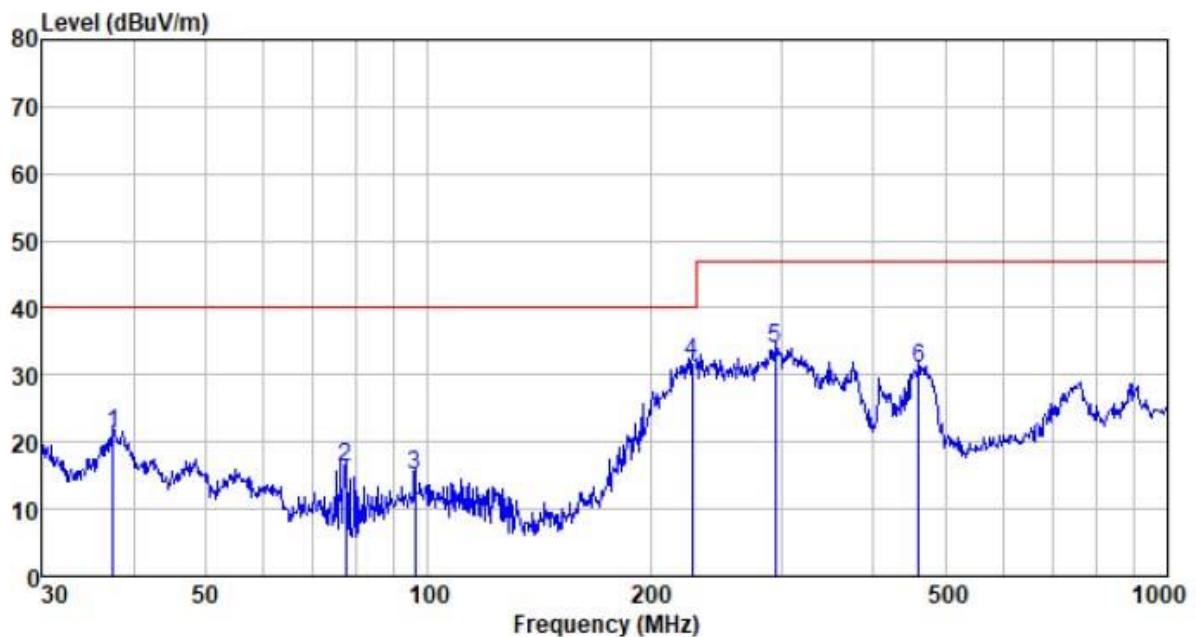
- a. The EUT was placed on the top of an insulating table 0.8 meters above the ground at an anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from 1 to 4 meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the heights from 1 to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detector Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emission that did not have 10dB margin would be retested one by one using the quasi-peak method.

2.3.3 Test Setup



1.3.4 Test Result

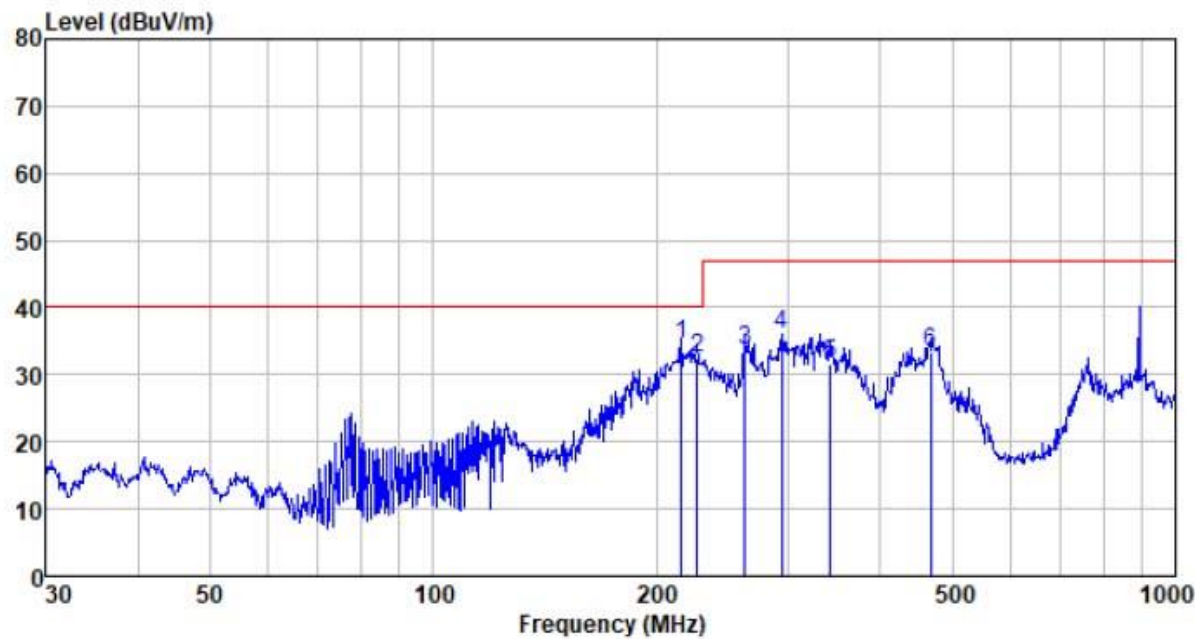
1. Radiation disturbances, antenna polarization: Vertical



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
37.548	44.38	11.80	0.64	35.52	21.30	40.00	-18.70	QP
77.321	44.26	7.42	1.01	36.52	16.17	40.00	-23.83	QP
96.099	38.94	11.65	1.16	36.69	15.06	40.00	-24.94	QP
227.691	55.85	11.42	2.01	37.36	31.92	40.00	-8.08	QP
295.147	55.51	13.45	2.34	37.42	33.88	47.00	-13.12	QP
460.727	48.88	16.57	3.14	37.51	31.08	47.00	-15.92	QP

Remarks: level = Reading level + Antenna factor + Cable loss - Preamp Factor

2. Radiation disturbances, antenna polarization: Horizontal



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
216.024	58.79	11.02	1.93	37.35	34.39	40.00	-5.61	QP
226.894	56.56	11.38	2.00	37.36	32.58	40.00	-7.42	QP
262.896	56.23	12.55	2.19	37.39	33.58	47.00	-13.42	QP
295.147	57.51	13.45	2.34	37.42	35.88	47.00	-11.12	QP
343.180	52.19	14.40	2.59	37.47	31.71	47.00	-15.29	QP
467.235	50.99	16.69	3.17	37.51	33.34	47.00	-13.66	QP

Remarks: level = Reading level + Antenna factor + Cable loss - Preamp Factor

2.4 Harmonics Test Results

Test Requirement:	EN IEC 61000-3-2
Test Method:	EN IEC 61000-3-2
Frequency range:	100Hz to 2kHz
Measurement Time:	2.5 min
Class/Severity:	Class A
Detector:	As per EN 61000-3-3
Test mode:	On mode
Test results:	Passed

2.5 Flicker Test Result

Test Requirement:	EN 61000-3-3
Test Method:	EN 61000-3-3
Class/Severity:	Clause 5 of EN 61000-3-3
Measurement Time:	10 min
Detector:	As per EN 61000-3-3
Test mode:	On mode
Test results:	Pass

Measurement Data

	EUT values	Limit	Result
Pst	0.034	1.00	PASS
Plt	0.048	0.65	PASS
Dc[%]	0.000	3.30	PASS
Dmax[%]	0.062	4.00	PASS
Dt [s]	0.000	0.50	PASS

3 Immunity Test

3.1 EUT Setup and Operating Conditions

Same as 2.1

3.2 Performance Criteria Description in Clause 4 of EN IEC 61000-6-2

Criterion A:	The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
Criterion B:	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
Criterion C:	Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

3.3 Electrostatic Discharge Immunity Test

3.3.1 Test Specification

Basic Standard:	EN 61000-4-2
Discharge Impedance	330Ω / 150 pF
Discharge Voltage:	Air Discharge – 8 kV Contact Discharge – 4 kV
Polarity:	Positive / Negative
Number of Discharge:	Minimum 20 times at each test point
Discharge Mode:	Single discharge
Discharge Period:	1-second minimum

3.3.2 Test Procedure

The discharges shall be applied in two ways:

a. Contact discharges to the conductive surfaces and coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three contact test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

b. Air discharges at slots and apertures and insulating surfaces:

On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled selected test point for each such area.

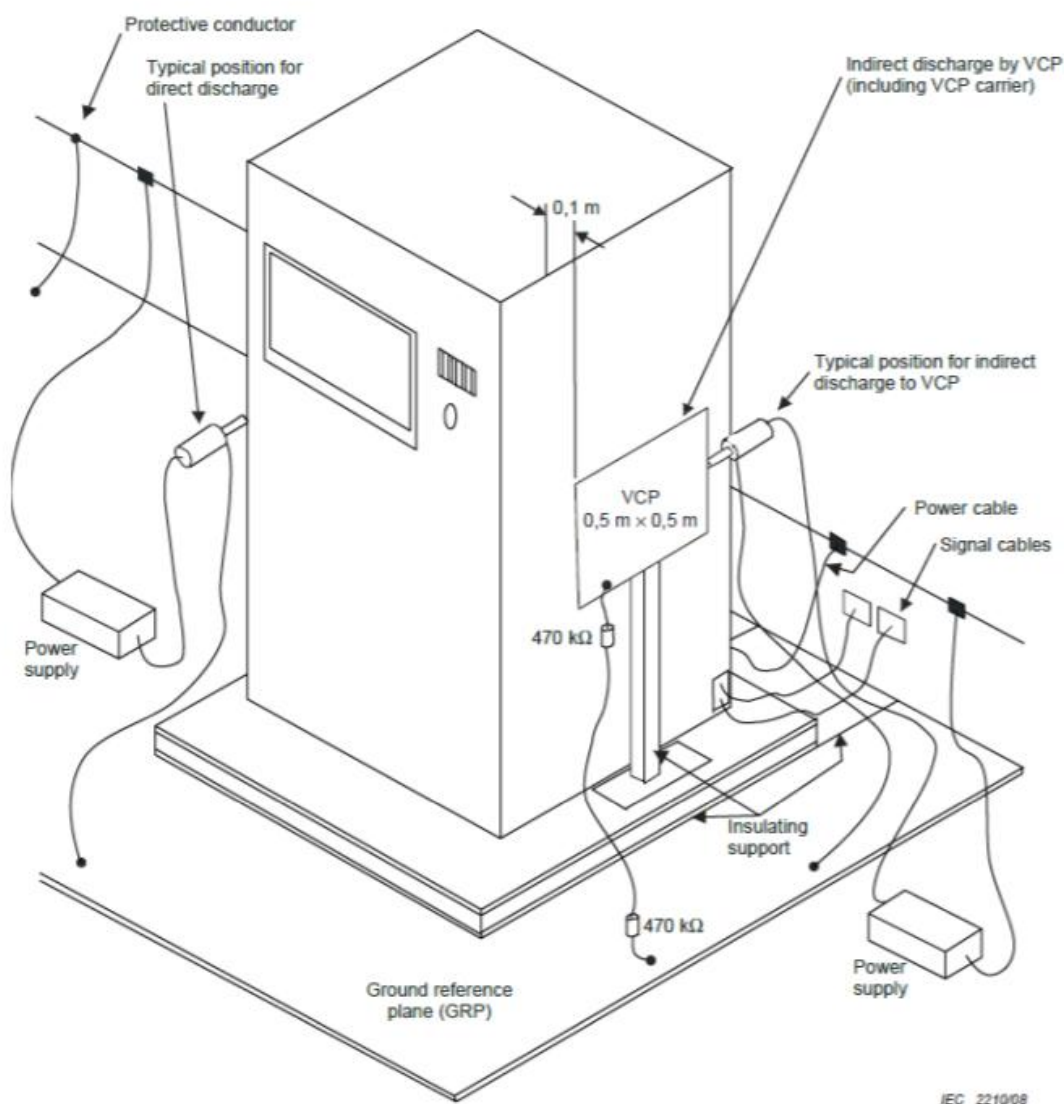
The basic test procedure was in accordance with EN 61000-4-2:

- Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- The time interval between two successive single discharges was at least 1 second.
- The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
- Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test

was repeated until all discharges were completed.

- g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m×0.5m) was placed vertically to and 0.1 meters from the EUT.

3.3.3 Test Setup



3.3.4 Test Result

Test Points	Discharge Level (kV)	Discharge Mode	Observation	Comply with Criterion
Screw	±4	Contact	Note(1)	A
All touchable metal material of EUT	±4	Contact	Note(1)	A
HCP	±4	Contact	Note(1)	A
VCP	±4	Contact	Note(1)	A
Cover seams	±8	Air	Note(1)	A
Port	±8	Air	Note(1)	A
Button	±8	Air	Note(1)	A

Note:

(1) The EUT continued to operate as intended. No degradation of performance was observed.

3.4 Radiated, Radio Frequency Electromagnetic Field Immunity Test

3.4.1 Test Specification

Basic Standard:	EN 61000-4-3
Frequency Range:	80 MHz – 1000MHz, 1.4GHz-6.0GHz
Field Strength:	10V/m, 3V/m
Modulation:	1kHz sine wave, 80%, AM modulation
Frequency Step:	1% of fundamental
Polarity of Antenna	Horizontal and Vertical
Test Distance:	10m
Antenna Height:	1.5m
Dwell Time:	3 seconds

3.4.2 Test Procedure

The test procedure was in accordance with EN 61000-4-3.

The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 10 meters from the EUT.

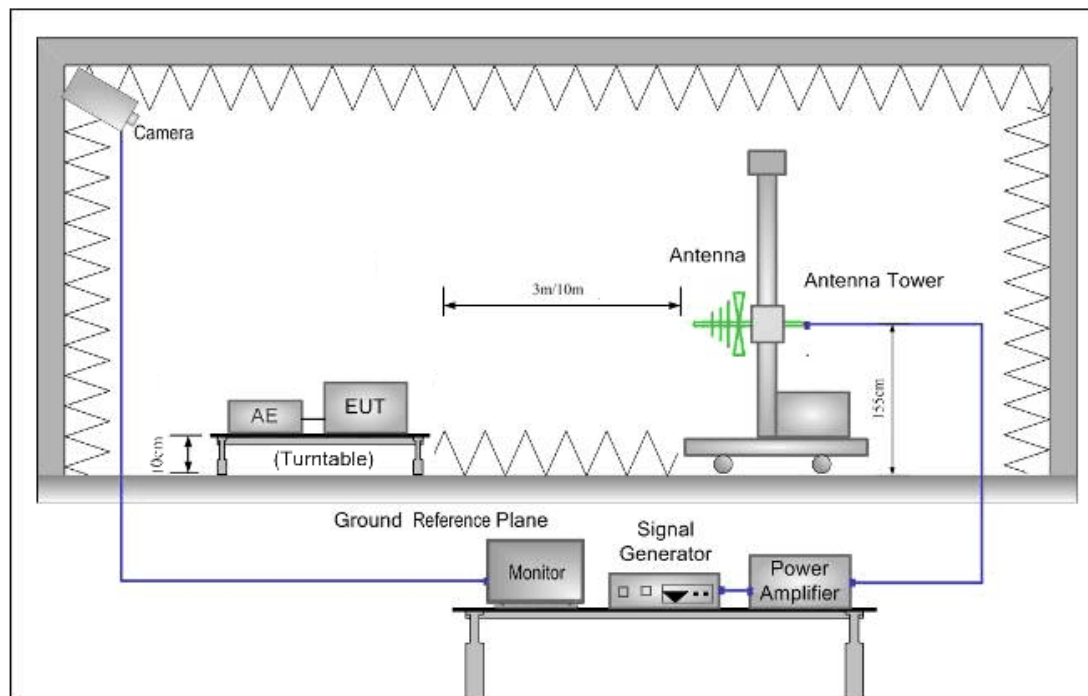
The frequency range is swept from 80 MHz to 1000MHz with the signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.

The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond

The field strength level was 10V/m.

The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

3.4.3 Test Setup



3.4.4 Test Result

Frequency	Polarity	Azimuth	Field Strength (V/m)	Observation	Comply with Criterion
80-1000 MHz	V&H	0, 90, 180, 270	10	Note(1)	A
1.4GHz-6.0GHz	V&H	0, 90, 180, 270	3	Note(1)	A

Note:

(1) The EUT continued to operate as intended. No degradation of performance was observed.

3.5 Electrical Fast Transient/Burst Immunity Test

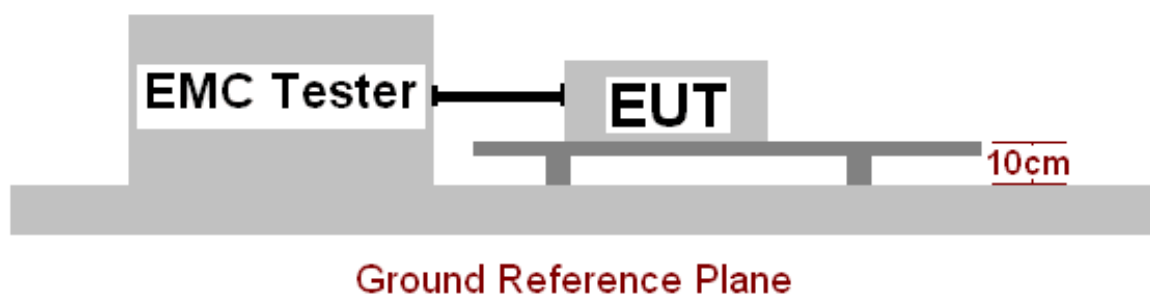
3.5.1 Test Specification

Basic Standard:	EN 61000-4-4
Test Voltage:	a.c. power port – 2 kV
Polarity:	Positive/Negative
Impulse Frequency:	5kHz
Impulse wave shape:	5/50ns
Burst Duration:	15ms
Burst Period:	300ms
Test Duration:	Not less than 1 min.

3.5.2 Test Procedure

- The EUT was tested with 1000-volt discharges to the AC power input leads.
- Both positive and negative polarity discharges were applied.
- The length of the “hot wire” from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 meter
- The duration time of each test sequential was 1 minute.
- The transient/burst waveform was in accordance with EN 61000-4-4, 5/50ns.

3.5.3 Test Setup



3.5.4 Test Result

Test Point	Polarity	Test Level (kV)	Observation	Comply with Criterion
L	+/- 2kV	Direct	A	Pass
N	+/- 2kV	Direct	A	Pass
L-N	+/- 2kV	Direct	A	Pass
PE	+/- 2kV	Direct	A	Pass
L-PE	+/- 2kV	Direct	A	Pass
N-PE	+/- 2kV	Direct	A	Pass
L-N-PE	+/- 2kV	Direct	A	Pass

Note:

The EUT continued to operate as intended. No degradation of performance was observed.

3.6 Surge Immunity Test

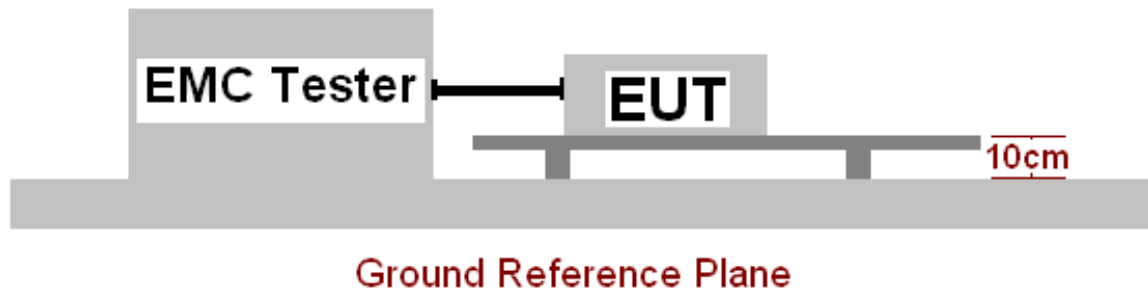
3.6.1 Test Specification

Basic Standard:	EN 61000-4-5
Waveform:	Voltage 1.2/50 μ s; Current 8/20 μ s
Test Voltage:	a.c. power port, line to line 1 kV, line to earth 2kV
Polarity:	Positive/Negative
Phase Angle:	0°, 90°, 180°, 270°
Repetition Rate:	60sec
Times:	5 times/each condition.

3.6.2 Test Procedure

a. The EUT and the auxiliary equipment were placed on a table of 0.8m heights above a metal ground reference plane. The size of ground plane is greater than 1m×1m and project beyond the EUT by at least 0.1m on all sides. The ground plane is connected to the protective earth. The length of power cord between the coupling device and the EUT was less than 2 meters (provided by the manufacturer).
b. The EUT was connected to the power mains through a coupling device that directly couples the surge interference signal. The surge noise was applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).
c. The surges were applied line to line and line(s) to earth. When testing line to earth the test voltage was applied successively between each of the lines and earth. Steps up to the test level specified increased the test voltage. All lower levels including the selected test level were tested. The polarity of each surge level included positive and negative test pulses.

3.6.3 Test Setup



3.6.4 Test Result

Coupling Line	Polarity	Voltage (kV)	Observation	Comply with Criterion
L-N	+/-	1	Note (1)	A
L-PE	+/-	2	Note (1)	A
N-PE	+/-	2	Note (1)	A

Note:

(1) The EUT continued to operate as intended. No degradation of performance was observed.

3.7 Immunity to Conducted Disturbances Induced by RF Fields

3.7.1 Test Specification

Basic Standard:	EN 61000-4-6
Frequency Range:	0.15 MHz – 80 MHz
Field Strength:	10V
Modulation:	1 kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1% of fundamental
Coupled Cable:	a.c. power line, Ethernet line, Phone line
Coupling Device:	CDN-M2

3.7.2 Test Procedure

The EUT shall be tested within its intended operating and climatic conditions.

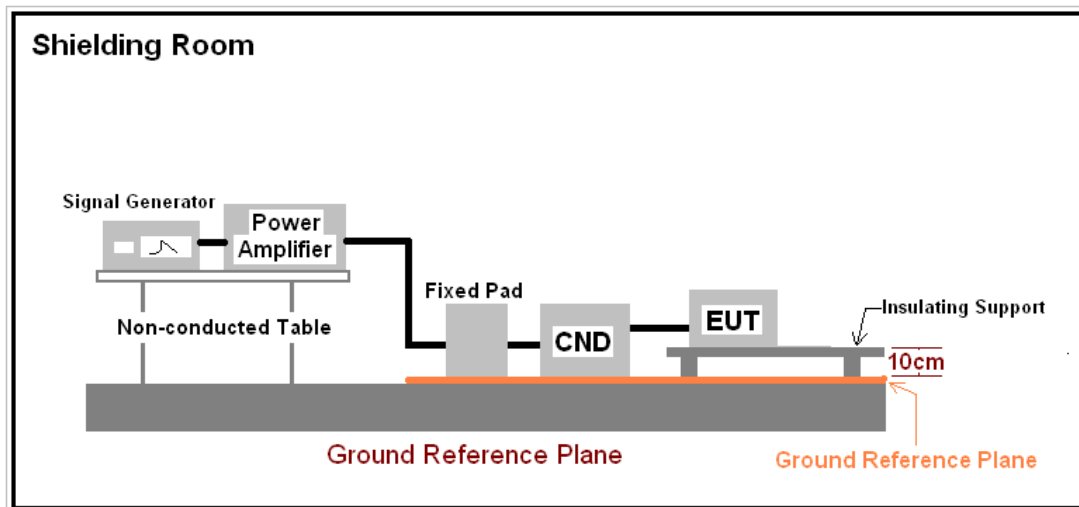
The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.

The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80% amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate shall not exceed 1.5×10^{-3} decades/s. The step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value where the frequency is swept incrementally.

The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequencies and harmonics or frequencies of dominant interest, shall be analyzed separately.

Attempts should be made to fully exercise the EUT during test, and to fully interrogate all exercise modes selected for susceptibility.

3.7.3 Test Setup



3.7.4 Test Result

Test Point	Frequency	Field Strength (Vrms)	Observation	Comply with criterion
a.c. power line	0.15 – 80 MHz	10	Note(1)	A

Note:

(1) The EUT continued to operate as intended. No degradation of performance was observed.

3.8 Power Frequency Magnetic Field Immunity Test

3.8.1 Test Specification

Basic Standard:	EN 61000-4-8
Frequency Range:	50Hz
Field Strength:	30 A/m
Observation Time:	2 minute
Inductance Coil:	Rectangular type, 1m×1m

3.8.2 Test Procedure

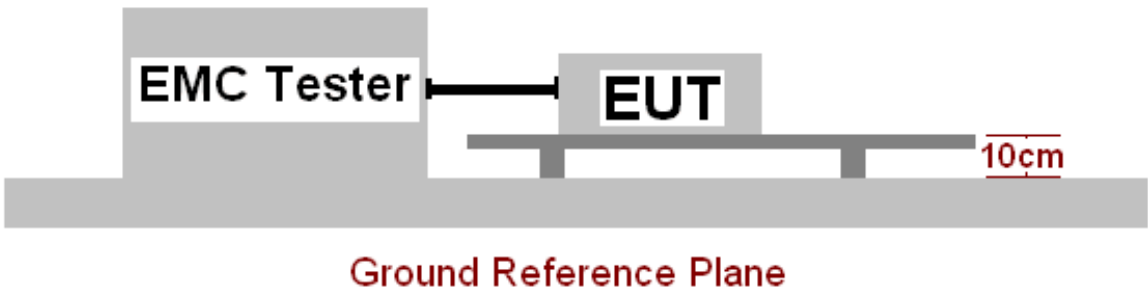
The equipment is configured and connected to satisfy its functional requirements. It shall be placed on the GRP with the interposition of a 0.1m thick insulating support.

The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.

The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.

The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

3.8.3 Test Setup



3.8.4 Test Result

Direction	Field Strength(A/m)	Observation	Comply with Criterion
X	30	Note(1)	A
Y	30	Note(1)	A
Z	30	Note(1)	A

Note:

The EUT continued to operate as intended. No degradation of performance was observed.

3.9 Voltage Dips and Short Interruptions Immunity Test

3.9.1 Test Specification

Basic Standard:	IEC 61000-4-11
Voltage Dips:	0% reduction, 1 period 40% reduction, 10 periods 70% reduction, 25 period
Voltage Interruptions:	>95% reduction, 250 periods
Voltage Phase Angle:	0°

3.9.2 Test Procedure

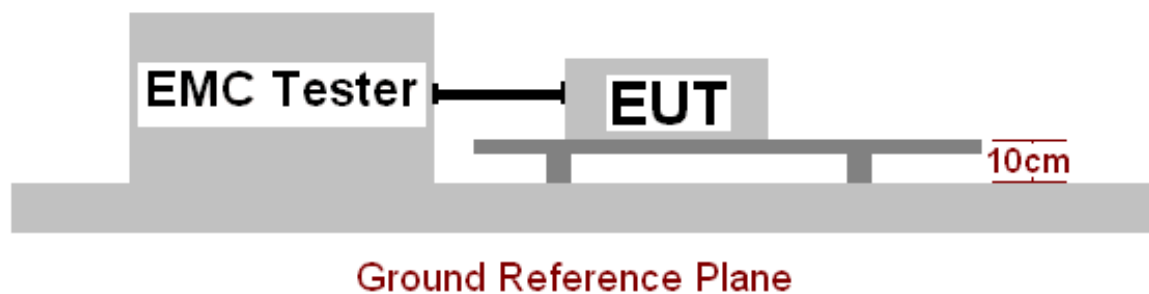
The power cord was used as supplied by the manufacturer. The EUT was connected to the line output of the Voltage Dips and Interruption Generator.

The EUT was tested for (I) 95% voltage dip of supplied voltage with duration of 10ms, (II) 30% voltage dip of supplied voltage and duration 500ms. Both of the dip tests were carried out for a sequence of three voltage dips with intervals of 10 seconds.

95% voltage interruption of supplied voltage with duration of 5000ms was followed, which was a sequence of three voltage interruptions with intervals of 10 seconds.

Voltage reductions occur at 0 dePOWERLDe crossover point of the voltage waveform. The performance of the EUT was checked after the voltage dip or interruption.

3.9.3 Test Setup



3.9.4 Test Result

Test Mode	Voltage Reduction	Duration (ms)	Times	Interval (Sec)	Observation	Comply with Criterion
Voltage dips	100%	20	3	10	Note (1)	A
	60%	200	3	10	Note (1)	A
	30%	500	3	10	Note (1)	A
Voltage interruptions	100%	5000	3	10	Note (1)	A

Note:

(1). The EUT continued to operate as intended. No degradation of performance was observed.

Annex : Technical Information

A1. Picture of machine



A2. Warning Label



A3.Nameplate

		Industrial Cobot	
Model: H7-890		Total Power:1.95 Kw	
Volatge/Frequence/Phase No: 220V-230V/50 Hz/1P			
Series No:RHB0725031001	Date for manufactured: 2025.3		
Dimension: 405mm*344mm*172mm	Weight: 12.5KG		
made in China			
Tel: +86 020- 84898493			
Manufacture name: Guangzhou Aucotech Automation Technology Ltd			
Manufacture address: Room 903, Building E1, Design City, No. 7, Hexian North Street, Helong Street, Baiyun District, Guangzhou City, CHINA			
Importer:***** Address:*****			