

Technical Construction File

File No: MD-TCF-190211-16904

Applicant:

SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD

Address of applicant:

ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT,
SHANGHAI.



Directive: 2006/42/EC Machinery Directive
2014/35/EU Low Voltage Directive

Legal Person: _____

Product: HIGH SPEED INDUSTRIAL DOOR

Model: /

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Part I: General

1.1 General description

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 12978:2003+A1:2009 Industrial, commercial and garage doors and gates

- Safety devices for power operated doors and gates - Requirements and test methods

EN13241-1:2003+A1:2011 Industrial, commercial and garage doors and gates - Product standard - Part 1: Products without fire resistance or smoke control characteristics

EN 60204-1:2006+A1:2009+AC: 2010 Safety of machinery - Electrical equipment of machines

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

1.2 List of the series products

N/A

1.3 Quality control system

In order to ensure the conformity of the series production, the SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD has taken the related procedures mentioned below :

(1) Apply for the consultant from the qualified body in Germany

The SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD has applied for the consultant from GTS Prüf- und Zertifizierungs GmbH who is a competent institute for the CE marking consultant and certification in China.

The complete technical construction file (TCF) have been established before applying for the CE marking certificate under the consultant of GTS.

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

Before the assemblies of the series production, the QC engineers of SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., 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.

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

Before packing the products, the QC engineers of SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD have to do the necessary inspection and testing to ensure the conformity of related requirements, in particularly, the testing and inspection of electrical characteristics and outer feature.

(4) 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.

(5) 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 SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD , if the change may effects the related electrical or mechanical characteristics.

(6) Provision for the Quality Assurance

For the provisions of internal control measures to ensure the conformity of series production of the machines, SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD has built an internal quality control system in accordance with the international standard of ISO-9001.

TEST REPORT

Essential health and safety requirements

Name and address of the testing laboratory	Shanghai Global Testing Services Co., Ltd Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China	Tel: / Fax: /
Name and address of the applicant	SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.	
Name and address of the manufacturer	SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.	
Name and address of the factory (production sites)	SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.	
Product	HIGH SPEED INDUSTRIAL DOOR	
Mode/type reference	/	
Tested according to	Essential health and safety requirements	
Test Result	PASS	
Test Report No.	MD-TCF-190211-16904-1	
Work carried out by	Tony Guo	Signature 
	Director	
Word verified by	Kevin Shi	Signature 
	Manager	
Date of issue	2019/03/10	



Part II: Assessment of conformity**2.1 Essential health and safety requirements****ESSENTIAL REQUIREMENTS ACCORDING TO ANNEX I****MACHINERY SAFETY DIRECTIVE 2006/42/EC**

Article	Sub-article	Requirement	Fulfilment			Remark
			Y	N	N/A	
1	1.1.2	<p><u>Principles of safety integration</u></p> <p>(a) Machinery must be so constructed that it is fitted for its function, and can be adjusted and maintained without putting persons at risk when these operations are carried out under the conditions foreseen by the manufacturer. The aim of measures taken must be to eliminate any risk of accident throughout the foreseeable lifetime of the machinery, including the phases of assembly and dismantling, even where risks of accident arise from foreseeable abnormal situations.</p> <p>(b) In selecting the most appropriate methods, the manufacturer must apply the following principles, in the order given:</p> <ul style="list-style-type: none"> - eliminate or reduce risks as far as possible (inherently safe machinery design and construction), - take the necessary protection measures in relation to risks that cannot be eliminated, - inform users of the residual risks due to any shortcomings of the protection measures adopted, indicate whether any particular training is required and specify any need to provide personal protection equipment. <p>(c) When designing and constructing machinery, and when drafting the instructions, the manufacturer must envisage not only the normal use of the</p>	<input checked="" type="checkbox"/>			<p>Pass. All the machines are fitted for the function. Enough protection is provided</p> <p>-</p> <p>Pass Manufacturer has provided enough safety devices to eliminate or reduce risks..</p> <p>Pass. Safety guards and other devices are used.</p> <p>Pass. Enough warnings are provided in the appropriate spot</p> <p>Pass. All the conditions are</p>

	<p>machinery but also uses which could reasonably be expected. The machinery must be designed to prevent abnormal use if such use would engender a risk. In other cases the instructions must draw the user's attention to ways - which experience has shown might occur - in which the machinery should not be used.</p> <p>(d) Under the intended conditions of use, the discomfort, fatigue and psychological stress faced by the operator must be reduced to the minimum possible taking ergonomic principles into account.</p> <p>(e) When designing and constructing machinery, the manufacturer must take account of the constraints to which the operator is subject as a result of the necessary or foreseeable use of personal protection equipment (such as footwear, gloves, etc.).</p> <p>(f) Machinery must be supplied with all the essential special equipment and accessories to enable it to be adjusted, maintained and used without risk.</p>			<p>considered by the manufacturer, and the related information also has been provided within the instruction</p> <p>Pass. These requirements have been complied with, and the related information also has been provided within the instruction manual.</p> <p>Pass. These requirements have been taken into account during the design of this machine</p>
1.1.3	<p><u>Materials and products</u></p> <p>The materials used to construct machinery or products used and created during its use must not endanger exposed persons' safety or health. In particular, where fluids are used, machinery must be designed and constructed for use without risks due to filling, use, recovery or draining.</p>	<input checked="" type="checkbox"/>		<p>Pass. They cannot endanger exposed person's safety or health</p>
1.1.4	<p><u>Lighting</u></p> <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> <p>The manufacturer must ensure 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 due to the lighting provided by the manufacturer.</p> <p>Internal parts requiring frequent inspection and adjustment and maintenance areas must be provided with appropriate lighting</p>	<input checked="" type="checkbox"/>		<p>Not applicable. No integral lighting has been used.</p> <p>Not applicable. No integral lighting has been used.</p> <p>Not applicable. No integral lighting has been used.</p>

1.1.5	<p><u>Design of machinery to facilitate its handling</u></p> <p>Machinery or each component part thereof must:</p> <ul style="list-style-type: none"> - be capable of being handled safely, - be packaged or designed so that it can be stored safely and without damage (e.g. adequate stability, special supports, etc.). <p>Where the weight, size or shape of machinery or its various component parts prevents them from being moved by hand, the machinery or each component part must;</p> <ul style="list-style-type: none"> - either be fitted with attachments for lifting gear, or - be designed so that it can be fitted with such attachments (e.g. threaded holes), or - be shaped in such a way that standard lifting gear can easily be attached. <p>Where machinery or one of its component parts is to be moved by hand, it must:</p> <ul style="list-style-type: none"> - either be easily movable, or - be equipped for picking up (e.g. hand-grips, etc.) and moving in complete safety. <p>Special arrangements must be made for the handling of tools and/or machinery parts, even if lightweight, which could be dangerous (shape, material, etc.).</p>			<input checked="" type="checkbox"/>	<p>-</p> <p>Pass. Enough measures have been taken to ensure the safe of the handling.</p> <p>Pass. The machine can be stored in wood box safely and without damage.</p> <p>Not applicable</p> <p>Not applicable</p> <p>Not applicable</p> <p>Not applicable</p> <p>Not applicable</p> <p>Not applicable</p> <p>Not applicable</p>
1.2	Controls			<input checked="" type="checkbox"/>	
1.2.1	<p><u>Safety and reliability of control systems</u></p> <p>Control systems must be designed and constructed so that they are safe and reliable, in a way that will prevent a dangerous situation arising.</p>				<p>Pass. The control system for this</p>

		<p>Above all they must be designed and constructed in such a way that:</p> <ul style="list-style-type: none"> - they can withstand the rigours of normal use and external factors, - errors in logic do not lead to dangerous situations. 			<p>machine is safe and reliable by appropriate designing</p> <p>-</p> <p>Pass. The control system can withstand related effects during normal operation.</p> <p>Pass. Any error in logic doesn't lead to dangerous situations.</p>
1.2.2	<u>Control devices</u>	<p>Control devices must be:</p> <ul style="list-style-type: none"> - clearly visible and identifiable and appropriately marked where necessary, - positioned for safe operation without hesitation or loss of time, and without ambiguity, - designed so that the movement of the control is consistent with its effect, - located outside the danger zones, except for certain controls where necessary, such as emergency stop, console for training of robots, - positioned so that their operation cannot cause additional risk, 	<input checked="" type="checkbox"/>		<p>Pass. Appropriate labels and markings are provided This requirement has been complied with</p> <p>Pass. Appropriate positions have been taken into account during design.</p> <p>Pass. Movement of the control is consistent with its effect</p> <p>Pass. All control devices have been located outside the danger zones.</p> <p>Pass. All operation of control</p>

		<p>- designed or protected so that the desired effect, where a risk is involved, cannot occur without an intentional operation,</p> <p>- made so as to withstand foreseeable strain; particular attention must be paid to emergency stop devices liable to be subjected to considerable strain.</p> <p>Where a control is designed and constructed to perform several different actions, namely where there is no one-to-one correspondence (e.g. keyboards, etc.), the action to be performed must be clearly displayed and subject to confirmation where necessary.</p> <p>Controls 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.</p> <p>Constraints due to the necessary or foreseeable use of personal protection equipment (such as footwear, gloves, etc.) must be taken into account.</p> <p>Machinery must be fitted with indicators (dials, signals, etc.) as required for safe operation. The operator must be able to read them from the control position</p> <p>From the main control position the operator must be able to ensure that there are no exposed persons in the danger zones.</p> <p>If this is impossible, the control system must be designed and constructed so that an acoustic and/ or visual warning signal is given whenever the machinery is about to start. The exposed person must have the time and the means to take rapid action to prevent the machinery starting up.</p>			<p>devices 'tcause additional risk.</p> <p>Pass. ppropriate safety devices have been used to comply with this requirement.</p> <p>Pass. All of them can withstand foreseeable strain.</p> <p>Not applicable.</p> <p>Pass. These requirements have been taken into account during design.</p> <p>Not applicable.</p> <p>Pass. The indicators have been provided.</p> <p>Pass. Emergency stop , main switch and other related devices have been provided for the exposed person.</p>
1.2.3	<u>Starting</u>	<p>It must be possible to start machinery only by voluntary actuation of a control provided for the purpose.</p>	<input checked="" type="checkbox"/>		<p>Pass. Devices preventing unintended</p>

		<p>The same requirement applies:</p> <ul style="list-style-type: none"> - when restarting the machinery after a stop-page, whatever the cause, - when effecting a significant change in the operating conditions (e.g. speed, pressure, etc.), <p>unless such restarting or change in operating conditions is without risk to exposed persons. This essential requirement does not apply to the restarting of the machinery or to the change in operating conditions resulting from the normal sequence of an automatic cycle.</p> <p>Where machinery has several starting controls and the operators can therefore put each other in danger, additional devices (e.g. enabling devices or selectors allowing only one part of the starting mechanism to be actuated at any one time) must be fitted to rule out such risks.</p> <p>It must be possible for automated plant functioning in automatic mode to be restarted easily after a stoppage once the safety conditions have been fulfilled.</p>			<p>strating have been provided.</p> <p>Pass. Reset is necessary before restarting.</p> <p>Pass. These requirements have been complied with.</p> <p>—</p> <p>Not applicable.</p> <p>Not applicable.</p>
1.2.4		<p><u>Stopping device</u></p> <p><u>Normal stopping</u></p> <p>Each machine must be fitted with a control whereby the machine can be brought safely to a complete stop.</p> <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. The machinery's stop control must have priority over the start controls..</p> <p>Once the machinery or its dangerous parts have stopped, the energy supply to the actuators concerned must be cut off</p>	<input checked="" type="checkbox"/>		<p>Pass. A normal stop control has been provided.</p> <p>Pass. It has priority over the start control.</p> <p>Pass.</p>

					The stops belong to the category 0, or category 1 stops.
		<p><u>Emergency stop</u> Each machine must be fitted with one or more emergency stop devices to enable actual or impending danger to be averted.</p> <p>The following exceptions apply:</p> <ul style="list-style-type: none"> - 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, - hand-held portable machines and hand-guided machines. <p>This device must:</p> <ul style="list-style-type: none"> - have clearly identifiable, clearly visible and quickly accessible controls, - stop the dangerous process as quickly as possible, without creating additional hazards, - where necessary, trigger or permit the triggering of certain safeguard movements. <p>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; it must not be possible to engage the device without triggering a stop command; 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.</p>	<input checked="" type="checkbox"/>		<p>Pass. These machines are fitted with one emergency stop devices. —</p> <p>Not applicable.</p> <p>Not applicable. —</p> <p>Pass. The emergency stop has red button, yellow background and marked with “emergency stop”</p> <p>Pass. The emergency stop will stop the machine as soon as it is pressed and it will not create any additional hazards.</p> <p>Not applicable.</p>
		<u>Complex installations</u>	<input checked="" type="checkbox"/>		—

		In the case of machinery or parts of machinery designed to work together, the manufacturer 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.			Not applicable.
1.2.5	<u>Mode selection</u>	<p>The control mode selected must override all other control systems with the exception of the emergency stop.</p> <p>If machinery has been designed and built to allow for its use in several control or operating modes presenting different safety levels (e.g. to allow for adjustment, maintenance, inspection, etc.), it must be fitted with a mode selector which can be locked in each position. Each position of the selector must correspond to a single operating or control mode.</p> <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 (e.g. access codes for certain numerically controlled functions, etc.).</p> <p>If, for certain operations, the machinery must be able to operate with its protection devices neutralised, the mode selector must simultaneously:</p> <ul style="list-style-type: none"> - disable the automatic control mode, - permit movements only by controls requiring sustained action, - permit the operation of dangerous moving parts only in enhanced safety conditions (e.g. reduced speed, reduced power, step-by-step, or other adequate provision) while preventing hazards from linked sequences, - prevent any movement liable to pose a danger by acting voluntarily or involuntarily on the machine's internal sensors. <p>In addition, the operator must be able to control operation of the parts he is working on at the adjustment point.</p>	<input checked="" type="checkbox"/>		<p>Pass. The emergency stop is effective regardless of operating modes.</p> <p>Not applicable. No this kind of mode selection has been found.</p> <p>Not applicable. No this kind of mode selection has been found</p> <p>Not applicable. No this kind of mode selection has been found.</p> <p>Not applicable. No this kind of mode selection has been found.</p> <p>Not applicable. No this kind of mode selection has been found.</p> <p>Not applicable. No this kind of mode selection has been found.</p> <p>Not applicable. No this kind of mode selection has been found.</p> <p>Not applicable. No this kind of mode selection has been found.</p> <p>Not applicable. No this kind of mode selection has been found.</p> <p>Not applicable. No this kind of mode selection has been found.</p>

						selectionhas been found.
1.2.6	<p><u>Failure of the power supply</u></p> <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.</p> <p>In particular:</p> <ul style="list-style-type: none"> - the machinery must not start unexpectedly, - the machinery must not be prevented from stopping if the command has already been given, - no moving part of the machinery or piece held by the machinery must fall or be ejected, - automatic or manual stopping of the moving parts whatever they may be must be unimpeded, - the protection devices must remain fully effective. 	<input checked="" type="checkbox"/>				<p>—</p> <p>Pass. No any dangerous situation has been found.</p> <p>—</p> <p>Pass. The stop command has the priorityover all other devices</p> <p>Pass. No such part is found.</p>
1.2.7	<p><u>Failure of the control circuit</u></p> <p>A fault in the control circuit logic, or failure of or damage to the control circuit must not lead to dangerous situations.n particular:</p> <ul style="list-style-type: none"> - the machinery must not start unexpectedly, - the machinery must not be prevented from stopping if the command has already been given, - no moving part of the machinery or piece held by the machinery must fall or be ejected, - automatic or manual stopping of the moving parts whatever they may be must be unimpeded, 	<input checked="" type="checkbox"/>				

		- the protection devices must remain fully effective.				
1.2.8	<u>Software</u>	Interactive software between the operator and the command or control system of a machine must be user-friendly.			<input checked="" type="checkbox"/>	
1.3		Protection against mechanical hazards	<input checked="" type="checkbox"/>			-
1.3.1	Stability	<p>Machinery, components and fittings thereof must be so designed and constructed that they are stable enough, under the foreseen operating conditions (if necessary taking climatic conditions into account) for use without risk of overturning, falling or unexpected movement.</p> <p>If the shape of the machinery itself or its intended installation does not offer sufficient stability, appropriate means of anchorage must be incorporated and indicated in the instructions.</p>				<p>-</p> <p>Pass. These requirements have been taken into account design</p> <p>Not applicable. The sufficient stability has been offered for this machine.</p>
1.3.2	<u>Risk of break-up during operation</u>	<p>The various parts of machinery and their linkages must be able to withstand the stresses to which they are subject when used as foreseen by the manufacturer.</p> <p>phenomena of fatigue, ageing, corrosion and abrasion.</p> <p>The durability of the materials used must be adequate for the nature of the work place foreseen by the manufacturer, in particular as regards the</p> <p>The manufacturer must indicate in the instructions the type and frequency of inspection and maintenance required for safety reasons. He must, where appropriate, indicate the parts subject to wear and the criteria for replacement.</p> <p>Where a risk of rupture or disintegration remains despite the measures taken (e.g. as with grinding wheels) the moving parts must be mounted and positioned in such a way that in case of rupture their fragments will be</p>	<input checked="" type="checkbox"/>			<p>Pass. All parts of the machine can withstand related stress when they are used.</p> <p>Pass. All materials used for this machine are appropriate for their intended use and have adequate life.</p> <p>Pass. The related information has been provided within the instruction manual.</p> <p>Not applicable. No such risk is possible.</p>

	<p>contained.</p> <p>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; precautions must be taken to ensure that no risk is posed by a rupture (sudden movement, high-pressure jets, etc.). 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 (e.g. tool breakage):</p> <ul style="list-style-type: none"> - when the workpiece comes into contact with the tool the latter must have attained its normal working conditions, - when the tool starts and/or stops (intentionally or accidentally) the feed movement and the tool movement must be coordinated. 				<p>Not applicable.</p> <p>Pass.</p> <p>Pass.</p>
1.3.3	<p><u>Risks due to falling or ejected objects</u></p> <p>Precautions must be taken to prevent risks from falling or ejected objects (e.g. workpieces, tools, cuttings, fragments, waste, etc.).</p>	<input checked="" type="checkbox"/>			
1.3.4	<p><u>Risks due to surfaces, edges or angles</u></p> <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.</p>	<input checked="" type="checkbox"/>			<p>—</p> <p>Pass. No this kind injury has been found.</p>
1.3.5	<p><u>Risks related to combined machinery</u></p> <p>Where the machinery is intended to carry out several different operations with the manual removal of the piece between each operation (combined machinery), 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. For this purpose, it must be possible to start and stop separately any elements that are not protected.</p>			<input checked="" type="checkbox"/>	<p>—</p> <p>Not applicable. No this kind of combined machinery.</p> <p>Not applicable. No this kind of combined machinery.</p>

1.3.6	<p><u>Risks relating to variations in the rotational speed of tools</u></p> <p>When the machine is designed to perform operations under different conditions of use (e.g. different speeds or energy supply), 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>	☑			<p>—</p> <p>Not applicable.</p>
1.3.7	<p><u>Prevention of risks related to moving parts</u></p> <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.</p> <p>All necessary steps must be taken to prevent accidental blockage of moving parts involved in the work.</p>	☑			<p>—</p> <p>Pass. This kind of hazards have been prevented by appropriate guards.</p> <p>Pass. All necessary steps have been taken.</p>
	<p>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.</p>				<p>Not applicable. No this kind of need.</p>
1.3.8	<p><u>Choice of protection against risks related to moving parts</u></p> <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. The following guidelines must be used to help make the choice.</p> <p><u>A. Moving transmission parts</u></p> <p>Guards designed to protect exposed persons against the risks associated with moving transmission parts (such as pulleys, belts, gears, rack and pinions, shafts, etc.) must be:</p> <ul style="list-style-type: none"> - either fixed, complying with requirements 1.4.1 and 1.4.2.1, or - movable, complying with requirements 1.4.1 and 1.4.2.2.A. 	☑			<p>—</p> <p>Pass. It is in accordance with the risk assessment.</p> <p>See the related clauses.</p> <p>See the related clauses.</p>

		Movable guards should be used where frequent access is foreseen.				
		<p><u>B. Moving parts directly involved in the process</u></p> <p>Guards or protection devices designed to protect exposed persons against the risks associated with moving parts contributing to the work (such as cutting tools, moving parts of presses, cylinders, parts in the process of being machined, etc.) must be:</p> <ul style="list-style-type: none"> - wherever possible fixed guards complying with requirements 1.4.1 and 1.4.2.1, - otherwise, movable guards complying with requirements 1.4.1 and 1.4.2.2.B or protection devices such as sensing devices (e.g. non-material barriers, sensor mats), remote-hold protection devices (e.g. two-hand controls), or protection devices intended automatically to prevent all or part of the operator's body from encroaching on the danger zone in accordance with requirements 1.4.1 and 1.4.3. <p>However, when certain moving parts directly involved in the process cannot be made completely or partially inaccessible during operation owing to operations requiring nearby operator intervention, where technically possible such parts must be fitted with:</p> <ul style="list-style-type: none"> - fixed guards, complying with requirements 1.4.1 and 1.4.2.1 preventing access to those sections of the parts that are not used in the work, - adjustable guards, complying with requirements 1.4.1 and 1.4.2.3 restricting access to those sections of the moving parts that are strictly for the work. 	<input checked="" type="checkbox"/>			
	1.4	<u>Required characteristics of guards and protection devices</u>	<input checked="" type="checkbox"/>			
	1.4.1	<p><u>General requirements</u></p> <p>Guards and protection devices must:</p> <ul style="list-style-type: none"> - be of robust construction, - not give rise to any additional risk, 				<p>Pass. They all can be opened only with tools. Not applicable.</p>

		<ul style="list-style-type: none"> - not be easy to by-pass or render non-operational, - be located at an adequate distance from the danger zone, - cause minimum obstruction to the view of the production process, - enable essential work to be carried out on installation and/or replacement of tools and also for maintenance by restricting access only to the area where the work has to be done, if possible without the guard or protection device having to be dismantled. 				Not applicable.
1.4.2		<u>Special requirements for guards</u>	<input checked="" type="checkbox"/>			
1.4.2.1		<u>Fixed guards</u> Fixed guards must be securely held in place. They must be fixed by systems that can be opened only with tools. Where possible, guards must be unable to remain in place without their fixings.				
1.4.2		<u>Movable guards</u>			<input checked="" type="checkbox"/>	
1.4.2.2		<u>A. Type A movable guards must</u> <ul style="list-style-type: none"> - as far as possible remain fixed to the machinery when open, - be associated with a locking device to prevent moving parts starting up as long as these parts can be accessed and to give a stop command whenever they are no longer closed. 				
1.4.2		<u>B. Type B movable guards must be designed and incorporated into the</u>			<input checked="" type="checkbox"/>	
1.4.2.2		<u>control system so that:</u> <ul style="list-style-type: none"> - moving parts cannot start up while they are within the operator's reach, - the exposed person cannot reach moving parts once they have started up, - they can be adjusted only by means of an intentional action, such as the use of a tool, key, etc., - the absence or failure of one of their components prevents starting or stops the moving parts, - protection against any risk of ejection is proved by means of an appropriate barrier. 				

1.4.2	<u>Adjustable guards restricting access</u>			<input checked="" type="checkbox"/>	
1.4.2.3	Adjustable guards restricting access to those areas of the moving parts strictly necessary for the work must: - be adjustable manually or automatically according to the type of work involved, - be readily adjustable without the use of tools, - reduce as far as possible the risk of ejection.				
1.4.3	<u>Special requirements for protection devices</u> Protection devices must be designed and incorporated into the control system so that:			<input checked="" type="checkbox"/>	
	- moving parts cannot start up while they are within the operator's reach,				
	- the exposed person cannot reach moving parts once they have started up, - they can be adjusted only by means of an intentional action, such as the use of a tool, key, etc., - the absence or failure of one of their components prevents starting or stops the moving parts.				
1.5	<u>Protection against other hazards</u>	<input checked="" type="checkbox"/>			
1.5.1	<u>Electricity supply</u> 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. The specific rules in force relating to electrical equipment designed for use within certain voltage limits must apply to machinery which is subject to those limits.				
1.5.2	<u>Static electricity</u> Machinery must be so designed and constructed as to prevent or limit the build-up of potentially dangerous electrostatic charges and/or be fitted with a discharging system.	<input checked="" type="checkbox"/>			
1.5.3	<u>Energy supply other than electricity</u>	<input checked="" type="checkbox"/>			

	Where machinery is powered by an energy other than electricity (e.g. hydraulic, pneumatic or thermal energy, etc.), it must be so designed, constructed and equipped as to avoid all potential hazards associated with these types of energy.			
1.5.4	<p><u>Errors of fitting</u></p> <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 given on the parts themselves and/or the housings. The same information must be given on moving parts and/or their housings where the direction of movement must be known to avoid a risk. Any further information that may be necessary must be given in the instructions.</p> <p>Where a faulty connection can be the source of risk, incorrect fluid connections, including electrical conductors, must be made impossible by the design or, failing this, by information given on the pipes, cables, etc. and/or connector blocks.</p>	<input checked="" type="checkbox"/>		
1.5.5	<p><u>Extreme temperatures</u></p> <p>Steps 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. The risk of hot or very cold material being ejected should be assessed. Where this risk exists, the necessary steps must be taken to prevent it or, if this is not technically possible, to render it non-dangerous.</p>		<input checked="" type="checkbox"/>	
1.5.6	<p><u>Fire</u></p> <p>Machinery must be designed and constructed to avoid all risk of fire or overheating posed by the machinery itself or by gases, liquids, dust, vapours or other substances produced or used by the machinery.</p>		<input checked="" type="checkbox"/>	
1.5.7	<p><u>Explosion</u></p> <p>Machinery must be designed and constructed to avoid any risk of explosion posed by the machinery itself or by gases, liquids, dust, vapours or other substances produced or used by the machinery. To that end the manufacturer must take steps to:</p> <ul style="list-style-type: none"> - avoid a dangerous concentration of products, - prevent combustion of the potentially explosive atmosphere, 		<input checked="" type="checkbox"/>	

	<p>- minimise any explosion which may occur so that it does not endanger the surroundings. The same precautions must be taken if the manufacturer foresees the use of the machinery in a potentially explosive atmosphere. Electrical equipment forming part of the machinery must conform, as far as the risk from explosion is concerned, to the provision of the specific Directives in force.</p>				
1.5.8	<p><u>Noise</u></p> <p>Machinery must be so designed and constructed that risks resulting from the emission of airborne noise are reduced to the lowest level taking account of technical progress and the availability of means of reducing noise, in particular at source.</p>	<input checked="" type="checkbox"/>			
1.5.9	<p><u>Vibration</u></p> <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.</p>			<input checked="" type="checkbox"/>	
1.5.10	<p><u>Radiation</u></p> <p>Machinery must be so designed and constructed that any emission of radiation is limited to the extent necessary for its operation and that the effects on exposed persons are non-existent or reduced to non-dangerous proportions.</p>			<input checked="" type="checkbox"/>	
1.5.11	<p><u>External radiation</u></p> <p>Machinery must be so designed and constructed that external radiation does not interfere with its operation.</p>			<input checked="" type="checkbox"/>	
1.5.12	<p><u>Laser equipment</u></p> <p>Where laser equipment is used, the following provisions should be taken into account:</p> <ul style="list-style-type: none"> - laser equipment on machinery must be designed and constructed so as to prevent any accidental radiation, - laser equipment on machinery must be protected so that effective radiation, radiation produced by reflection or diffusion and secondary radiation do not damage health, 			<input checked="" type="checkbox"/>	

		- 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.				
1.5.13		<p><u>Emissions of dust, gases, etc</u></p> <p>Machinery must be so designed, constructed and/or equipped that risks due to gases, liquids, dust, vapours and other waste materials which it produces can be avoided.</p> <p>Where a hazard exists, the machinery must be so equipped that the said substances can be contained and/or evacuated.</p> <p>Where machinery is not enclosed during normal operation, the devices for containment and/or evacuation must be situated as close as possible to the source emission.</p>			<input checked="" type="checkbox"/>	<p>Adequate design and construction have been taken</p> <p>All the conditions have been considered</p>
1.5.14		<p><u>Risk of being trapped in a machine</u></p> <p>Machinery must be designed, constructed or fitted with a means of preventing an exposed person from being enclosed within it or, if that is impossible, with a means of summoning help.</p>	<input checked="" type="checkbox"/>			
1.5.15		<p><u>Risk of slipping, tripping or falling</u></p> <p>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.</p>			<input checked="" type="checkbox"/>	
1.6		<p><u>Maintenance</u></p>	<input checked="" type="checkbox"/>			
1.6.1		<p><u>Machinery maintenance</u></p> <p>Adjustment, lubrication and maintenance points must be located outside danger zones. It must be possible to carry out adjustment, maintenance, repair, cleaning and servicing operations while machinery is at a standstill.</p> <p>If one or more of the above conditions cannot be satisfied for technical reasons, these operations must be possible without risk (see 1.2.5).</p> <p>In the case of automated machinery and, where necessary, other machinery, the manufacturer must make provision for a connecting device for mounting diagnostic fault-finding equipment.</p> <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. Access to the components must enable these tasks to be carried out with the necessary technical means (tools,</p>				

		measuring instruments, etc.) in accordance with an operating method specified by the manufacturer.			
1.6.2		<p><u>Access to operating position and servicing points</u></p> <p>The manufacturer must provide means of access (stairs, ladders, catwalks, etc.) to allow access in safety to all areas used for production, adjustment and maintenance operations.</p>	<input checked="" type="checkbox"/>		Appropriate guards and safety control device have been used
1.6.3		<p><u>Isolation of energy sources</u></p> <p>All machinery must be fitted with means to isolate it from all energy sources. Such isolators must be clearly identified.</p> <p>They must be capable of being locked if reconnection could endanger exposed persons. In the case of machinery supplied with electricity through a plug capable of being plugged into a circuit, separation of the plug is sufficient.</p> <p>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.</p> <p>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> <p>As an exception to the above requirements, certain circuits may remain connected to their energy sources in order, for example, to hold parts, protect information, light interiors, etc. In this case, special steps must be taken to ensure operator safety.</p>	<input checked="" type="checkbox"/>		The power switch has been used
1.6.4		<p><u>Operator intervention</u></p> <p>Machinery must be so designed, constructed and equipped that the need for operator intervention is limited.</p> <p>If operator intervention cannot be avoided, it must be possible to carry it out easily and in safety.</p>	<input checked="" type="checkbox"/>		
1.6.5		<p><u>Cleaning of internal parts</u></p> <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 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</p>	<input checked="" type="checkbox"/>		

		allow cleaning to take place with the minimum of danger.				
1.7	<u>Indicators</u>		<input checked="" type="checkbox"/>			
1.7.0	<u>Information devices</u>	The information needed to control machinery must be unambiguous and easily understood. It must not be excessive to the extent of overloading the operator. Where the health and safety of exposed persons may be endangered by a fault in the operation of unsupervised machinery, the machinery must be equipped to give an appropriate acoustic or light signal as a warning.				
1.7.1	<u>Warning devices</u>	Where machinery is equipped with warning devices (such as signals, etc.), these must be unambiguous and easily perceived. The operator must have facilities to check the operation of such warning devices at all times. The requirements of the specific Directives concerning colours and safety signals must be complied with.	<input checked="" type="checkbox"/>			
1.7.2	<u>Warning of residual risks</u>	Where risks remain despite all the measures adopted or in the case of potential risks which are not evident (e.g. electrical cabinets, radioactive sources, bleeding of a hydraulic circuit, hazard in an unseen area, etc.), the manufacturer must provide warnings. Such warnings should preferably use readily understandable pictograms and/or be drawn up in one of the languages of the country in which the machinery is to be used, accompanied, on request, by the languages understood by the operators.			<input checked="" type="checkbox"/>	
1.7.3	<u>Marking</u>	All machinery must be marked legibly and indelibly with the following minimum particulars: - name and address of the manufacturer,	<input checked="" type="checkbox"/>			

	<ul style="list-style-type: none"> - the CE marking (see Annex III), - designation of series or type, - serial number, if any, - the year of construction. <p>Furthermore, where the manufacturer constructs machinery intended for use in a potentially explosive atmosphere, this must be indicated on the machinery.</p> <p>Machinery must also bear full information relevant to its type and essential to its safe use (e.g. maximum speed of certain rotating parts, maximum diameter of tools to be fitted, mass, etc.).</p> <p>Where a machine part must be handled during use with lifting equipment, its mass must be indicated legibly, indelibly and unambiguously.</p> <p>The interchangeable equipment referred to in the third indent of <u>Article 1(2)(a)</u>, must bear the same information.</p>				
1.7.4	<p><u>Instructions</u></p> <p>(a) All machinery must be accompanied by instructions including at least the following:</p> <ul style="list-style-type: none"> - a repeat of the information with which the machinery is marked, except the serial number (see 1.7.3) together with any appropriate additional information to facilitate maintenance (e.g. addresses of the importer, repairers, etc.), - foreseen use of the machinery within the meaning of 1.1.2(c), - workstation(s) likely to be occupied by operators, - instructions for safe: <ul style="list-style-type: none"> - putting into service, - use, - handling, giving the mass of the machinery and its various parts where they are regularly to be transported separately, - assembly, dismantling, 	<input checked="" type="checkbox"/>			User manual in English provided

- adjustment

- maintenance (servicing and repair),
- where necessary, training instructions,
- where necessary, the essential characteristics of tools which may be fitted to the machinery.

Where necessary, the instructions should draw attention to ways in which the machinery should not be used.

(b) The instructions must be drawn up in one of the Community languages by the manufacturer or his authorised representative established in the Community.

On being put into service, all machinery must be accompanied by a translation of the instructions in the language or languages of the country in which the machinery is to be used and by the instructions in the original language. This translation must be done either by the manufacturer or his authorised representative established in the Community or by the person introducing the machinery into the language area in question.

By way of derogation from this requirement, the maintenance instructions for use by specialised personnel employed by the manufacturer or his authorised representative established in the Community may be drawn up in only one of the Community languages understood by that personnel.

(c) The instructions must contain the drawings and diagrams necessary for putting into service, maintenance, inspection, checking of correct operation and, where appropriate, repair of the machinery, and all useful instructions in particular with regard to safety.

(d) Any literature describing the machinery must not contradict the instructions as regards safety aspects. The technical documentation describing the machinery must give information regarding the airborne noise emissions referred to in (f) and, in the case of hand-held and/or hand-guided machinery, information regarding vibration as referred to in 2.2.

(e) Where necessary, the instructions must give the requirements relating to installation and assembly for reducing noise or vibration (e.g. use of dampers, type and mass of foundation block, etc.).

(f) The instructions must give the following information concerning airborne noise emissions by the machinery, either the actual value or a value established on the basis of measurements made on identical machinery:

- equivalent continuous A-weighted sound pressure level at workstations, where this exceeds 70 dB(A); where this level does not exceed 70 dB(A), this

	<p>fact must be indicated,</p> <ul style="list-style-type: none"> - peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 mPa), - sound power level emitted by the machinery where the equivalent continuous A-weighted sound pressure level at workstations exceeds 85 dB(A). <p>In the case of very large machinery, instead of the sound power level, the equivalent continuous sound pressure levels at specified positions around the machinery may be indicated.</p> <p>Where the harmonised standards are not applied, sound levels must be measured using the most appropriate method for the machinery.</p> <p>The manufacturer must indicate the operating conditions of the machinery during measurement and what methods have been used for the measurement.</p> <p>Where the workstation(s) are undefined or cannot be defined, sound pressure levels must be measured at a distance of 1 metre from the surface of the machinery and at a height of 1,60 metres from the floor or access platform. The position and value of the maximum sound pressure must be indicated.</p> <p>(g) If the manufacturer foresees that the machinery will be used in a potentially explosive atmosphere, the instructions must give all the necessary information.</p> <p>(h) In the case of machinery which may also be intended for use by non-professional operators, the wording and layout of the instructions for use, whilst respecting the other essential requirements mentioned above, must take into account the level of general education and acumen that can reasonably be expected from such operators.</p>				
<p>Technical construction file shall be retained and kept available for the competent national authorities for at least 10 years following the date of manufacture of the machinery or of the last unit produced.</p>	<input checked="" type="checkbox"/>				
<p>Safety measures for fulfilling the product conformity requirements</p> <ul style="list-style-type: none"> - Critical components shall be checked for every purchasing order if it is comply with the critical component list and relevant conformance and requirements are considered during incoming inspection. - Production flow chart and quality control plans 	<input checked="" type="checkbox"/>				

- Regulatory compliance records for the released machinery. (Availability and compliance)

- ▣ Relevant warning signs
- ▣ CE Conformity mark
- ▣ User manual
- ▣ Relevant circuit diagrams
- ▣ Relevant accessories, tools and apparatus
- ▣ Functional tests
- ▣ Mechanical tests
- ▣ Electrical safety tests



TEST REPORT

EN 12978:2003+A1:2009 Industrial, commercial and garage doors and gates

- Safety devices for power operated doors and gates - Requirements and test methods

EN13241-1:2003+A1:2011 Industrial, commercial and garage doors and gates - Product standard - Part 1:

Products without fire resistance or smoke control characteristics

Name and address of the testing laboratory	Shanghai Global Testing Services Co., Ltd Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China	Tel: / Fax: /
Name and address of the applicant	SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.	
Name and address of the manufacturer	SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.	
Name and address of the factory (production sites)	SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.	
Product	HIGH SPEED INDUSTRIAL DOOR	
Mode/type reference	/	
Tested according to	EN 12978:2003+A1:2009, EN13241-1:2003+A1:2011.	
Test Result	PASS	
Test Report No.	MD-TCF-190211-16904-2	
Work carried out by	Tony Guo	Signature 
	Director	
Word verified by	Kevin Shi	Signature 
	Manager	
Date of issue	2019/03/10	



EN 12978			
Clause	Requirement – Test	Result - Remark	Verdict
4.1.1	Environmental conditions		
	General		
	The safety device shall maintain its protective function and be suitable for operation in the environmental conditions expected from the intended use of the device.	This requirement is complied with.	Pass
	following vibration conditions in accordance with EN 60068-2-6: <ul style="list-style-type: none"> – frequency range: 10 Hz to 55 Hz; – displacement: 0,15 mm; – cycles per axis: 10; – sweep rate: 1 octave/min. After this vibration test, the safety device shall continue to operate normally. 		
4.1.2	Power supply		
4.1.2.1	Electrical power supply		
	The safety devices shall be designed to operate correctly under full load as well as no load with the conditions of the nominal supply as specified in 4.3.1 and 4.3.4 of EN 60204-1:1997.	Appropriate machine design has been performed by the manufacturer.	Pass
4.1.2.2	Non-electrical inner power supply		
	The device shall continue to operate normally when subjected to supply pressure variations within the range specified by the manufacturer. Devices shall be in accordance with the requirements of EN 982 and EN 983, as applicable. Variations of supply pressure below the operating range shall not prevent the OSSD to change to the off state.	Not Applicable.	N/A
4.1.3	Electrical equipment		
	The electrical equipment shall be suitable for their intended use and be operated within their specified ratings. Protection against electric shock shall be provided in accordance with 6.1, 6.2 and 6.3 of EN 60204-1:1997. Overcurrent protection, where applicable, shall be provided in accordance with 7.2.1, 7.2.3, 7.2.7, 7.2.8, and 7.2.9 of EN 60204-1:1997.	Appropriate machine design has been performed by the manufacturer.	Pass

EN 12978			
Clause	Requirement – Test	Result - Remark	Verdict
	The electrical equipment shall be suitable for pollution degree 3 in accordance with 6.1.2.3 of EN 60439-1:1994. For electrical enclosures with a degree of protection of IP 54 or higher (according to EN 60529), pollution degree 2 is permissible.	Appropriate machine design has been performed by the manufacturer.	Pass
	The electrical equipment shall be wired in accordance with 7.8.3 of EN 60439-1:1994 and with EN 60204-1. Where components of different configurations are interchangeable by means of plug and socket connections, incorrect placement or exchange of these components shall either be made impossible by design or shall not cause a failure to danger.	This requirement is complied with.	Pass
	When the ambient temperature limits set in 60204-1 are exceeded, the appropriate means such as design, heating, cooling, specific testing, etc. shall be used.	This requirement is complied with.	Pass
	If a sensing element is connected by a plug and socket, either:		
	a) removal or disconnection of the sensing element at the plug and socket		Pass
	from the control unit shall cause the OSSD to go to an off-state; or b) the removal/disconnection shall be detected at the latest at one of the final end positions of the door leaf travel.		
4.1.4	Enclosures for electrical equipment		
	Enclosures intended to be exposed to outdoor conditions shall be at least IPX4.	IP55	Pass
4.1.5	Functional requirements		
4.1.5.1	Safety device response		
	The sensing function output shall change state when the device is actuated	This requirement is complied with.	Pass
4.1.5.2	Detection capability The detection capability stated by the manufacturer shall be maintained: – for a supply which remains within the limits; – throughout the detection zone; – throughout the intended conditions of use.	The appropriate technical knowledge of mechanical has been taken into account.	Pass

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Clause	Requirement – Test	Result - Remark	Verdict
4.1.6	Adjustments		
	Where adjustment is provided this shall only be possible by means of a	The appropriate technical knowledge of mechanical	Pass
	key, tool or other means giving an equivalent level of security. Adjustment shall require intentional human intervention.	has been taken into account.	
4.1.7	Fixing of safety devices	The appropriate technical knowledge of mechanical has been taken into account.	
	The design of the safety device shall enable it to be fixed in the mounting orientation intended by the manufacturer. The sensing element shall have sufficient mechanical strength to withstand the maximum forces stated by the manufacturer.	This requirement is complied with.	Pass
4.2	Additional requirements for pressure sensitive protective equipment	The materials have been treated by appropriate methods.	Pass
4.2.1	Additional coverings for sensing elements	The materials have been treated by appropriate methods.	Pass
	Where the manufacturer specifies that additional coverings such as flexible extrusions can be used over the top of the sensing element, the requirements of this standard shall be fulfilled by the covered sensing element.	The materials have been treated by appropriate methods.	Pass
4.2.2	Actuating force	The materials have been treated by appropriate methods.	Pass
	The actuating force shall be applied perpendicular to the sensing surface of the pressure sensitive protective	The materials have been treated by appropriate methods.	Pass
	equipment as shown on Figure 5. The maximum working force (see Figure 3) shall be compatible with the requirements of EN 12453:2000, annex A.		
	Figure 5 — Direction of actuating force F applied to		

EN 12978			
Clause	Requirement – Test	Result - Remark	Verdict
	a pressure sensitive equipment		
	The maximum working force (see Figure 3) shall be compatible with the requirements of EN 12453:2000, annex A.		
4.2.3.1	Recovery after deformation		
	<p>After being subject to the maximum actuating force using test piece n°1 for a period of 24 hours, the active area shall recover the same characteristics as before the loading within 30s under the worst temperature conditions within the temperature range, and the pressure sensitive edge or bar shall operate normally (i.e. the OSSD operates).</p> <p>For pressure sensitive edge and bar only intended to be installed on doors where they are never loaded during normal operation of the door, including when the door is the closed position, it may be accepted that the pressure sensitive edge or bar has a residual deformation after 30s of not more than 20% (as specified in EN 1760-2).</p>	No noise will result in hazard in this machine.	Pass
4.2.3.2	Protruding parts	No vibration will result in hazard in this machine.	Pass
	Exposed parts of pressure sensitive edges and bars shall have no sharp edges and corners which can cause injury to persons coming into contact with the device(s). They shall be rounded to a 3mm radius.	No hazardous substances will result in hazard in this machine.	Pass
4.2.4.1	Static force	No radiation will result in hazard in this machine.	Pass
4.2.4.1.1	Sensing element load capability	Appropriate working coefficients have been taken into account during design and calculation.	Pass
	The pressure sensitive mat(s) or pressure sensitive floor(s) shall fulfil the requirements in 4.4.1 of EN 1760-1:1997.		

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Clause	Requirement – Test	Result - Remark	Verdict
	Pressure sensitive mats and floors intended to be used by wheeled traffic shall be so designed that they are able to resist the forces derived from the expected traffic.		
4.2.4.1.2	Sensing element deformation capability		
	The pressure sensitive mat(s) or pressure sensitive floor(s) shall fulfil the requirements in 4.4.2 of EN 1760-1:1997.	Not applicable.	N/A
4.2.4.2	Tripping		
	The pressure sensitive mats and floors shall be designed so that they can be recessed into a mat well and mounted flush with the surrounding floor. Where mats or floors are intended to be used in combination, provision shall be made to minimise the tripping hazard at joints and junctions between the mats or floors.	The appropriate technology has been chosen.	Pass
	NOTE This is normally realised e.g. by junctions, by limitations of the difference in level to maximum 6 mm.		
4.2.4.3	Slipperiness and softness of the sensing element top surfaces		
	Provision shall be made on the top surface of pressure sensitive mats to minimise slipping hazard under the expected operating conditions, e.g. mats with non smooth surface, a checker plate. Surfaces shall be resistant to water, oil, grease, and detergent where practicable.	The principle of the positive mechanical action of a component on another component has been applied.	Pass
4.2.4.4	Combinations of Pressure sensitive mats		
	Inactive areas at the edges of pressure sensitive mats shall have a maximum width of 38 mm. Pressure sensitive mats intended to be fitted side by side, with the longest dimension perpendicular to a door opening, shall have a combined inactive area width of < 60 mm at the meeting line. Pressure sensitive mats intended to be fitted side by side, with the longest dimension parallel to a door opening, shall have a combined inactive area width of < 90 mm at the meeting line.	These machines have been designed to have sufficient stability to allow them to be used safely in their specified conditions of use.	Pass

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Clause	Requirement – Test	Result - Remark	Verdict
4.2.4.5	Number of operations		
	The pressure sensitive mat or floor shall fulfil the requirements in 4.5.1, 4.5.2, 4.5.3 and 4.5.4 of EN 1760-1:1997.	The factor has been taken into account during design.	Pass
	When these requirements have been met, the pressure sensitive mat or pressure sensitive floor shall still meet the requirements in 4.2.3 of EN 1760-1:1997.		
4.2.4.6	Fixing		
	Fastening of pressure sensitive mats and floors intended to be used by wheeled traffic shall be designed to resist the forces derived from the intended traffic.	The factor has been taken into account during design.	Pass
4.3.1	Detection capability		
	The sensing function shall be effective over the detection zone and the signal range specified by the manufacturer.	Not applicable.	N/A
4.3.2	Lasers		
	The radiation intensity generated and emitted from the device shall be specified by the supplier and shall at no time exceed the maximum power or energy levels for a class 1 laser in accordance with 9.3 and 9.4 and Table 1 of EN 60825-1:1994.	Not applicable.	N/A
4.3.3	Additional requirements for active opto-electronic protective devices (AOPD's)		
	The AOPD shall fulfil the requirements for a type 2 ESPE in accordance with IEC 61496-2:1997 with the acceptable deviation that: – the periodic test of the device can be done at the latest at one of the	Please see the related clause.	Pass
	– name of manufacturer; – serial number or traceability code; – manufacturer's type reference; – rated supply level. In addition a label shall be located on the control unit which shall contain information about the temperature range for which the sensing unit is intended.		

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Clause	Requirement – Test	Result - Remark	Verdict
	<p>All labels and markings shall be securely fixed and durable for the expected lifetime of the part to which it is attached.</p> <p>Plastic stickers satisfy this requirement. Every part of the PSPE that can be replaced in accordance with the instruction manual shall be marked with a type reference or part number as listed in the manual and a traceability code.</p>		
6	Information for use		
6.1	Instruction handbook -General		
	<p>The instruction handbook shall be in accordance with 5.5 of EN 292-2:1991 and shall include information mentioned in 1.7.4 of annex A to EN 292-2:1991.</p> <p>This information shall include the duties and conditions under which the equipment is intended to be used, in particular with regard to: – category according to EN 954-1;</p>	This requirement is complied with.	Pass
	<ul style="list-style-type: none"> – electrical supply; – information on rating of fuses or setting of an over current protective device for the circuit(s) connected to the OSSD(s) output connection points; – intended type of door; – intended speed(s); – intended over travel; – response time; – recovery of the sensing unit; – intended position on or towards the door; – range of intended environmental conditions (e.g. wind, temperature, relative humidity); – restrictions of use.(see exclusions listed in the scope of this standard); – a repeat of the information marked on the device; – address of manufacturer or its representative. <p>This information shall also contain details as stated in the following clauses.</p>		

EN 12978			
Clause	Requirement – Test	Result - Remark	Verdict
6.1.1	Electro sensitive protective equipment		
	– Documentation in accordance with clause 7 of EN 61496-1:1997 and, for AOPD(s) in accordance with clause 7 of IEC 61496-2:1997 as long as this is not in contradiction with 6.1.	This requirement is complied with.	Pass
6.1.2	Pressure sensitive protective equipment		
	– Guidance regarding use of the device in alternative mounting orientations, where applicable; – for non-electrical power supplies, the manufacturer shall specify the supply pressure and the allowable operating range within which normal operation will be maintained; – information about the possible need for an overpressure protective device in the power supply ; – suitable information on pre-travel, over-travel, response time and ability to recover shall be provided to enable choice of an appropriate safety device to be chosen to ensures that the admissible values of operating forces are in accordance with annex A of EN 12453:2000, or 4.6.3.2 of prEN 12650-1:1996 as appropriate.	This requirement is complied with.	Pass
6.2	Instructions for the installation of a safety device		
	When the equipment is supplied unassembled, the manufacturer shall provide with the equipment assembling specifications preferably with drawings showing: – instructions for assembly, installation and fixing; – description of the intended interface (i.e. rating, characteristics and location of all input/output terminals, permissible lengths of interconnections and earthing, configurations of sensors which can be connected to a	This requirement is complied with.	Pass
	control unit) with the door equipment; – any special equipment for assembly, fixing and settings; – any fixing positions and fixing methods to ensure stability during assembly and operation; – electric, hydraulic and pneumatic connections		

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	<p>and diagrams;</p> <ul style="list-style-type: none"> – the assembly phases; – any special requirements for storage; – the methods for safe handling of the components. <p>The instruction handbook shall draw the attention of the installer on the fact that modification of the design or configuration of the equipment should not be made without consulting the manufacturer or his authorised representative.</p>		
6.3	Instructions for the use of the safety device		
	<p>The installer of the safety device shall provide the end-user with the following: the instruction handbook shall include, in addition to 5.1.1 a), b), c) and d) of EN 292-2:1991 the following requirements:</p> <ul style="list-style-type: none"> – safety devices shall be made known to all appropriate persons. <p>Areas giving access to them shall be kept clear of obstacles;</p> <ul style="list-style-type: none"> – the cleaning requirements in order to avoid eventual dangerous accumulation of material; 	This requirement is complied with.	Pass
	<ul style="list-style-type: none"> – possible details of a restarting procedure to be followed after an emergency or accidental stoppage caused by the control system. <p>The instruction handbook shall draw the attention of the user on the fact that modifying of the design or configuration of the equipment without consulting the manufacturer or his authorised representative may create dangerous situation.</p>		
6.4	Instructions for maintenance		
	<p>The instruction handbook shall specify in particular (refer to 5.5.1.e of EN 292-2:1991):</p> <ul style="list-style-type: none"> – the technical knowledge and skills of the maintenance staff, specially for particular operations which need specific competence, and shall specify that all adjustments, whether mechanical or electrical, shall only be carried out 	This requirement is complied with.	Pass

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	<p>by persons entitled to do so in accordance with a safe system of work and the manufacturer's instructions;</p> <ul style="list-style-type: none"> – a list of wearing parts, as well as the approximate frequency and conditions for their replacement; – a list of parts to be checked periodically; – safety devices shall be kept in proper working condition and 		
	<p>maintained in accordance with the manufacturer's instructions; – information about checking the presence and legibility of initial markings.</p>		
7.1	General		
	<p>The following verification and testing shall be carried out to determine whether safety devices meet the requirements of this standard.</p>	<p>Appropriate ergonomic principles have been taken into account in designing machinery to reduce mental or physical stress and strain of the operator.</p>	Pass
7.2	Test specimen	<p>These principles have been taken into account during allocating functions to operator and machine.</p>	Pass
	<p>Insofar as it is practicable all parts of ESPE or PSPE shall be tested together.</p> <p>Where this is not practicable, parts of the ESPE or PSPE may be tested separately.</p> <p>In such cases any input signals necessary for the operation of the ESPE or PSPE shall be simulated.</p> <p>The tests shall be carried out on either a ready to use test specimen as specified below or on integrated ESPE's or PSPE's, (mounted on or linked to a door or barrier as in normal use).</p>	<p>All these factors have been taken into account during design.</p>	Pass
	<p>In applications where the ESPE or PSPE is designed and manufactured as a part of a door or barrier it may be impossible or impractical to submit</p>	<p>All arrangement and design of manual controls have been</p>	Pass

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	these devices to all tests set out in this	checked in compliance with.	
	clause. Where tests are omitted, the manufacturer shall provide information to explain and justify why the tests have been omitted and provide information to explain how the requirements are met.		
	Where a particular test is destructive and identical results are obtained by testing part of the ESPE or PSPE in isolation, a sample of that part may be used instead of the whole equipment sample for the purpose of obtaining the results of the test.	All arrangement and design of manual controls have been checked in compliance with.	Pass
	Where the ESPE or PSPE is designed for operation at a number of different supply voltages (e.g. for differing applications), more than one sample may be required.	Stressful postures and movements during use of the machine have been avoided.	Pass
	When the ESPE or PSPE is designed to be supplied from an external dedicated power supply, it shall undergo testing with the specified dedicated power supply.	This machine has been adjusted to the human strength and convenient movement.	Pass
	Some of the following factors which may affect the performance of the safeguarding device shall be considered:	This machine has been designed with low noise, vibration.	Pass
	a) shape/size of the sensing element; b) top or covering material of the active area or effective sensing zone; c) combination of sensing elements; d) length of the interconnecting cables or tubes;		Pass
	e) sensing element mounting orientations.		
7.2.1.1.1	Pressure sensitive edge(s) or bar(s)		
	The preferred sensing element sample(s) shall have a length of approximately 1 m. If the device is built up from a combination of sensing elements then, if relevant, the maximum stated number of sensors for connection with one control unit shall be provided. If the sensor length influences the characteristics of the sensor output, a sensor of the least favourable	All these factors have been taken into account during design.	Pass

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Clause	Requirement – Test	Result - Remark	Verdict
	length as specified by the manufacturer shall, where practicable, be used.		
7.2.1.1.2	Pressure sensitive mat(s) or floor(s)		
	The preferred sensing element sample(s) shall have a sensing element top surface of at least 1 m x 0,5 m. If the device is built up from a combination of sensing elements then, if relevant, the maximum stated number of sensors for connection with one control unit shall be provided	All design and arrangement of the control logic have been checked in compliance with this requirement.	Pass
7.2.1.2	Electro-sensitive protective equipment (all types)		
	The preferred sensing element sample(s) shall consist of emitter(s) and receiver(s) or emitter(s)/receiver(s) and reflective parts for retro-reflective systems. If the device is built up from a	This requirement is complied with.	Pass
	combination of sensing elements this shall be considered when specifying the actual configuration. In case of systems with separate emitter and receiver, those should be arranged at spatial distances not less than the maximum specified operating range. In case of retro-reflective systems, those should be arranged at the spatial distance between emitter/receiver and reflecting object not less than the maximum specified operating range.		
7.3	Test conditions		
	Unless otherwise specified in the test method, the tests shall be carried out with the test sample operating within the conditions specified. For the purpose of electrical disturbance immunity tests the equipment shall be in as near its final operating configuration as is possible (i.e. with peripheral devices and covers attached, connected to the power supply and, where applicable, connected to the external protective conductor). Testing shall, unless otherwise specified, be made at the least favourable positions on the active area	All the arrangement of the control logic have been checked in compliance with this requirement.	Pass

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	taking account of the application. When several mounting positions are specified, the least favourable mounting position shall be used.		
7.4.3	Humidity The requirements for humidity shall be verified in accordance with Table 2 for a period of four days. EN 60068-2-78 Safety device is not connected to power supply. Test Ca After this test a high voltage test according to Tables 1 and 5 of IEC 60664-1:1992 shall be performed between circuits and exposed conductive parts or accessible surfaces of the control unit/output signal switching device. The functional test as specified in 7.7.1.1 shall be performed prior to and after the humidity test.		N/A
7.4.5	Vibration		
	These requirements shall be verified in accordance with Table 3. During this test, it shall be verified that the OSSD remains in the OFF state. After the vibration test has been completed, the function of the safety device shall be verified.	This requirement is complied with.	Pass
	Test method EN 60068-2-6 Test conditions Safety device is connected to the power supply	This requirement is complied with.	Pass
7.4.6.1	Supply voltage variation		
	The safety device shall be subjected to the following sequence of tests	This requirement is complied with.	Pass
	using the relevant values according to 4.1.2.1.		
	The safety device shall be actuated at the lower limit of the power supply range.	This requirement is complied with.	Pass
	The supply voltage shall be increased, within a period of 10 s to 20 s, to the upper limit of the power supply range.	This requirement is complied with.	Pass
	The safety device shall be actuated at the upper limit of the power supply range. The requirements for frequency variations and for harmonic distortions shall be verified either by testing or by using analytical methods.	This requirement is complied with.	Pass
7.4.6.2	Supply voltage interruptions		
	The ESPE or PSPE shall continue in normal		Pass

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	operation when subjected to ten voltage interruption having a duration of 3 ms and with a time of 1 s between successive interruptions.		
7.4.6.3	Non-electric power supply		
	The function of the safety device shall be verified at the limits of power supply variations as specified by the manufacturer. Possible variations outside the operating range shall not cause the safety device to fail to danger.	No this kind of hazard in this machine	Pass
7.5	Electrical equipment		
	The suitability and operation of each component within its specified ratings throughout the entire operating range of the ESPE or PSPE in accordance with the requirements of 4.1.3 shall be verified by design check and/or visual verification as applicable.	This requirement is complied with.	Pass
7.6	Enclosure(s) for electrical equipment		
	Degree of protection shall be verified by document and enclosure's marking analysis or tested according to EN 60529. All other requirements shall, where applicable, be verified by visual verification.	This requirement is complied with.	Pass
7.7.1	Sensing function and detection capability		
	Correct function of the ESPE or PSPE shall be tested according to the requirements in 4.1.1, 4.1.5.1 and 4.1.5.2 as specified below.	No this kind of hazard in this machine	Pass
7.7.1.1.1	Pressure sensitive edge		
	The function of the pressure sensitive edge shall be verified using test piece n° 1 (see Figure 5) applying the actuating force to the active area in one random location, in the opposite direction to the door movement, at the	This requirement is complied with.	Pass
	highest and lowest specified speed. In the case of a pressure sensitive edge attached to a moving door leaf, the highest specified speed of actuation is the speed resulting from the specified maximum leaf speed (see also clause 7 of EN 12445:2000 or 5.4.2 of prEN 12650-1:1996) as appropriate		

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	depending on the type of door.		
7.7.1.1.2	Pressure sensitive mat or floor		
	The function of the Pressure Sensitive Mat or Pressure Sensitive Floor shall be verified according to 7.4.1 and 7.4.2 of EN 1760-1:1997 using the relevant actuating force and test piece as given in Table 1 of EN 1760-1:1997.	The design of control systems comply with the related principles and methods	Pass
7.7.1.1.3	Opto-electronic safety device		
	The function shall be verified by a moving test piece according to clause 7 of EN 12445:2000 or 5.4.2 of prEN 12650-1:1996 as appropriate, depending on the type of door, at an angle of 45° and 90° through the detection zone at the following positions: <ul style="list-style-type: none"> – midway between the emitter and receiver or, in case of retroreflective systems, at a distance of 1 m from the receiver/emitter; – close to the receiver; – close to the emitter. 	This requirement is complied with.	Pass
7.7.1.1.4	Capacitive, active infra-red and ultra-sonic devices		
	The functional requirements of 4.1.6. shall be verified using a test piece according to clause 7 of EN 12445:2000 or 5.4.2 of prEN 12650-1:1996 as appropriate, depending on the type of door.	This requirement is complied with.	Pass
7.7.1.2	Integrity of the detection capability It shall be verified that the integrity of the detection capability is maintained, or the ESPE or PSPE does not fail to danger in accordance with 4.1, by systematic analysis of the design employed, using tests where appropriate. The results of the systematic analysis shall specify which measurement of the response time is required in addition to the tests.	This requirement is complied with.	Pass
7.7.1.3	Testing of safety devices installed on a power operated door		
	Where a safety device is installed on a power operated door, it shall be tested according to clause 7 of EN 12445:2000 or 5.4.2 of prEN	This requirement is complied with.	Pass

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	12650-1:1996 as appropriate, depending on the type of door.		
7.7.2	Response time		
	The response time shall be verified by systematic analysis and test. The response time may be determined by electrical simulation of an actuation, provided that it includes the	This requirement is complied with.	Pass
7.13	Information for installation and use		
	Check by visual verification that the requirements of clause 6 are met. To be checked at the application according to EN 12453:2000, annex A		

- End of Test Report -

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Clause	Requirement – Test	Result - Remark	Verdict
4.1	General		
	a)The choice of the door type and its specification needs to be made after taking into account where the door is to be installed and the operating requirements expected from it. Safety in use, ease of use and the amount and frequency of maintenance, its mode of operation, frequency of operation, degree of automation, provision of pass doors and position of the door within the building, etc. are all linked to the choice of the door type.	This requirement is complied with.	Pass
	Such specifications may include requirements for performance features which shall be demonstrated by the standards given in the following clauses		
	b) Unless the manufacturer is supplying to fulfil the particular classes or values of performance characteristics for resistance to water penetration, resistance to wind load, thermal resistance air permeability, resistance to fire or resistance to smoke as notified by the purchaser, the manufacturer shall declare the relevant performance levels of his product.	This requirement is complied with.	Pass
	Doors shall be planned, designed and constructed in accordance with the following requirements to ensure their satisfactory and safe operation in their intended situation and under their expected conditions of use and their safe maintenance, repair and dismantling.		
4.2	Mechanical aspects		
4.2.1	General		
	All doors, manual and power operated, shall be planned, designed and constructed in accordance with EN 12604. In particular, all doors shall meet the following requirements.	Appropriate machine design has been performed by the manufacturer.	Pass
4.2.2	Force for manual operation		
	Maximum values for the force for manual	Appropriate machine	Pass

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Clause	Requirement – Test	Result - Remark	Verdict
	operation are specified in EN 12604:2000, 4.4.1.	design has been performed by the manufacturer.	
	Maximum values of the force for emergency manual operation due to power or drive failure are specified in EN 12453:2000, 5.3.5. Verification of the force for manual operation shall be carried out in accordance with the test method specified in EN 12605:2000, 5.1.5.		
4.2.3	Mechanical resistance		
	Doors shall be designed and constructed in accordance with EN 12604:2000, 4.2.2 and 4.2.3 so that in normal operation the imposed forces, impacts and stresses neither damage the door nor impair its mechanical	This requirement is complied with.	Pass
	performance. The mechanical strength shall be verified in accordance with the test methods specified in EN 12605:2000, 5.1.1 and 5.4.1.		
4.2.4	Mechanical durability		
4.2.4	The mechanical performance of a door shall be ensured, subject to prescribed maintenance, for a number of operational cycles, to be declared by the manufacturer in accordance with EN 12604:2000, clause 5. Mechanical durability shall be verified in accordance with the test methods specified in EN 12605:2000, 5.2. NOTE The influences of degradation, by chemical and/or biological attack on the components, which may be incorporated in the test specimen for mechanical durability testing, when they are necessary to achieve characteristics such as air permeability, resistance to water penetration, safety in use etc. are not taken into account. The components are e.g. seals, gaskets, guards.	This requirement is complied with.	Pass
4.2.5	Geometry of glazing/glass components		
	Where transparent materials are used in doors they shall not become dangerous, if any	No Glazing/Glass in the door.	N/A

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	breakage should occur. Door leaves which are primarily made of transparent material shall be easily visible.		
	Specific requirements are specified in EN 12604:2000, 4.2.5, which shall be verified by the related test methods specified in EN 12605:2000, 5.3.1.		
4.2.6	Protection against cutting		
	Accessible parts of doors shall not create any cutting hazard. Sharp edges shall be eliminated in accordance with EN 12604:2000, 4.5.1, and EN 12453:2000, 5.1.1.3.	Appropriate machine design has been performed by the manufacturer.	Pass
4.2.7	Protection against tripping		
	Parts of doors shall not cause any tripping hazard. Height differences up to 5 mm which occur in the traffic area are not considered dangerous. When height differences greater than 5 mm are needed due to technical reasons, e.g. thresholds of pass doors, the raised parts shall be clearly visible themselves or shall be made so by warning signs, e.g. yellow-black strips. Pressure sensitive mats and floors which may create a tripping hazard shall comply with EN 12978:2003, 4.2.4.2.	Appropriate machine design has been performed by the manufacturer.	Pass
4.2.8	Safe openings		
	Vertically moving doors shall be safeguarded in the event of failure of a single component in their suspension (including gear drives) or balancing system against dropping or uncontrolled out-of-balance movement. Requirements are specified in EN 12604:2000, 4.3.4. These requirements shall be verified in accordance with	Appropriate machine design has been performed by the manufacturer.	Pass
	EN 12605:2000, 5.3.2 and 5.4.3. Horizontally moving doors shall be safeguarded against derailment. Requirements are specified in EN 12604:2000, 4.3.1. These requirements shall be verified in accordance with EN 12605:2000,		

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	5.1.2 and 5.4.2.		
4.2.9	Release of dangerous substances		
	Products shall not release any dangerous substances in excess of the maximum permitted levels specified in the relevant European Standard or other specifications. NOTE For products sold in the EEA see annex ZA.	The mass and/or velocity of the movable elements, and hence their kinetic energy have been limited.	Pass
4.3	Power operation		
4.3.1	General		
	All power operated doors shall fulfil (in addition to meeting the requirements of 4.2) the requirements of EN 12453. In particular, power operated doors shall fulfil the following requirements:	This requirement is complied with.	Pass
4.3.2	Protection against crushing, shearing and drawing-in		
	Crushing, shearing and drawing-in points generated by the door leaf during normal use shall be eliminated or safeguarded. Requirements for safety measures are specified in EN 12453:2000, 5.1.1. The effectiveness of these measures shall be assessed in accordance	The appropriate technical knowledge of mechanical has been taken into account.	Pass
	with EN 12445:2000, 4.1.1. Safety devices, e.g. pressure-sensitive or electro-sensitive protective devices, which are involved in compliance with the requirements listed above shall be designed and tested in accordance with EN 12453:2000, 5.1.1.6 and EN 12978.		
4.3.3	Operating forces		
	Operating forces exerted by the door leaf of power operated doors, including power operated pass doors, where crushing, shearing or impact hazards are safeguarded by limitation of forces, shall be kept to a safe level for users, as specified in EN 12453:2000, 5.1.1.5 and 5.1.3. Compliance shall be verified by tests	This requirement is complied with.	Pass

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	specified in EN 12445:2000, clause 5 and 7.3. For power operated doors which are operated in the hold to run mode of operation, the stopping distance after release of the actuator shall be kept under control. Specific requirements are given in EN 12453:2000, 5.1.1.4. Compliance shall be verified by tests specified in EN 12445:2000, 4.1.1.4.		
	Safety devices, e.g. pressure-sensitive or electro-sensitive protective devices, which are involved in compliance with the requirements listed above shall be designed and tested in accordance with EN 12453:2000, 5.1.1.6 and EN 12978.		
4.3.4	Electrical safety		
	Electrical drive systems, control units and their components shall be designed and constructed so that when installed, electrical hazards in normal use and foreseeable misuse are avoided or safeguarded. EN 12453:2000, 5.2.1 and 5.2.2 as well as EN 12978:2003, 4.1.2, 4.1.3 and 4.1.4 define specific requirements and identify the relevant test methods to be used for verification.	This requirement is complied with.	Pass
4.3.6	Alternative requirements		
	For power operated garage doors for one household only which are vertically operating, non-automatic, which do not open onto public access areas, 4.3.1 to 4.3.5 may be superseded by the requirements of EN 12453:2000, 5.5.2.	Not applicable.	N/A
4.3.7	Upgrading of manually operated doors		
	Power operated doors which are produced by the subsequent addition of a drive unit can deviate from 4.2 with the exception of 4.2.3 and 4.2.8	The principle of the positive mechanical action of a component on another component has been applied.	Pass
4.4	Additional requirements for specific performance characteristics		

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4.4.1	General	These machines have been designed to have sufficient stability to allow them to be used safely in their specified conditions of use.	Pass
	In addition to complying with the requirements in 4.2 and 4.3, performance of the following environmental characteristics, where required, shall be determined and specified in accordance with the following requirements.		
	NOTE Table A.1 can be used for this specification.		
4.4.2	Water tightness		
	Resistance to water penetration shall be based upon test measurements carried out on completely assembled doors or individual representative parts in accordance with EN 12489.	This requirement is complied with.	Pass
	The classified test results may be derived from a test specimen with the maximum dimensions of the product, or from a test specimen which is representative of the leaf assembly with the minimum dimensions specified in EN 12489 whichever is more onerous.		
	The test results shall show, that there is no water leakage through the door at the applied test pressure during the time, specified in the relevant class in EN 12425.		
4.4.3	Resistance to wind load		
	The resistance to wind load of a door is its capacity to withstand a	This requirement is complied with.	Pass
	specified differential wind pressure. Doors shall be designed in order to resist a specified differential wind pressure, and shall be classified in accordance with the wind load classes specified in EN 12424.		
	The requirements of this clause apply to the		

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	ability of the closed doors and not to their ability to be opened or closed under wind load.		
	It is not a requirement that doors are able to operate under wind load.		
	NOTE 1 The construction of the door depends with regard to pressure on a number of factors including e. g. the maximum wind speed anticipated in the area, the location, height, size and shape of the building, and the position of the door in the building. Methods for determining the wind pressure that a building element such as a door has to withstand, from wind speed and other data, are not covered by this European Standard.	This requirement is complied with.	Pass
	These methods are given e.g. in ENV 1991-2-4 or other relevant national application documents. NOTE 2 In most of these documents, the base wind speed is often stated as an average speed over a period of time, and this average speed should not be confused with the peak wind speeds that need to be considered for the design of doors.		
	When definite wind load classes or pressures are not stated by the specifier, doors shall be designed to withstand positive and negative differential pressures in accordance with EN 12604:2000, 4.2.4. In deviation from this requirement, doors to be installed in a façade shall at least comply with class 2 of EN 12424.		
	When a door has to resist different wind loads at different heights, it may be designed to achieve different wind load classes at different levels. Resistance of a door to differential pressure shall be determined in accordance with the methods specified in EN 12444, by a full-scale test, or by a model test, or by a component part test and extrapolation, or by calculation.		

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	<p>Different safety factors shall be used depending on whether test or calculation is the basis of the design.</p> <p>These factors, specified in EN 12604, EN 12444 and EN 12424, are correlated in annex C.</p> <p>NOTE 3 It is recommended that user instructions should contain a warning stating that the operation of the door can be dangerous under windy conditions.</p>		
4.4.4	Noise		
	Direct airborne sound insulation performance capabilities, when required, shall be determined in accordance with EN ISO 140-3.	Not applicable.	N/A
	The test results shall be evaluated in accordance with EN ISO 717-1.		
4.4.5	Thermal resistance		
	shall be replaced during the test at the frequency defined in the manufacturer's maintenance instructions. Wear and tear of these design features shall be visually checked during the test at intervals not less than those at least as specified in EN 12605:2000, 5.2.4.1.		
	NOTE Endurance against chemical or biological attack is not specified unless given in the particular material standards.		
4.5	Instructions for installation, operation and maintenance		
	Suitable instructions shall be provided by the manufacturer to ensure that doors can be properly assembled, installed, operated, maintained and dismantled in a safe manner, in accordance with the requirements of EN 12635:2002, 4.1.1.1.	This requirement is complied with.	Pass
	The manufacturer shall specify the main wearing parts of the product, their discard criteria, the requisite actions and maintenance intervals in the maintenance instructions. Components such as seals, hardware and		

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	insulating material that can be impaired by wear or ageing shall be designed to be replaceable.		
5	Marking and labelling		
	Each door shall be provided with a permanently attached and easily readable label giving at least the following information:	This requirement is complied with.	Pass
	a) manufacturer or importer in EU (name / contact details i.e. code or address); b) door type; c) series number / unique door reference number; d) year of manufacture; e) any legal marking.		
	NOTE 1 Legal marking means CE-marking in the member states of the EU. These details shall also be given in the accompanying handover documentation together with additional performance characteristic details in accordance with EN 12635. NOTE 2 A form for designation and classification of performances is shown in annex A which contains the specific data		
6	Evaluation of conformity		
6.1	General		
	The evaluation of conformity shall be based on initial type testing according to 6.2 or on site testing according to 6.3, and on factory production control to ensure that variability of production is kept within controlled limits. Where a door is the result of an in-situ assembly of products provided by several manufacturers or suppliers the installer is assumed to be the manufacturer in accordance with this European Standard.	This requirement is complied with.	Pass
	Replacement components which are identical to the original ones used for the type testing may be exchanged without affecting the evaluation of conformity. Where alternative and/or additional components are put in which may affect the declared characteristics, the evaluation of		

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	conformity shall be reviewed for applicability.		
6.2	Initial type test		
	An initial type test shall demonstrate conformity of the test specimen with all the requirements stated in 4.2, and for power operated doors with those stated in 4.3, and for additional characteristics with the relevant parts of 4.4. Initial type tests of a specimen or specimens representative of the product or the product type shall demonstrate that the required values and properties are achieved.	This requirement is complied with.	Pass
	Specimens to be tested shall be selected in such a way that the test results are valid for the product type. When test results derive from tests carried out on products of dimensions different from those of the test specimen(s), the relevant test method shall be observed, otherwise the following shall apply:		
	a) General: Test the most unfavourable size in the most unfavourable arrangement (i.e. with windows and passdoors incorporated in the moving door leaf, etc.) for each product type.	This requirement is complied with.	Pass
	The test results obtained can then be applied to all more favourable arrangements and to all smaller sizes in the particular product design.		
	b) Resistance to water penetration and air permeability:		
	Test results deriving from the most unfavourable arrangement with at least the minimum size specified in this European Standard shall be applicable to doors with more favourable arrangements and to all smaller and larger doors for the particular design criteria and product type.		
	c) Thermal resistance: Specific information are given in annex B.		
6.3	Test on site		

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	The test on site is only applicable to power operated doors which are produced by the subsequent addition of a drive unit in order to declare conformity of the installed product with the requirements specified in 4.2.3, 4.2.8 and 4.3.	This requirement is complied with.	Pass
6.4	Production control		
	A permanent internal control of production shall be exercised by the manufacturer.	This requirement is complied with.	Pass
	All elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies, procedures and instructions.		
	The adopted production control system shall ensure a common understanding of quality assurance. It shall also enable the repeated achievement of the required characteristics.		
	All results of Factory Production Control (FPC) tests and inspections, carried out according to a test plan shall be recorded. These records shall show clearly whether the product has fulfilled the defined acceptance criteria.		
	Where the product fails to fulfil the acceptance measures, the provisions for non-conforming products apply.		
	The adopted production control system shall furthermore ensure the effective operation of the production control system to be checked.		
	The FPC system documentation shall at least address the following: a) specification of tasks and authorities; b) specification of the structure of the system documentation; c) specification and verification of raw material and components; d) identification and traceability of products; e) documented procedures and instructions related to FPC;	This requirement is complied with.	Pass

EN 13241-1			
Clause	Requirement – Test	Result - Remark	Verdict
	f) control of FPC related records; g) design control; h) identification of inspections and tests to be carried out; i) identification of necessary equipment for inspections and tests; j) treatment of non conforming products; k) carrying out corrective actions.		
	All records of the system shall be stored in a safe and proper way for a minimum period of 10 years.	Appropriate ergonomic principles have been taken into account in designing machinery to reduce mental or physical stress and strain of the operator.	Pass
	The installation control system shall be part of the factory production control, when manufacturers complete their own installation.		
	NOTE When installation with the need of trained installers is carried out by a separate organisation and where installation has influence on the final performance of the product, installation should be covered by a separate control system.		

- End of Test Report -

3. Airborne noise test report

I. Applicable standards

1. EN ISO 3744:2010 Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane.
2. EN ISO 11202: Acoustics-Noise emitted by machinery and equipment-Measurement of emission sound pressure levels at the work station and at other specified positions-Survey method in situ.
3. ISO/TR 11688-1: Acoustics-Recommended practice for the design of low-noise machinery and equipment -Part 1 : Planning.

II. Test instrument

The sound level meter used in the noise measurement is TES1350A manufactured by TES Electrical Electronic Corp. with the following features

- Portable with light weight easy operation.
- Measurement range from 35 to 130 dBA.
- Type 1 precision.
- With "F"&"S" detect mode in accordance with IEC 651 type 1.
- Built in A-weighting network.
- Equipped with a high prepoarized condenser microphone.
- With automatic&manual display.
- DC output for level recorder.

III. Measurement method

The measurements of this test have been carried out by a hand-held sound level meter, and readings are taken by A-frequency weighting at each measuring position.

For operator positions in process of measurement, the measuring instrument is to be set at a distance of 1 m from the machine and 1.5 m above the floor.

IV. Test environment

The test was carried out in the location of machine inside the factory, and the background noise has been ensured that its measuring value is lower than that of machine.

V. Test result

1. Background

Reading value : 60.5dB(A)

2. Sound pressure level (machine on "Stand by" and normal load condition)

Position	1	2	3	4	5
Reading (dB (A))	61.4	58.5	59.8	59.9	58.1

3. Sound pressure level (machine on full load condition)

Position	1	2	3	4	5
Reading (dB (A))	59.6	58.9	60.7	60.3	58.8

The following is the calculation formula of L_w (Sound power level):

$$L_w = L_{pf} + 10 \times \log (S/S_0)$$

- L_{pf} is the A-weighted or frequency bank surface sound pressure level
- S is the area of the measurement surface in square meters 20 m^2
- S_0 is 1 m^2

- End of Airborne Noise Test Report -

TEST REPORT

EN 60204-1:2006 Safety of Machinery - Electrical Equipment of Machines Part 1: General Requirement

Name and address of the testing laboratory	Shanghai Global Testing Services Co., Ltd Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China	Tel: / Fax: /
Name and address of the applicant	SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.	
Name and address of the manufacturer	SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.	
Name and address of the factory (production sites)	SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.	
Product	HIGH SPEED INDUSTRIAL DOOR	
Mode/type reference	/	
Tested according to	EN 60204-1:2006+A1:2009+AC: 2010	
Test Result	PASS	
Test Report No.	MD-TCF-190211-16904-4	
Work carried out by	Tony Guo	Signature
	Director	
Word verified by	Kevin Shi	Signature
	Manager	
Date of issue	2019/03/10	



3 IEC 60204-1 report

TEST REPORT IEC 60204-1 Safety of machinery - Electrical equipment of machines Part 1: General requirements	
Report reference No.	MD-TCF-190211-16904-4
Date of issue	2019/03/10
Total number of pages.....	44
Testing Laboratory	Shanghai Global Testing Services Co., Ltd.
Address.....	Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China
Applicant's name	SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD
Address.....	ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.
Test specification:	
Standard.....	EN 60204-1:2006+A1:2009+AC: 2010
Test procedure.....	CB
Non-standard test method.....	N/A
Test Report Form No.	IEC60204_1A
Test Report Form(s) Originator.....	GTS
Master TRF.....	Dated 2009-11
Test item description	HIGH SPEED INDUSTRIAL DOOR
Model/Type reference.....	/

Testing procedure and testing location:	
<input checked="" type="checkbox"/>	Testing procedure: TMP Tested by (name + signature).....: Approved by (+ signature).....: Testing location/ address.....: Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China
<input type="checkbox"/>	Testing procedure: WMT Tested by (name + signature).....: Witnessed by (+ signature)..... : Approved by (+ signature).....: Testing location/ address.....:
<input type="checkbox"/>	Testing procedure: SMT Tested by (name + signature).....: Approved by (+ signature).....: Supervised by (+ signature).....: Testing location/ address.....:
<input type="checkbox"/>	Testing procedure: RMT Tested by (name + signature).....: Approved by (+ signature).....: Supervised by (+ signature).....: Testing location/ address.....:

Summary of testing:	
Tests performed (name of test and test clause): All of test are performed at: Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China	Testing location: Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China
Summary of compliance with National Differences: N/A	
Copy of marking plate /	

Test item particulars :	
Classification of installation and use..... :	Class I
Supply Connection..... :	Terminal
..... :	
..... :	
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	Pass
- test object does not meet the requirement..... :	Fail
Testing :	
Date of receipt of test item..... :	2019/03/06
Date (s) of performance of tests..... :	2019/03/10
General remarks:	
<p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a comma (point) is used as the decimal separator.</p> <p>This test report include:</p> <p>Attachment to Test Report IEC60204-1, 5 page(s)</p>	

4	GENERAL REQUIREMENTS		-
4.1	General		-
	Hazards relevant to the electrical equipment are assessed as part of the overall risk assessment of the machine.		P
4.2	Selection of equipment		P
4.2.1	Electrical components/devices suitable for their intended use and applied in accordance with supplier's instructions.		P
4.2.2	Where possible electrical equipment in compliance with the IEC 60439 series.		P
4.3	Electrical supply		P
4.3.1	Electrical equipment to be designed for correct operation within the conditions of mains power supply - as stated below (cl. 4.3.2 or 4.3.3)		P
	or as stated by the user (record specs in this TR)		N
	or as stated by the supplier ¹		P
4.3.2	AC supplies		P
	Supply Voltage: Steady state voltage: 0,9 ... 1,1 of nominal voltage		P
	Frequency: 0,99 ... 1,01 of nominal frequency continuously; 0,98 ... 1,02 short time.		P
	Harmonics: not exceeding 10 % of the total r.m.s. etc.		P
	Voltage unbalance: not exceeding 2% deviation.		P
	Voltage interruption: interrupted or at zero voltage for not more than 3 ms at any random time in the supply cycle with more than 1 s between successive interruptions.		P
	Voltage dips not exceeding 20 % of the peak voltage of the supply for more than one cycle with more than 1 s between successive dips.		P
4.3.3	DC supplies		N
	Supply Voltage: - other: 0,85 to 1,15 of nominal voltage; - battery-operated vehicles: 0,7 to 1,2 of nom. volt. - from converting equipment: 0,9 to 1,1 of nom. volt.		N
	Voltage interruption: - other: not exceeding 5 ms - converting equipment: not exceeding 20 ms		N
	Ripple (peak-to-peak): not exceed. 0,15 of nom. volt.		N
4.3.4	Special supply systems; e.g. on board generators limits acc. 4.3.2 / .3 exceeded, but equipment designed acc. exceeded limits.		N
4.4	Physical environment and operating conditions		P

4.4.1	Electrical equipment suitable for the physical environment and operating conditions of its intended use.		P
4.4.2	<p>Electromagnetic compatibility (EMC): Equipment shall not generate electromagnetic disturbances above levels that are appropriate for its intended operating environment and shall have a level of immunity to electromagnetic disturbances so that it can function in its intended environment (IEC 61000-6-1 or IEC 61000-6-2 and CISPR 61000-6-3 or IEC 61000-6-4 give general EMC emission and immunity limits.)</p> <p>Are there sufficient measures to limit the generation of electromagnetic disturbances, i.e. conducted and radiated provided? (E.g. power supply filtering; cable shielding; enclosures designed to minimize RF radiation; RF suppression techniques; design of functional bonding system, using conductors with low RF impedance and as short as practicable.</p>		P
4.4.3	Electrical equipment shall be capable of operating correctly in the intended ambient air temperature. (Minimum requirement: air temperatures of +5 °C and +40 °C)		P
4.4.4	Electrical equipment shall be capable of operating correctly when the relative humidity is up to 50 % at a maximum temperature of +40 °C		P
4.4.5	Electrical equipment shall be capable of operating correctly at altitudes up to 1 000 m above mean sea level.		P
4.4.6	Electrical equipment shall be adequately protected against the ingress of solids and liquids (see 11.3)		P
4.4.7	Electrical equipment shall withstand ionizing and non-ionizing radiation.		P
4.4.8	Electrical equipment shall withstand vibration, shock and bump.		P
4.5	Electrical equipment designed to withstand the effects of transportation and storage within a temperature range of - 25 to + 55 °C.		P
4.6	Heavy or bulky electrical equipment of the machine provided with suitable means for handling.		P
4.7	Electrical equipment is installed and operated in accordance with the supplier's instruction.		P


5	INCOMING SUPPLY CONDUCTOR TERMINATIONS AND DEVICES FOR DISCONNECTING AND SWITCHING OFF		-
5.1	Incoming supply conductor terminal		P
5.1	Electrical equipment of a machine connected to one single power supply (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)		P

	Power supply conductors terminated to main disconnecting device of electrical equipment (unless a plug is provided for disconnection)		P
	Neutral conductor clearly indicated in technical documentation with "N" (see cl. 16.1)		P
	No connection between neutral conductor and protective bonding circuit nor combined PEN-terminals. Exception: a connection may be made between the neutral terminal and the PE terminal at the point of the connection of the power supply to the machine for TN-C systems.		P
	All terminals of incoming supply clearly marked in acc. with cl. 16.1 (symbols acc. to EN 60445)		P
5.2	Terminal for connection to external protective earthing system		P
	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.		P
	Cross section of incoming PE conductor acc. to cl. 5.2, table 1. (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).	1,5 mm ²	P
	Protective earth identified either by graphic symbol, letters "PE", or bicolour combination GREEN / YELLOW		P
5.3	Supply disconnecting device		-
5.3.1	A supply disconnecting device shall be provided: – for each incoming source of supply to a machine – for each on-board power supply.		P
5.3.2	Type of power supply disconnecting device:		—
	a) Switch-disconnector, acc. to EN 60947-3 for appliance category AC-23 B or DC-23 B		P
	b) Disconnector with or without fuses, with aux. contact (acc. to EN 60947-3)		P
	c) Power circuit breaker suitable for isolation (acc. to EN 60947-2)		P
	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		P
	e) Plug/socket combination for electrical load (requirements see cl. 5.3.3)	No such construction	N
5.3.3	Disconnection device has to fulfil all of the following requirements		—
	- isolate the electrical equipment from the supply and have only one OFF (isolated) and only one ON position marked with "O" and "I"		P

	- 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		P
	- have an external operating means e.g.a handle (except power operated CB's)		P
	- coloured black or grey recommended (If used as an emergency stop, red/yellow combination selected)		P
	- be provided with a means permitting it to be locked in the OFF position (padlocks). When so locked, remote as well as local closing shall be prevented		P
	- disconnect all live conductors of its power supply circuit (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.)		p
	Requirements for plug/socket combination as a disconnection device: - Breaking capacity of the plug/socket combination: 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. - further see. cl. 13.4.5 a) to f)		N
5.3.4	The operating means are easily accessible and located between 0,6 m and 1,9 m above the servicing level.	1,25m	P
5.3.5	Only the following circuits need not be disconnected by the supply disconnecting device: - lighting circuits for lighting needed during maintenance or repair; - plug and socket outlets for the exclusive connection of repair or maintenance tools and equipment; - under voltage protection circuits that are only provided for automatic tripping in the event of supply failure; - circuits supplying equipment that should normally remain energized for correct operation - control circuits for interlocking Such circuits are provided with their own disconnecting device.		N
	Circuits not disconnected by the supply disconnecting device have: - permanent warning labels in accordance with cl. 16.1		N
	- a statement is included in the maintenance manual		N
	- additionally one or more of the following is applied; - a permanent warning label in accordance with 16.1 is affixed in proximity to each excepted circuit, or - the circuit is separated from other circuits, or - the conductors are identified by colour taking into account the recommendation of Cl.13.2.4.		N
5.4	Disconnecting devices to prevent of unexpected start-up:		—

	- Devices for the prevention of unexpected start-up are provided These devices are appropriate and convenient for the intended use, are suitably placed, and readily identifiable as to their function and purpose (for example by a durable marking in accordance with cl. 16.1).		P
	- Means are provided to prevent inadvertent and/or mistaken closure of these devices either at the controller or from other locations		P
	- Devices that do not fulfil the isolation function (e.g. a contactor switched off by a control circuit) are only used for situations that include: <ul style="list-style-type: none"> - inspections; - adjustments; - no hazardous work on the electrical equipment (for example replacement of plug-in devices without disturbing existing wiring) 		P
5.5	Devices for disconnecting electrical equipment		—
	- Requirements to devices for disconnecting electrical equipment to enable work to be carried out when it is de-energised and isolated: <ul style="list-style-type: none"> - appropriate and convenient for the intended use; - suitably placed; - readily identifiable as to which part or circuit of the equipment is served (for example by durable marking in accordance with 16.1 where necessary). <p>- Additional means are provided to prevent of inadvertent and/or mistaken closure of these devices either at the controller or from other locations</p>		P
	- 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 is provided for each part, or for each machine, requiring separate isolation. In addition to the mentioned supply disconnecting device, the following devices that fulfil the isolation function may be provided for this purpose: <ul style="list-style-type: none"> - devices described in 5.3.2; - disconnectors, withdrawable fuse links and withdrawable links only if located in an electrical operating area (see 3.15) and relevant information is provided with the electrical equipment (see 17.2 b)9) and b)12)). 		P
5.6	Protection against unauthorized, inadvertent and/or mistaken connection		—
	For devices acc. to cl. 5.4(disconnecting electrical equipment) and 5.5 (prevention of unexpected start-up) locking means in OFF position are provided and no remote reconnection is possible.		P
	Where a non-lockable disconnecting device is provided (for example withdrawable fuse-links, withdrawable links), other means of protection against unintended energising are used.		P

	Where plug/socket combinations according to 5.3.2 e) are used for the purpose of prevention of unexpected start-up they are so positioned that they can be kept under the immediate supervision of the person carrying out the work.		P
6	PROTECTION AGAINST ELECTRIC SHOCK		-
6.2.2	Protection against direct contact		—
	Live parts that are located inside enclosures have to conform to the relevant requirements of Clauses 4, 11, and 14 and have to have a protection against direct contact of at least IP2X or IPXXB.		P
	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.	IP54	P
6.2.2 a	Opening an enclosure (i.e. opening doors, lids, covers, and the like) is possible only when: a) Either the use of a key or tool is necessary for access and: - all live parts, that are likely to be touched when resetting or adjusting devices intended for such operations while the equipment is still connected are protected against direct contact to at least IP2X or IPXXB - live parts on the inside of doors are protected against direct contact to at least IP1X or IPXXA.		P

6.2.2 b	<p>b) Or the opening of an enclosure (i.e. opening doors, lids, covers, and the like) is possible only if disconnection is provided for all live parts inside the enclosure before it can be opened.</p> <p>Exception: If a special device or tool (intended for use only by skilled or instructed persons) as prescribed by the supplier is provided that can be used to defeat the interlock and that intends that:</p> <ul style="list-style-type: none"> - it is possible at all times while the interlock is defeated to open the disconnecting device and lock the disconnecting device in the OFF position or otherwise prevent unauthorised closure of the disconnecting device; - upon closing the door, the interlock is automatically restored - all live parts, that are likely to be touched when resetting or adjusting devices intended for such operations while the equipment is still connected are protected against direct contact to at least IP2X or IPXXB - live parts on the inside of doors shall be protected against direct contact to at least IP1X or IPXXA - relevant information is provided with the electrical equipment like instructions on the procedures for securing the machine for safe maintenance and information on the residual risks. - means are provided to restrict access to live parts behind doors not directly interlocked with the disconnecting means to skilled or instructed persons. - parts still alive after switching off are protected at least IP 2X or IP XXB and marked with a warning sign in accordance with 16.2.1  <p>Excepted from this marking are:</p> <ul style="list-style-type: none"> - parts that can be live only because of connection to interlocking circuits and that are distinguished by colour as potentially live in accordance with 13.2.4 - the supply terminals of the supply disconnecting device when the latter is mounted alone in a separate enclosure. 		P
6.2.2 c	<p>c) Or the 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. 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.</p>		P
6.2.3	Protection by insulation of live parts:		—
	Live parts are completely covered with insulation that can only be removed by destruction and that is capable of withstanding the mechanical, chemical, electrical, and thermal stresses to which it can be subjected under normal operating conditions.		
	Paint, varnish lacquer etc. not used as the unique insulation layer.		P

6.2.4	Protection against residual voltages		—
	Live parts with residual voltage greater than 60 V after a time period of 5 s after disconnection of the supply shall be discharged until this interferes with the proper functioning of the equipment. Except are components with charges of $\leq 60 \mu\text{C}$ (\rightarrow equivalent to capacitor with less than $1 \mu\text{F}$ @ 60V).		P
	Where pins of plugs or similar devices after withdrawal are exposed, discharge time is $\leq 1\text{s}$. Otherwise such conductors are protected against direct contact to at least IP2X or IPXXB.	No such construction	N
	If above requirements cannot be achieved, additional disconnecting devices or appropriate warning devices shall be applied (e.g. warning acc. cl. 16.1).		P
6.2.5	For protection by barriers, 412.2 of IEC 60364-4-41 is applied.		N
6.2.6	For protection by placing out of reach, 412.4 of IEC 60364-4-41 shall apply. For protection by obstacles, 412.3 of IEC 60364-4-41 is applied.		P
6.3	Protection against indirect contact		-
6.3.2	Prevention of the occurrence of a touch voltage		—
6.3.2.2	Protection by provision of: - class II electrical devices or apparatus (double insulation, reinforced insulation or by equivalent insulation in accordance with IEC 61140) or - switchgear and control gear assemblies having total insulation in accordance with IEC 60439-1 or - supplementary or reinforced insulation in accordance with 413.2 of IEC 60364-4-41.		P
6.3.2.3	Protection by electrical separation. For this type of protection, the requirements of 413.5 of IEC 60364-4-41 apply.		P
6.3.3	Protection by automatic disconnection of supply.		
6.3.3 a)	Use of overcurrent protective device for automatic cut-off in the event of an insulation failure in a TN-System. Where disconnection within the time specified in Clause A.1 cannot be assured, supplementary bonding is provided as necessary to meet the requirements of Clause A.3.		P
6.3.3 b)	Use of residual current protective devices (RCD) for automatic cut-off in the event of an insulation failure in a TN - or TT -System.		P
6.3.3 c)	Use of earth fault detection device to initiate automatic disconnection in a IT-System.		P
6.4	Protection by the use of PELV		P

6.4.1 a)	PELV circuits shall satisfy all of the following conditions: -the nominal voltage does not exceed: • 25 V a.c. r.m.s. or 60 V ripple-free d.c. when the equipment is normally used in dry locations and when large area contact of live parts with the human body is not expected; or • 6 V a.c. r.m.s. or 15 V ripple-free d.c. in all other cases;		P
6.4.1 b)	one side of the circuit or one point of the source of the supply of that circuit is connected to the protective bonding circuit;		P
6.4.1 c)	live parts of PELV circuits is electrically separated from other live circuits		P
6.4.1 d)	Conductors of each PELV circuit are physically separated from those of any other circuit. If this requirement is impracticable, the insulation provisions of 13.1.3 are fulfilled;		P
6.4.1 e)	plugs and socket-outlets for a PELV circuit are conform to the following: 1) plugs do not to enter socket-outlets of other voltage systems; 2) socket-outlets do not admit plugs of other voltage systems.	No PELV plug and socket provided	N
6.4.2	Sources for PELV		—
	The source for PELV shall be one of the following: - safety isolating transformer in accordance with IEC 61558-1 and IEC 61558-2-6 or - a source of current with a degree of safety equivalent to that of the safety isolating transformer or - an source independent of circuit with higher voltage - electronic power supply conforming to appropriate standards		P
6.1	Other measures from IEC 60364-4-41 are used. (Description!)		P

7.	PROTECTION OF EQUIPMENT		-
7.2.	Overcurrent protection Unless otherwise specified by the user, the supplier of the electrical equipment is not responsible for providing the overcurrent protective device for the supply conductors to the electrical equipment (see Annex B).		P
7.2.2.	On the installation diagram data necessary for selecting the overcurrent protective device are stated for each incoming feeder. (see 7.2.10 and 17.4)		P
7.2.3	Power circuits:		—

	Devices for detection and interruption of overcurrent, selected in accordance with 7.2.10, are applied to each live conductor. And, none of the following conductors, as applicable, is disconnected without disconnecting all associated live conductors: – the neutral conductor of a.c. power circuits; – the earthed conductor of d.c. power circuits; – d.c. power conductors bonded to exposed conductive parts of mobile machines.		P
	Cross section area of neutral conductor is at least equal to the phase conductor. No overcurrent protective/ disconnecting device is required. (For a neutral conductor with a cross sectional area smaller than that of the associated phase conductors, the measures detailed in 524 of IEC 60364-5-52 shall apply.)		P
	IT-Systems:; no neutral conductor is used. Or, when it is used, the measures detailed in 431.2.2 of IEC 60364-4-43 are applied.		P
7.2.4	Control circuits		—
	Conductors of control circuits directly connected to the supply voltage and of circuits supplying control circuit transformers are protected against overcurrent in accordance with 7.2.3.		P
	Conductors of control circuits supplied by a control circuit transformer or d.c. supply: see 9.4.3.1		—
7.2.5	Socket outlets and their associated conductors		—
	Overcurrent protection is provided for the circuits feeding the general purpose socket.		P
7.2.6	Lighting circuits		—
	Lighting circuits are protected separate from other circuits.		P
7.2.7	Transformers		—
	Transformers are protected in accordance with the manufacturer's instructions and includes: - avoiding tripping due to transformer magnetizing inrush currents - avoiding a winding temperature rise in excess of the permitted value for the insulation class when there is a short circuit at the secondary terminals. - type and setting of the overcurrent protective device in accordance with the recommendations of the transformer supplier.		P
7.2.8	Location of overcurrent protective devices:		—
	- located at the point where a reduction in the cross sectional area of the conductors or another change reduces the current-carrying capacity of the conductors.		P

	<p><u>Exceptions:</u></p> <ul style="list-style-type: none"> - current carrying capacity of the conductors is at least equal to that of the load and - conductors between the point of reduction of current-carrying capacity and the position of the overcurrent protective device is ≤ 3 m and - the conductor is protected e.g. by an enclosure or duct. 		P
7.2.9	Selection of overcurrent protective devices		—
	<p>The rated short-circuit breaking capacity I_{cn} is at least equal to the prospective fault current at the point of installation.</p> <p>Additional currents other than from the supply (e.g. from motors, from power factor correction capacitors) shall be taken into consideration.</p>		P
	<p>Reduced breaking capacity is permitted, where another protective device is installed at supply side with the necessary breaking capacity.</p> <p>(In that case, the characteristics of the two devices shall be co-ordinated so that the let-through energy (I^2t) of the two devices in series does not exceed that which can be withstood without damage to the overcurrent protective device on the load side and to the conductors protected by that device. See Annex A of IEC 60947-2).</p>		N
	<p>Where fuses are provided as overcurrent protective devices, a type readily available in the country of use shall be selected, or arrangements shall be made for the supply of spare parts.</p>		P
7.2.10	Rating and setting of overcurrent protective devices:		—
	<p>Rated current of fuses or overcurrent setting of other protective devices selected as low as possible, but adequate for anticipated overcurrents.</p>		P
	<p>The rated current of overcurrent protective device is determined by the current carrying capacity of the conductors to be protected in accordance with Cl. 12.4, D.2 and the maximum allowable interrupting time t in accordance with Clause D.3, taking into account the needs of coordination with other electrical devices in the protected circuit.</p>		P
7.3	Protection of motors against overheating		P
7.3.1	<p>Overload protection for all motors provided for ratings of > 0.5 kW in continuous operation.</p>		P
	<p>Protective device may be omitted for motors, which cannot be overloaded.</p>		P
	<p><u>Exceptions:</u></p> <p>In applications where an automatic interruption of the motor operation is unacceptable (for example fire pumps), the means of detection shall give a warning signal to which the operator can respond.</p>		P
7.3.2	<p>Protection achieved by overload protection device:</p> <ul style="list-style-type: none"> - detection in each live conductor - switching off of all live conductors (not necessary to switch of neutral conductor) 		P

	For special duty motors, appropriate protective devices are recommended		P
7.3.3	Protection achieved by over-temperature protection device: Is recommended in situations where the cooling can be impaired (for example dusty environments)		P
7.3.4	Protection achieved by 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.		P
7.4	Abnormal temperature protection: Resistance heating or other circuits that are capable of attaining or causing abnormal temperatures and can cause a hazardous situation are provided with suitable detection to initiate an appropriate control response.		P
7.5	Protection against supply interruption or voltage reduction and subsequent restoration: Where a supply interruption or a voltage reduction can cause a hazardous situation, damage to the machine, or to the work in progress, undervoltage protection is provided.		P
	Upon restoration of supply voltage, automatic or unexpected restarting of machine prevented.		P
	Undervoltage protection does initiate appropriate control responses to ensure necessary coordination of groups of machines working together		P
7.6	Motor overspeed protection: Overspeed protection is provided where overspeeding can occur and could possibly cause a hazardous situation.		P
7.8	Phase sequence protection: Where an incorrect phase sequence of the supply voltage can cause a hazardous situation or damage to the machine, protection shall be provided.		P
7.9	Protection against overvoltage due to lightning and to switching surges: - Devices are connected to the incoming terminals of the supply disconnecting device.		P

8	EQUIPOTENTIAL BONDING		-
8.2	Protective bonding circuit		P
8.2.1	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 is provided.		P
	In IT distribution systems, the machine structure is part of the protective bonding circuit and insulation monitoring is provided.		P

	Exposed conductive parts of equipment in accordance with 6.3.2.3 (Protection by electrical separation) are not connected to the protective bonding circuit. (For this type of protection, the requirements of 413.5 of IEC 60364-4-41 apply.)		P
8.2.2	Protective conductors		—
	Protective conductors shall be identified in accordance with 13.2.2.		P
	Copper conductors are preferred.		P
	Where other material 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.	No other material used for conductor	N
	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. This requirement is met in most cases if it is in accordance with Table 1 of this standard (see 5.2).		P
8.2.3	Continuity of the protective bonding circuit		
	All exposed conductive parts are connected to the protective bonding circuit in accordance with 8.2.1. Parts that are mounted so that they do not constitute a hazard because cannot be touched on large surfaces or grasped with the hand and they are small in size (less than approximately 50 mm × 50 mm) or they are located so that either contact with live parts, or an insulation failure is unlikely need not be connected to the protective bonding circuit		P
	Where a part is removed the protective bonding circuit for the remaining parts isn't interrupted.		P
	Current-carrying capacity of connection and bonding points cannot impaired by mechanical, chemical, or electrochemical influences (e.g. electrolytic corrosion on aluminium parts)		P
	Metal ducts of flexible or rigid construction and metallic cable sheaths are not used as protective conductors. Nevertheless they are connected to the protective bonding circuit.		P
	Where the electrical equipment is mounted on lids, doors, or cover plates, continuity of the protective bonding circuit shall be ensured. The use of a protective conductor (see 8.2.2) is recommended.		P
	For cables that are exposed to damage (for example flexible trailing cables) the continuity of the protective conductors are ensured by appropriate measures (for example monitoring).		P

8.2.4	No means of interruption of the protective bonding conductor are provided. <u>Exception:</u> links for test or measurement purposes that cannot be opened without the use of a tool and that are located in an enclosed electrical operating area.		P
	As well the protective bonding circuit does not incorporate a switching device or an over current protective device (for example switch, fuse).		P
	Removable current collectors, plug/socket combinations or withdrawable plug-in units: The protective bonding circuit is interrupted by a first make last break contact. (see also 13.4.5)		P
8.2.6	Protective conductor connecting points: have no other function and are not intended to attach or connect appliances or parts.		P
	Each protective conductor connecting point is marked or labelled as such using the symbol IEC 60417-5019 or the letters PE or by use of bicolour GREEN / YELLOW		P
8.2.7	Mobile machines with on-board power supplies: The protective bonding system is connected to a single protective bonding terminal. This protective bonding terminal is the connection point for a possible additional external incoming power supply.		N
8.2.8	Electrical equipment having earth leakage currents higher than 10 mA a.c. or d.c.: Additional protective bonding requirements: - Cross section of protective conductor $\geq 10 \text{ mm}^2$ CU or 16 mm^2 AL - OR Second protective conductor of at least the same cross sectional area if above cross section is impracticable - OR monitoring of continuity of protective conductor with automatic disconnection function.		P
	Additionally a warning label is provided adjacent to the PE terminal.		P

9	CONTROL CIRCUITS AND CONTROL FUNCTIONS		
9.1.	Control circuit		P
9.1.1	Control circuit supply: Control transformers mandatory only when more than one motor starter or two control devices are used.		P
	Control transformers with separate windings are used for supplying the control circuits.		P
	Where several transformers are used, the secondary voltages are in phase.		P
	Separate windings on transformer for DC supplies connected to PE.		P

	Switch-mode units fitted with transformers in accordance with IEC 61558-2-17		P
9.1.2	The nominal voltage of control supply does not exceed 277 V when supplied from a transformer.		P
9.1.3	Control circuits are provided with overcurrent protection in accordance with 7.2.4 and 7.2.10.		P
9.2.	Control functions		P
	Safety related control functions in accordance with ISO 13849-1 (2006), ISO 13849-2 (2003) and /or IEC 62061 (see 9.4.1)		—
9.2.1	Start functions operating by energizing the relevant circuit (see 9.2.5.2).		P
9.2.3	Operating modes		—
	Suitable means are prevented for unauthorized or inadvertent mode selection if hazardous situations can result.		P
	Mode selection by itself does not initiate machine operation. A separate actuation of the start control has to be stated by the operator.		P
	Indication of the selected operating mode is provided (e.g. the position of a mode selector, the provision of an indicating light, a visual display indication).		P
9.2.4	Where it is necessary to suspend safety functions and/or protective measures (for example for setting or maintenance purposes), protection is ensured.		P
9.2.5	Operation		—
	Prevention of movement of the machine in an unintended or unexpected manner is taken after any stopping of the machine. (e.g. due to locked-off condition, power supply fault, battery replacement, lost signal condition with cableless control)		P
	When a machine has more than one control station, measures are provided to ensure that initiation of commands from different control stations do not lead to a hazardous situation.		P
9.2.5.2	Start of an operation is possible only when all of the relevant safety functions and/or protective measures are in place and are operational.		P
	Where safety functions and/or protective measures cannot be applied for certain operations, manual control of such operations are by hold-to-run controls, together with enabling devices, as appropriate.		P
	In the case of machines requiring the use of more than one control station to initiate a start, each of these control stations shall have a separate manually actuated start control device. The conditions to initiate a start are: - all required conditions for machine operation are met - and all start control devices are in the released (off) position - then all start control devices have to be actuated concurrently (see 3.6).		P

9.2.5.3	Stop category 0 and/or stop category 1 and/or stop category 2 stop functions are provided as indicated by the risk assessment and the functional requirements of the machine (see 4.1).		P
	Stop functions override related start functions		P
	Facilities to connect protective devices and interlocks are provided, where required. 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 does not initiate any hazardous situation.		P
	Where more than one control station is provided, stop commands from any control station is effective when required by the risk assessment of the machine.		P
9.2.5.4	Emergency operations (emergency stop, emergency switching off)		—
	Emergency stop or emergency switching off commands are sustained until it is reset.		P
	This reset is possible only by a manual action at that location where the command has been initiated.		P
	The reset of the command does not restart the machinery but only permit restarting.		P
	It is not be possible to restart the machinery until all emergency stop commands are reset.		P
	It is not be possible to reenergize the machinery until all emergency switching off commands are reset.		P
9.2.5.4.2	The emergency stop does function either as a stop category 0 or as a stop category 1.		P
	- it overrides all other functions and operations in all modes;		P
9.2.5.4.3	Emergency switching off is provided where: -Protection against direct contact is achieved only by placing out of reach or by obstacles (see 6.2.6) - or there is the possibility of other hazards or damage caused by electricity.		P
	Emergency switching off is accomplished by electromechanical switching devices, effecting a stop category 0 of machine actuators connected to this incoming supply.		P
9.2.5.5	Movement or action that can result in a hazardous situation are monitored by providing, for example, overtravel limiters, motor overspeed detection, mechanical overload detection or anti-collision devices.		P
9.2.6	Other control functions		—
9.2.6.2	No type 1 two-hand control device is used for the initiation of hazardous operation. It need type 2 or type 3 two-hand control devices for such operations.		P

9.2.6.3	Enabling control: Enabling control are arranged in the way to minimize the possibility of defeating, e. g. by requiring the de-activation of the enabling control device before machine operation may be reinitiated. It is not possible to defeat the enabling function by simple means.		P
9.2.6.4	Combined start and stop controls: Push-buttons etc. that alternately initiate and stop motion are provided only for functions, which cannot result in a hazardous situation.		P
9.2.7	Cableless control station		N
9.2.7.1	Means shall be provided to readily remove or disconnect the power supply of the operator control station (see also 9.2.7.3).		N
	Means (for example key operated switch, access code) are provided, as necessary, to prevent unauthorized use of the operator control station.		N
	Each operator control station carries an unambiguous indication of which machine(s) is (are) intended to be controlled by that operator control station.		N
9.2.7.2	Measures shall be taken to ensure that control commands: – affect only the intended machine; – affect only the intended functions.		N
	Measures are taken to prevent the machine from responding to signals other than those from the intended operator control station(s).		N
	Where necessary, means are provided so that the machine can only be controlled from operator control stations in one or more predetermined zones or locations.		N
9.2.7.3	Operator control stations include a separate and clearly identifiable means to initiate the stop function of the machine or of all the operations that can cause a hazardous situation. The actuating means to initiate this stop function are not marked or labelled as an emergency stop device, even though the stop function initiated on the machine can fulfil an emergency stop function.		N
	Stopping of the machine and preventing a potentially hazardous operation is automatically initiated in the following situations: – when a stop signal is received; – when a fault is detected in the cableless control system; – when a valid signal (which includes a signal that communication is established and maintained) has not been detected within a specified period of time (see Annex B), except when a machine is executing a pre-programmed task taking it outside the range of the cableless control where no hazardous situation can occur.		N

9.2.7.4	Machines having more than one operator control station, including one or more cableless control stations, have measures provided to ensure that only one of the control stations can be enabled at a given time.		N
	An indication of which operator control station is in control of the machine is provided at suitable locations as determined by the risk assessment of the machine. Exception: a stop command from any one of the control stations are effective when required by the risk assessment of the machine.		N
9.2.7.5	Battery-powered cableless operator control stations: A variation in the battery voltage does not cause a hazardous situation.		N
	A clear warning is given to the operator when a variation in battery voltage exceeds specified limits.		N
	Under those circumstances, the cableless operator control station remains functional long enough for the operator to put the machine into a non- hazardous situation.		N
9.3	Protective interlocks		P
9.3.1	The reclosing or resetting of an interlocking safeguard does not initiate hazardous machine operation.		P
9.3.2	Where overtraveling an operating limit (for example speed, pressure, position) can lead to a hazardous situation, means are provided to detect when a predetermined limit(s) is exceeded and initiate an appropriate control action.		P
9.3.3	The correct operation of auxiliary functions is checked by appropriate devices.		P
	Appropriate interlocking is provided, when non-operation of an auxiliary function (for example lubrication, supply of coolant, swarf removal) can cause a hazardous situation, or cause damage to the machine or to the work in progress.		P
9.3.4	Interlocks between different operations and for contrary motions are provided if this operations lead to hazardous situations.		P
9.3.5	Reverse current braking: Where braking of a motor is accomplished by current reversal, measures prevent the motor starting in the opposite direction at the end of braking where that reversal can cause a hazardous situation or damage to the machine or to the work in progress.		P
	For this purpose, a device operating exclusively as a function of time is not permitted.		P
	Control circuits are arranged that rotation of a motor shaft, for example manually, does not result in a hazardous situation.		P
9.4	Control functions in the event of failure		P

9.4.1	The safety related electrical control circuits have an appropriate level of safety performance that has been determined from the risk assessment at the machine. The requirements of IEC 62061 and/or ISO 13849-1, ISO 13849-2 are met.		P
	Where memory retention is achieved for example, by battery power, measures are taken to prevent hazardous situations arising from failure or removal of the battery.		P
	Means are provided to prevent unauthorized or inadvertent memory alteration by, e.g. requiring the use of a key, access code or tool.		P
9.4.2	Measures are taken to minimize risk in the event of failure:		—
9.4.2.1	- Use of proven circuit techniques and components		P
9.4.2.2	- Provisions of partial or complete redundancy		P
9.4.2.3	- Provision of diversity		P
9.4.2.4	- Provision for functional tests		P
9.4.3	Protection against mal-operation due to earth faults, voltage interruptions and loss of circuit continuity		—
9.4.3.1	Earth faults on any control circuit don't cause unintentional starting, potentially hazardous motions, or prevent stopping of the machine. Methods to meet these requirements include but are not limited to the following:		—
	a) 1) Control circuits, fed by control transformers and connected to the protective bonding circuit at the point of supply. (PELV) (see Figure 3 of this standard)		P
	a) 2) Control circuits, fed by control transformers without connection to the protective bonding circuit at the point of supply in the arrangement according to figure 3 and having a device that interrupts the circuit automatically in the event of an earth fault		P
	b) Control circuits fed by a control transformer with a centre-tapped winding, this centre tap connected to the protective bonding circuit, arranged as shown in Figure 4 of this standard with the overcurrent protective device having switching elements in all control circuit supply conductors.		P
	c) Where the control circuit is not fed from a control transformer and is either: 1) directly connected between the phase conductors of an earthed supply, or; 2) directly connected between the phase conductors or between a phase conductor and a neutral conductor of a supply that is not earthed or is earthed through a high impedance, multipole switch that switch all live conductors are used for those functions that can cause hazardous situations or damage to the machine.		P
	Or in case of c) 2), a device is provided that interrupts the circuit automatically in the event of an earth fault.		P

9.4.3.2	For control systems using a memory device(s), proper functioning in the event of power failure is ensured (e.g. by using a non-volatile memory) to prevent any loss of memory that can result in a hazardous situation.		P
9.4.3.3	Upon sliding contacts the loss of continuity of safety-related control circuits depending on, can result in a hazardous situation. Appropriate measures are taken (for example by duplication of the sliding contacts).		P

10	OPERATOR INTERFACE AND MACHINE-MOUNTED CONTROL DEVICES		-
10.1.1	As far as is practicable, those devices are selected, mounted, and identified or coded in accordance with relevant parts of IEC 61310.		P
10.1.2	As far as is practicable, machine-mounted control devices are:		P
	– readily accessible for service and maintenance;		
	– mounted in such a manner as to minimize the possibility of damage from activities such as material handling.		P
	The actuators of hand-operated control devices are selected and installed so that:		P
	– they are not less than 0,6 m above the servicing level and		
	– are within easy reach of the normal working position of the operator;		P
	– the operator is not placed in a hazardous situation when operating them.		P
	The actuators of foot-operated control devices are selected and installed so that:		P
	– they are within easy reach of the normal working position of the operator;		
	– the operator is not placed in a hazardous situation when operating them.		P
10.1.3	The degree of protection (see IEC 60529) together with other appropriate measures does afford protection against:		P
	– the effects of aggressive liquids, vapours, or gases found in the physical environment or used on the machine;		P
	– the ingress of contaminants (for example swarf, dust, particulate matter).		P
	The operator interface control devices has a minimum degree of protection against direct contact of IPXXD (see IEC 60529).		P
10.1.4	Position sensors (for example position switches, proximity switches) are so arranged that they will not be damaged in the event of overtravel.		P

	Position sensors in circuits with safety-related control functions shall have direct opening action (see IEC 60947-5-1) or shall provide similar reliability (see 9.4.2).		P
10.1.5	Portable and pendant operator control stations and their control devices are so selected and arranged as to minimize the possibility of inadvertent machine operations caused by shocks and vibrations		P
10.2	Push-buttons		P
10.2.1	Mandatory: The colour RED is used only for emergency stop and emergency switching off actuators.		P
	The recommend colours of push-buttons are as shown in table 2 of this standard.		P
10.2.2	The recommend markings on push-buttons are as shown in table 3 of this standard.		P
10.3	Indicator lights and displays		-
10.3.1	Indicator lights and displays are selected and installed in such a manner as to be visible from the normal position of the operator (see also IEC 61310-1).		P
	Indicator light circuits used for warning lights are fitted with facilities to check the operability of these lights.		P
	The recommend colours on Indicator light are as shown in table 4 of this standard.		P
	Indicating towers on machines have the applicable colours in the following order from the top down; RED, YELLOW, BLUE, GREEN and WHITE.		P
	Where flashing lights or displays are used to provide higher priority information, audible warning devices should also be provided.		P
10.4	illuminated push-button actuators are colour-coded in accordance with Tables 2 and 4. Where there is difficulty in assigning an appropriate colour, WHITE is used.		P
	The colour RED for the emergency stop actuator shall not depend on the illumination of its light.		P
10.5	Devices having a rotational member, such as potentiometers and selector switches, have means of prevention of rotation of the stationary member. Friction alone isn't considered sufficient.		P
10.6	Actuators used to initiate a start function or the movement of machine elements (for example slides, spindles, carriers) are constructed and mounted so as to minimize inadvertent operation.		P
	However, mushroom-type actuators are used for two-hand control only. (see also ISO 13851).		P
10.7	Emergency stop devices		-
10.7.1	Devices for emergency stop are readily accessible.		P

	They are located at each operator control station and at other locations where the initiation of an emergency stop can be required (exception: see 9.2.7.3).		P
	In circumstances where confusion can occur between active and inactive emergency stop devices caused by disabling the operator control station, means (for example, information for use) are provided to minimise confusion.		P
10.7.2	Allowed types of device for emergency stop: – a push-button operated switch with a palm or mushroom head type; – a pull-cord operated switch; – a pedal-operated switch without mechanical guard.		P
	The devices are direct opening operation (see IEC 60947-5-1, Annex K).		P
10.7.3	Actuators are coloured RED. If a background exists immediately around the actuator, then this background is coloured YELLOW. See also ISO 13850.		P
10.7.4	The supply disconnecting device may be locally operated to serve the function of emergency stop when: – it is readily accessible to the operator; and – it is of the type described in 5.3.2 a), b), c), or d). When also intended for this use, the supply disconnecting device meets the colours RED/YELLOW.		P
10.8	Emergency switing off device		P
10.8.1	Means are provided, where necessary, to avoid confusion between these devices.		P
10.8.2	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. The devices are direct opening action (see IEC 60947-5-1, Annex K). The push-button operated switch may be in a break-glass enclosure.		P
10.8.3	Actuators are coloured RED. If a background exists immediately around the actuator, then this background is coloured YELLOW. See also ISO 13850.		P
10.8.4	Where the supply disconnecting device is to be locally operated for emergency switching off, it is be readily accessible and meets the colours RED/YELLOW.		P
10.9	Enabling control device		P
	An enabling control device as a part of a system, does allow operation when actuated in one position only. In any other position, operation is stopped or prevented.		P

	Functions of two-position types: position 1: off-function of the switch (actuator is not operated); position 2: enabling function (actuator is operated)		P
	Functions of three-position types: position 1: off-function of the switch (actuator is not operated); position 2: enabling function (actuator is operated in its mid position); position 3: off-function (actuator is operated past its mid position); when returning from position 3 to position 2, the enabling function is not activated.		P

11	CONTROLGEAR: LOCATION, MOUNTING AND ENCLOSURES		
11.2.1	All items of controlgear (inclusively terminals that are not part of controlgear components or devices) are placed and oriented so that they can be identified without moving them or the wiring.		P
	For items that require checking for correct operation or that are liable to need replacement, those actions should be possible without dismantling other equipment or parts of the machine (except opening doors or removing covers, barriers or obstacles).		P
	All controlgear are mounted so as to facilitate its operation and maintenance from the front.		P
	Necessary tools to adjust, maintain, or remove a device are supplied.		P
	Where access is required for regular maintenance or adjustment, the relevant devices shall be located between 0,4 m and 2,0 m above the servicing level.		P
	Terminals are least 0,2 m above the servicing level and so placed that conductors and cables can be easily connected to them.		P
	Only operating, indicating, measuring, and cooling devices are mounted on doors or on normally removable access covers of enclosures.		P
	Plug-in arrangements of control devices and plug-in-devices:		—
	The connection is clearly identified by shape, marking or reference designation, singly or in combination.		P
	When they have to be handled during normal operation means are provided with non-interchangeable features where the lack of such a facility can result in malfunctioning.		P
	Plug/socket combinations that are handled during normal operation are unobstructedly accessible.		P
	Test points for connection of test equipment are: – unobstructedly accessible; – clearly identified to correspond with the documentation; – adequately insulated; – sufficiently spaced.		P

11.2.2	Non-electrical parts and devices, not directly associated with the electrical equipment, are not located within enclosures containing controlgear.		P
	Devices such as solenoid valves are separated from the other electrical equipment (for example in a separate compartment).		P
	Control devices mounted in the same location and connected to the supply voltage, or to both supply and control voltages, are grouped separately from those connected only to the control voltages.		P
	Terminals shall be separated into groups for: – power circuits; – associated control circuits; – other control circuits, fed from external sources (for example for interlocking).		P
	The clearances and creepage distances specified by the supplier are maintained, taking into account the external influences or conditions of the physical environment.		P
11.2.3	Heat generating components (for example heat sinks, power resistors) are located so, that the temperature of each component in the vicinity remains within the permitted limit.		P
	Controlgears are sufficiently protected against: - ingress of solid foreign objects - liquids - dust, coolants, and swarf, taking into account the external influences under which the machine is intended to operate (i.e. the location and the physical environmental conditions).		P
	Enclosures of controlgear provide a degree of protection of at least IP22 (see IEC 60529). <u>Exceptions:</u> a) specific electrical operating area b) When with removable collectors on conductor wire or conductor bar systems do not achieve IP22 measures of 6.2.5 are applied.		P
11.4	Enclosures, doors and openings		P
	Enclosures (inclusively screens of windows (windows: toughened glass or polycarbonate sheet of not less than 3 mm thickness), joints, gaskets of doors and lids) do withstand the foreseeable mechanical, electrical and thermal stresses and other environmental factors and of the aggressive liquids, vapours, or gases used on the machine.		P
	Fasteners used to secure doors and covers are of the captive type.		P
	Enclosure doors are not wider than 0,9 m and have vertical hinges, with an angle of opening > 95°.		P

	<p>Openings in enclosures (for example, for cable access), including those towards the floor or foundation or to other parts of the machine are equipped with means to ensure the degree of protection specified for the equipment.</p> <p>A suitable opening may be provided in the base of enclosures within the machine so that moisture due to condensation can drain away.</p>		P
	Openings for cable entries shall be easily re-opened on site.		P
	No openings between enclosures containing electrical equipment and compartments containing coolant, lubricating or hydraulic fluids, or those into which oil, other liquids, or dust can penetrate.		P
	Holes in an enclosure for mounting do not impair the required protection.		P
	<p>Equipment that, in normal or abnormal operation, can attain a surface temperature sufficient to cause a risk of fire or harmful effect to an enclosure material is:</p> <ul style="list-style-type: none"> – located within an enclosure that will withstand, such temperatures; and – is located at a sufficient distance from adjacent equipment allowing safe dissipation of heat (see also 11.2.3); or – is otherwise screened by material that can withstand to the harmful effect. 		P
11.5	Access to control gear		N
	<p>Doors in gangways for access to electrical operating areas:</p> <ul style="list-style-type: none"> – are at least 0,7 m wide and 2,1 m high; – do open outwards; – have a means (for example panic bolts) to allow opening from the inside without the use of a key or tool. 		N
	Enclosures which readily allow a person to fully enter are provided with means to allow escape, e.g. panic bolts on the inside of doors.		N
	<p>Enclosures intended for such access, for example for resetting, adjusting, maintenance, shall have a clear width of at least 0,7 m and a clear height of at least 2,1 m</p> <p>When equipment is likely to be live during access with > 1,0m and when on both side with > 1.5m.</p>		N
12	CONDUCTORS AND CABLES		P
	IMPORTANT: The following requirements do not apply to the integral wiring of assemblies, subassemblies, and devices that are manufactured and tested in accordance with their relevant IEC standard (for example IEC 60439-1).		—
12.2	In general, conductors are of copper. Where aluminium conductors are used, the cross-sectional area is at least 16 mm ² .		P
	The cross-sectional areas of conductors are according to Table 5 and its notes.		P

	All conductors that are often in movement (> one movement per hour of machine operation) have flexible stranding of class 5 or class 6.		P
	Where the insulation of conductors and cables (for example PVC) can constitute hazards due to the propagation of a fire or the emission of toxic or corrosive fumes adequate means are provided. Special attention is given to the integrity of a circuit having a safety-related function		P
	Minimum insulation test voltages for used cables are: – $\geq 2\,000$ V a.c. for a duration of 5 min for operation at voltages higher than 50 V a.c. or 120 V d.c., or – ≥ 500 V a.c. for a duration of 5 min for PELV circuits (see IEC 60364-4-41, class III equipment).		P
	Insulation strong enough to withstand damage due to operation or during laying, especially for cables pulled into ducts.		P
12.4	Current-carrying capacity in normal service in accordance with table 6. Or in accordance with suppliers recommendation.		P
12.6	Flexible cables		P
12.6.1	All flexible cables have Class 5 or Class 6 conductors.		P
	Cables under severe duties are adequately protected against: - abrasion due to mechanical handling and dragging across rough surfaces; - kinking due to operation without guides; - stress resulting from guide rollers and forced guiding, being wound and re-wound on cable drums.		P
12.6.2	The tensile stress applied to copper conductors does not exceed 15 N/mm ² of cross-sectional area. Or special measures are taken to withstand the applied stress. For material other than copper the applied stress is within the cable manufacturer's specification.		P
12.6.3	For cables installed on drums, the maximum current-carrying capacity in free air is derated in accordance with Table 7.		P
12.7	Conductor wires, conductor bars and slip-ring assemblies		P
12.7.1	During normal access to the machine, protection against direct contact to conductor wires, conductor bars and slip-ring assemblies 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.		P

	Horizontal top surfaces of barriers or enclosures that are readily accessible provide a degree of protection of at least IP4X.		P
	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 is applied.		P
	Conductor wires and conductor bars are so placed / protected as to: – prevent contact with conductive items such as the cords of pull-cord switches, strain-relief devices and drive chains; – prevent damage from a swinging load.		P
12.7.2	Protective conductor circuit (PE) and the neutral conductor (N) each use a separate conductor wire, conductor bar or slip-ring.		P
	The continuity of the protective conductor circuit using sliding contacts is ensured by taking appropriate measures (for example, duplication of the current collector, continuity monitoring)		P
12.7.3	Protective conductor current collectors 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.		P
12.7.4	Removable current collectors (e.g. swivelingable) with disconnecter function: The protective conductor circuit interrupts after and reconnects before any live conductor.		P
12.7.5	Clearances in air between conductors and adjacent systems are suitable at least a rated impulse voltage of an overvoltage category III in accordance with IEC 60664-1 (For example 4 kV for 230/400 V systems → clearances 3mm)		P
12.7.6	Creepage distances between conductors and adjacent systems are suitable suitable for operation in the intended environment, e.g. open air (IEC 60664-1), inside buildings, protected by enclosures. In abnormally dusty, moist or corrosive environments, the following creepage distance requirements apply: – unprotected conductor etc.: minimum creepage dist. of 60 mm – enclosed conductor etc.: minimum creepage distance of 30 mm		P
12.7.7	Conductor system divided into isolated sections: suitable design measures are employed to prevent the energization of adjacent sections by the current collectors themselves.		P

12.7.8	<p>Construction of conductor wires etc.:</p> <ul style="list-style-type: none"> - power circuits are grouped separately from those in control circuits. - do withstand the foreseeable mechanical forces and thermal effects of short-circuit current. - covers can not be opened without the use of a tool - all conductive parts of accompanying enclosures are connected to the protective bonding circuit - underground and underfloor conductor bar ducts have drainage facilities 		P
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13	WIRING PRACTICES		P
13.1	Connections and routing		P
13.1.1	All connections are secured against accidental loosening.		P
	The means of connection are suitable for the cross-sectional areas and nature of the conductors being terminated.		P
	No connection of two or more conductors to one terminal, unless the terminal is designed for it.		P
	No soldered connections to terminals unless they are suitable for it.		P
	Terminals on terminal blocks are plainly marked or labelled corresponding with the diagrams.		P
	Installations of flexible conduits and cables are such that liquids drain away from the fittings.		P
	Retaining means for conductor strand and shields provided (no soldering for that purpose)		P
	Identification tags legible, permanent, and appropriate for the physical environment.		P
	Terminal blocks mounted and wired so that the internal and external wiring does not cross over the terminals (see IEC 60947-7-1).		P
13.1.2	<p>Conductors and cables run from terminal to terminal without splices or joints.</p> <p>Connections using plug/socket combinations with suitable protection against accidental disconnection are not considered to be joints for the purpose of this subclause.</p>		P
	Terminations of cables are adequately supported to prevent mechanical stresses at the terminations of the conductors.		P
	Protective conductor placed close to the associated live conductors in order to decrease the impedance of the loop.		P

13.1.3	Conductors for circuits that operate at different voltages are separated by suitable barriers, or are insulated for the highest voltage that occurs within the same duct.		P
13.1	Connections and routing		P
13.2.1	Each conductor is identifiable at each termination in accordance with the technical documentation.		P
13.2.2	The protective conductor has the bicolour combination GREEN-AND-YELLOW Where the protective conductor can be easily identified colour coding throughout its length is not necessary, but the ends or accessible locations are clearly identified by the graphical symbol or by the bicolour combination GREEN-AND-YELLOW.		P
13.2.3	Neutral conductors are identified by the colour LIGHT BLUE. That colour is not used for identifying any other conductor where confusion is possible.		P
	Bare conductors used as neutral conductors have at minimum a stripe in LIGHT BLUE 15 mm to 100 mm wide in each compartment or unit and at each accessible location.		P
	Identification by colour for other conductors: Colours GREEN or YELLOW are not used. (Details to colour coding see this norm Cl. 13.2.3)		P
13.3	Wiring inside enclosures		P
	Conductors inside enclosures are supported where necessary. Conductors and cables that do not run in ducts are adequately supported.		P
	Non-metallic supports are made with a flame-retardant insulating material (see IEC 60332 series)		P
	Connections to devices mounted on doors or to other movable parts are using flexible conductors in accordance with 12.2 and 12.6.		P
13.4	Wiring outside enclosures		P
13.4.2	Conductors and their connections external to the electrical equipment are placed in suitable ducts (see cl.13.5). Exceptions: - Cables with special suitable protection. - Position switches or proximity switches supplied with a dedicated cable which is sufficiently short.		P
13.4.3	Connection to moving elements of the machine		N
	Connections to moving elements of the machine are made of flexible cable in accordance with 12.2 and 12.6.		N
	Bending radius of the cable are of at least 10 times the diameter of the cable		N
	Cables close to moving parts, maintain a space of at least 25 mm between the moving parts and the cables or barriers are provided.		N

	Cable handling systems: Lateral cable angles do not exceeding 5°, at being wound on and off cable drums or approaching and leaving cable guidance devices. The bending radius is in accordance with table 8.		N
	Flexible conduit: - is not used for connections to rapidly or frequently moving parts, except when specifically designed for that purpose. - is supported when adjacent to moving parts		N
13.4.4	Interconnection of devices on the machine is made through adequate terminals.		P
13.4.5	Requirements to plug/socket combinations outside of enclosures: Exceptions: components connected to a bus system by a plug/socket combination a) Prevention for unintentional contact with live parts at any time. At least IPXXB. (PELV circuits are excepted from this requirement.) b) First make last break protective bonding contact if used in TN- or TT-systems. c) Sufficient load-breaking capacity, when intended to be disconnected under running conditions. When rated at ≥ 30 A interlocked with a switching device d) When rated at ≥ 16 A having a retaining means to prevent unintended or accidental disconnection. e) when unintended or accidental disconnection +can cause a hazardous situation, having a retaining means. f) Component remaining live after disconnection having at least IP2X or IPXXB, taking into account the required clearance and creepage distances.(PELV circuits are excepted from this requirement.) g) Metallic housings of plug/socket combinations being connected to the protective bonding circuit. (PELV circuits are excepted from this requirement.) h) Having retaining means to prevent unintended or accidental disconnection and being marked that they are not intended to be disconnected under load. i) Clearly identifiable if more then one plug / socket per device. It is recommended that mechanical coding being used. j) When used in control circuits fulfilling the applicable requirements of IEC 61984. Exception: see item k). k) No plug/socket combinations intended for household and similar general purposes used for control circuits. In plug/socket combinations in accordance with IEC 60309-1, only those contacts shall be used for control circuits which are intended for those purposes. Exception: The requirements of item k) do not apply to control functions using high frequency signals on the power supply.	No such construction	N
13.4.6	Protection of Plug / socket from the physical environment during transportation and storage.		P



13.5	Ducts, connection boxes and other boxes		P
	Provided with a degree of protection suitable for the application.		P
	No sharp edges, flash, burrs, rough surfaces, or threads with which the insulation of the conductors can come into contact.		P
	Where human passage is required, least 2 m above the working surface.		P
	Not used as connection for protective bonding circuit.		P
	Where cable trays are a.s.o. are only partially covered, the cables used are of a suitable type.		P
13.5.2	Filling the percentage of ducts adapted to the straightness and length of the duct and the flexibility of the conductors.		P
13.5.3	Rigid metal conduit and fittings shall galvanized steel or of a corrosion-resistant material		P
	Fittings compatible with the conduit.		P
	Conduit bends properly made		P
13.5.4	Flexible metal tubing or woven wire armour suitable for the expected physical environment.		P
13.5.5	Flexible non-metallic conduit resistant to kinking and suitable for the expected physical environment.		P
13.5.6	Requirements to cable trunking systems: - Rigidly supported and clear of all moving or contaminating portions of the machine - Covers overlapping the sides and attached.		P
13.5.7	The compartments of machine used as cable trunking systems are isolated from coolant or oil reservoirs and are entirely enclosed, and the conductors are secured.		P
13.5.8	Connection boxes and other boxes used for wiring: - Are accessible for maintenance. - Provide protection against the ingress of solid bodies and liquids, taking into account the external influences under which the machine is intended to operate (see 11.3). - Do not have unused knockouts etc.		P
13.5.9	Motor connection boxes: Encloses only connections to the motor and motor-mounted devices (e.g brakes, temperature sensors)		P

14	ELECTRIC MOTORS AND ASSOCIATED EQUIPMENT		P
14.1	Electric motors are conform to the relevant parts of IEC 60034 series.		P
	There protection is conform to the requirements given in 7.2 for overcurrent protection, in 7.3 for overload protection, and in 7.6 for overspeed protection.		P
	Motor control equipment is located and mounted in accordance with Clause 11.		P

14.2	Minimal IP23 protection for all motors. More stringent requirements depending on the application and the physical environment.		P
14.4	Motors incorporated as an integral part of the machine are adequately protected from mechanical damage.		P
	motors and its associated parts (inclusively motor connection box) are easily accessible for inspection and maintenance etc		P
	Cooling is ensured and the temperature rise remains within the limits of the insulation class (see IEC 60034-1)		P
	No opening between the motor compartment and any other compartment that does not meet the motor compartment requirements.		P
14.5	The characteristics of motors and associated equipment are selected in accordance with the anticipated service and physical environmental conditions (see 4.4). Detailed criteria see 14.5 of this norm.		P
14.6	Overload and overcurrent protective devices for mechanical brake actuators initiate simultaneously the deenergization (release) of the associated motors.		P
15	ACCESSORIES AND LIGHTING		P
15.1	Requirements for socket-outlets for accessory equipment: – conform to IEC 60309-1 (Where that is not practicable, they are clearly marked with voltage and current ratings); – continuity of the protective bonding circuit to the socket-outlet is ensured, except where protected by PELV; – unearthed conductors connected to the socket-outlet are overcurrent- and if required overload-protected – protection is separately from other circuits; – 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.		P
15.2.1	Requirements for local lighting of the machine and equipment: - protective bonding circuit in accordance with 8.2.2. - ON/OFF switch incorporated in the lamp-holder or in the flexible connecting cords. - Stroboscopic effects avoided. - Where fixed lighting electromagnetic compatibility is taken into account.		P

15.2.2	<p>Requirements to the power supply for local lighting:</p> <ul style="list-style-type: none"> – Nominal voltage not exceeding 250 V between conductors – isolating transformer connected to the load side of the supply with overcurrent protection in the secondary circuit; or – isolating transformer connected to the line side of the supply disconnecting device with overcurrent protection in the secondary circuit. That source is permitted for maintenance lighting circuits in control enclosures only; or – from a machine circuit with dedicated overcurrent protection; or – from an isolating transformer connected to the line side of the supply disconnecting device, provided with a dedicated primary disconnecting means and secondary overcurrent protection, and mounted within the control enclosure adjacent to the supply disconnecting device; or – from an externally supplied lighting circuit (for example factory lighting supply). This shall be permitted in control enclosures only, and for the machine work light(s) where their total power rating is not more than 3 kW. <p>Exception: Where fixed lighting is out of reach of operators during normal operations, the provisions of this subclause do not apply.</p>		P
15.2.3	All unearthed conductors of circuits supplying lighting have their own overcurrent protecting devices.		P
15.2.4	<p>Requirements to the fittings for local lighting:</p> <ul style="list-style-type: none"> – Adjustable lighting fittings are suitable for the physical environment. – lamp holders are in accordance with the relevant IEC standard; – lamp holders are constructed with an insulating material protecting the lamp cap – Reflectors are supported by a bracket and not by the lamp holder. <p>Exception: where fixed lighting is out of reach of operators during normal operation, the provisions of this subclause do not apply.</p>		P

16	MARKING, WARNING SIGNS AND REFERENCE DESIGNATIONS	
16.1	Warning signs, nameplates, markings, and identification plates are of sufficient durability to withstand the physical environment.	P

16.2.1	<p>Enclosures that do not clearly show that they contain electrical equipment that has a risk of electric shock</p> <p>are marked with the graphical symbol  plainly visible on the enclosure door or cover.</p> <p>Exception:</p> <ul style="list-style-type: none"> – enclosure equipped with a supply disconnecting device; – operator-machine interface or control station; – a single device with its own enclosure (for example position sensor). 		P
16.2.2	<p>Hazardous hot surfaces of the electrical equipment, are equipped with the graphical warning symbol</p> <p></p>	No such construction	N
16.2.3	Control devices, visual indicators, and displays are clearly and durably marked to their functions.		P
16.2.4	<p>Equipment (e.g. controlgear assemblies) is legibly and durably marked.</p> <p>A nameplate is attached to the enclosure adjacent to each incoming supply with:</p> <ul style="list-style-type: none"> – name or trade mark of supplier; – certification mark, when required; – serial number, where applicable; – rated voltage, number of phases and frequency (if a.c.), – full-load current for each supply; – short-circuit rating of the equipment; – main document number (see IEC 62023). 		P
16.2.5	All enclosures, assemblies, control devices, and components are plainly identified with the same reference designation as shown in the technical documentation.		P

17	TECHNICAL DOCUMENTATION		-
17.1	Documentation in agreed language provided.	Documentation in English	P

17.2	<p>Information provided with the electrical equipment include:</p> <p>a) A main document (parts list or list of documents);</p> <p>b) Complementary documents including:</p> <ol style="list-style-type: none"> 1) a clear, comprehensive description of the equipment, installation and mounting, and the connection to the electrical supply(ies); 2) electrical supply(ies) requirements; 3) information on the physical environment (for example lighting, vibration, noise levels, atmospheric contaminants) where appropriate; 4) overview (block) diagram(s) where appropriate; 5) circuit diagram(s); 6) information (as applicable) on: <ul style="list-style-type: none"> • programming, as necessary for use of the equipment; • sequence of operation(s); • frequency of inspection; • frequency and method of functional testing; <ul style="list-style-type: none"> • guidance on the adjustment, maintenance, and repair, particularly of the protective devices and circuits; • recommended spare parts list; • list of tools supplied. 7) a description (including interconnection diagrams) of the safeguards, interlocking functions, and interlocking of guards against hazards, particularly for machines operating in a co-ordinated manner; 8) a description of the safeguarding and of the means provided where it is necessary to suspend the safeguarding (for example for setting or maintenance), (see 9.2.4); 9) instructions on the procedures for securing the machine for safe maintenance; (see also 17.8); 10) information on handling, transportation and storage; 11) information regarding load currents, peak starting currents and permitted voltage drops, as applicable; 12) information on the residual risks due to the protection measures adopted, indication of whether any particular training is required and specification of any necessary personal protective equipment. 		P
17.3	<p>Unless otherwise agreed between manufacturer and user:</p> <ul style="list-style-type: none"> – the documentation is in accordance with relevant parts of IEC 61082; – reference designations are in accordance with relevant parts of IEC 61346; – instructions / manuals are in accordance with IEC 62079. – parts lists where provided are in accordance with IEC 62027, class B. 		P

17.4	Installation documents giving all information necessary for the preliminary work of setting up the machine (including commissioning) are provided. (In complex cases, it may be necessary to refer to the assembly drawings for details.)		P
	The recommended position, type, and cross-sectional areas of the supply cables to be installed on are clearly indicated.		P
	Data necessary for choosing the type, characteristics, rated currents, and setting of the overcurrent protective device for the supply conductors to the electrical equipment of the machine is stated (see 7.2.2).		P
	The size, purpose, and location of any ducts in the foundation that are to be provided by the user are detailed (see Annex B).		P
	The size, type, and purpose of ducts, cable trays, or cable supports between the machine and the associated equipment that are to be provided by the user are detailed (see Annex B).		P
	A diagram indicates where space is required for the removal or servicing of the electrical equipment.		P
	An interconnection diagram or table is provided, where it is appropriate. They give full information about all external connections.		P
	Where the electrical equipment is intended to be operated from more than one source of electrical supply, the interconnection diagram or table does indicate the modifications or interconnections required for the use of each supply.		P
17.5	Where it is necessary to facilitate the understanding of the principles of operation, an overview diagram is provided.		P
17.6	The circuit diagram shows the electrical circuits on the machine and its associated electrical equipment.		P
	Any graphical symbol not shown in IEC 60617-DB:2001 are separately described on the diagrams or supporting documents.		P
	The symbols and identification of components and devices are consistent throughout all documents and on the machine.		P
	Switch symbols on the electromechanical diagrams are shown with all supplies turned off (for example electricity, air, water, lubricant) and with the machine and its electrical equipment ready for a normal start.		P
	Conductors are identified in accordance with 13.2.		P
	Characteristics relating to the function of the control devices and components which are not evident from their symbolic representation are included on the diagrams adjacent to the symbol or referenced to a footnote.		P

17.7	An operating manual detailing proper procedures for set-up and use of the electrical equipment is provided.		P
	Particular attention is given to the safety measures.		P
	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) is given.		P
17.8	A maintenance manual detailing proper procedures for adjustment, servicing and preventive inspection, and repair is provided. Recommendations on maintenance/service intervals and records are part of that manual. Where methods for the verification of proper operation are provided (for example software testing programs), the use of those methods is detailed		P
17.9	The parts list, where provided, comprises, 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.		P

18	VERIFICATION		P
18.1	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): a) verification that the electrical equipment complies with its technical documentation; b) in case of protection against indirect contact by automatic disconnection, conditions for protection by automatic disconnection shall be verified according to 18.2; c) insulation resistance test (see 18.3); d) voltage test (see 18.4); e) protection against residual voltage (see 18.5); f) functional tests (see 18.6).		—
18.2	Verification of conditions for protection by automatic disconnection of supply		
18.2.2	Test 1: Verification of the continuity of the protective bonding circuit		—
	The resistance of each protective bonding circuit between the PE terminal and relevant points that are part of each protective bonding circuit is measured with a current between at least 0,2 A. And the resistance measured is in the expected range according to the length, the cross sectional area and the material of the related protective bonding conductor.		P
	Test 2: Fault loop impedance verification and suitability of the associated overcurrent protective device.		P

	The connections of the power supply and of the incoming external protective conductor to the PE terminal of the machine are verified by inspection.		P
	The conditions for the protection by automatic disconnection of supply in accordance with 6.3.3 and Annex A a verified by both: 1) A verification of the fault loop impedance by - calculation, or - measurement in accordance with A.4, and		P
	2) A confirmation that the setting and characteristics of the associated overcurrent protective device are in accordance with the requirements of Annex A or table 10		P
18.3	Insulation resistance tests (facultative) The insulation resistance measured at 500 V d.c. between the power circuit conductors and the protective bonding circuit are not less than 1 MΩ.		P
18.4	Voltage test (facultative) Testing voltage; twice the rated supply voltage of the equipment or 1 000 V whichever is the greater With test voltage applied between the power circuit conductors and the protective bonding circuit for a period of approximately 1 s. there is no disruptive discharge occurred.		P
18.5	Protection against residual voltages (facultative) Compliance with 6.2.4. is ensured		P
18.6	Functional tests The function of circuits for electrical safety (for example earth fault detection) is insured.		P

1. Continuity of the protective bonding circuit

Test Points	Test Result(m Ω)	Test Current(A)	Voltage Drop(V)
PE-Control Panel	68	10	0.68
PE-Electrical Box	58	10	0.58
PE-Motor1	65	10	0.65
Transformer1	68	10	0.68

2. Insulation Resistance

Test Points	Test Result(M Ω)
PE-Power Inlet	230
PE-Motor1	250
Transformer1	220

3. Withstanding Voltage

Test Points	Breakdown
PE-Power Inlet	No
PE-Motor1	No
Transformer1	No

List of test equipment used:

(Note: This is an example of the required attachment. Other forms with a different layout but containing similar information are also acceptable.)

Clause	ID of test equipment	Measurement / testing	Testing / measuring equipment / material used	Range used	Calibration due date
4.4	PT-2	Psychrometer-Thermograph	-10~50°C, 5%~98% R.H	10~50°C, 5%~98% R.H	2019-09-20
4.3	JO-1	Oscilloscope	0~20KVac/ 0~16KVdc, 0 ~ 200MHz,0~200MS	0-500V	2019-09-20
7.4, 11.2.3	JT-4	Chart Recorder	0~1000°C	0-200°C	2019-09-20
17	TM-1	Tape-Measure	0~35 m	0-35m	2019-09-20
12.7.6	XS-1	Digital Caliper	0~200 mm	0-200mm	2019-09-20
18.4	DH-3	Withstanding Voltage Tester	0~5KV 0.3-100mA 50/60Hz	2000V ac	2019-09-20
8.2	DA-3	Leakage Current Meter	0-10mA, 0-150V / 0-500V	0-500V ac	2019-09-20
18.4	SW-2	Stop watch	0-99 h	0-99h	2019-09-20
18.3	INSU-01	Insulation resistance meter	0-500 M ohm	0-500 Mohm	2019-09-20
8.2	GRD-01	Earthing continuity meter	0-10 ohm	0-2 ohm	2019-09-20
7.4, 11.2.3	TH-1	Thermocouple	0-1000°C, type K	0-200°C	2019-09-20

- End of Main Report -

3.4 EN 60204-1:2006+A1:2009+AC: 2010 Report
 (ATTACHMENT TO TEST REPORT IEC 60204-1
 European Group Differences and National Differences)

ATTACHMENT TO TEST REPORT IEC 60204-1 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES SAFETY OF MACHINERY - ELECTRICAL EQUIPMENT OF MACHINES PART 1: GENERAL REQUIREMENTS	
Differences according to.....:	EN 60204-1:2006+AC:2010
Attachment Form No.....:	EU_GD_IEC60204_1A
Attachment Originator.....:	Electrosuisse
Master Attachment.....:	2009-11
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	CENELEC COMMON MODIFICATIONS (EN)	
1.	Scope	—
	– are sewing machines, units, and systems; NOTE 7 For sewing machines, see EN 60204-31. – are hoisting machines. NOTE 8 For hoisting machines, see EN 60204-32.	—
3.	Terms and definitions	-
3.56	Uncontrolled stop NOTE This definition does not imply any particular state of other (for example, non-electrical) stopping devices, for example, mechanical or hydraulic brakes that are outside the scope of this standard.	-
4.2	Section of equipment	P
4.2.2	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).	P
4.4	Physical environment and operating conditions	P

TRF No. EU_GD_IEC60204_1A

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IEC60204_1A - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
4.4.1	The electrical equipment shall be suitable for the physical environment and operating conditions of its intended use. The requirements of 4.4.2 to 4.4.8 cover the physical environment and operating conditions of the majority of machines covered by this part of EN 60204. When special conditions apply or the limits specified are exceeded, an agreement between user and supplier (see 4.1) is recommended (see Annex B).		P
4.4.3	Electrical equipment shall be capable of operating correctly in the intended ambient air temperature. The minimum requirement for all electrical equipment is correct operation between air temperatures of +5 °C and +40 °C. For very hot environments (for example hot climates, steel mills, paper mills) and for cold environments, additional measures are recommended (see Annex B).		P
4.4.7	When equipment is subject to radiation (for example microwave, ultraviolet, lasers, X-rays), additional measures shall be taken to avoid malfunctioning of the equipment and accelerated deterioration of the insulation. A special agreement is recommended between the supplier and the user (see Annex B).	No radiation subjected.	N
4.4.8	Undesirable effects of vibration, shock and bump (including those generated by the machine and its associated equipment and those created by the physical environment) shall be avoided by the selection of suitable equipment, by mounting it away from the machine, or by provision of anti-vibration mountings. A special agreement is recommended between the supplier and the user (see Annex B).		P
5.	Incoming supply conductor terminations and devices for disconnecting and switching off		P
5.1	Add: See 17.8 for the provision of instructions for maintenance.		—
5.4	NOTE 2 Further information on the location and actuation of devices such as those used for the prevention of unexpected start-up is provided in EN 60447. After the fifth paragraph, replace note 2 with: NOTE 3 The selection of a device should take into account, for example, information derived from the risk assessment, intended use and foreseeable misuse of the device. For example, the use of disconnectors, withdrawable fuse links		—
9.	Control circuits and control functions		P

TRF No. EU_GD_IEC60204_1A

SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD
ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.

IEC60204_1A - ATTACHMENT																															
Clause	Requirement + Test	Result - Remark	Verdict																												
9.2.6.3	Enabling control (see also 10.9) is a manually activated control function interlock that:		—																												
	a) when activated allows a machine operation to be initiated by a separate start control		N																												
	b) when de-activated – initiates a stop function in accordance with 9.2.5.3, and – prevents initiation of machine operation.		N																												
	Enabling control shall be so arranged as to minimize the possibility of defeating, for example by requiring the de-activation of the enabling control device before machine operation may be reinitiated. It should not be possible to defeat the enabling function by simple means.		N																												
9.2.7.3	Stop:		—																												
	Cableless control stations shall include a separate and clearly identifiable means to initiate the stop function of the machine or of all the operations that can cause a hazardous situation. The actuating means to initiate this stop function shall not be marked or labelled as an emergency stop device (see 10.7).		P																												
10.	Operator interface and machine-mounted control devices		P																												
	Replace table 2 with Table 2 – Colour coding for push-button actuators and their meanings		P																												
	<table border="1"> <thead> <tr> <th>Colour</th> <th>Meaning</th> <th>Explanation</th> <th>Examples of application</th> </tr> </thead> <tbody> <tr> <td>RED</td> <td>Emergency</td> <td>Actuate in the event of a hazardous situation or emergency</td> <td>Emergency stop Initiation of emergency function (see also 10.2.1)</td> </tr> <tr> <td>YELLOW</td> <td>Abnormal</td> <td>Actuate in the event of an abnormal condition</td> <td>Intervention to suppress abnormal condition Intervention to restart an interrupted automatic cycle</td> </tr> <tr> <td>BLUE</td> <td>Mandatory</td> <td>Actuate for a condition requiring mandatory action</td> <td>Reset function</td> </tr> <tr> <td>GREEN</td> <td>Normal</td> <td>Actuate to initiate normal conditions</td> <td>(See 10.2.1)</td> </tr> <tr> <td>WHITE</td> <td rowspan="3">No specific meaning assigned</td> <td rowspan="3">For general initiation of functions except for emergency stop</td> <td>START/ON (preferred) STOP/OFF</td> </tr> <tr> <td>GREY</td> <td>START/ON STOP/OFF</td> </tr> <tr> <td>BLACK</td> <td>START/ON STOP/OFF (preferred)</td> </tr> </tbody> </table>	Colour	Meaning	Explanation	Examples of application	RED	Emergency	Actuate in the event of a hazardous situation or emergency	Emergency stop Initiation of emergency function (see also 10.2.1)	YELLOW	Abnormal	Actuate in the event of an abnormal condition	Intervention to suppress abnormal condition Intervention to restart an interrupted automatic cycle	BLUE	Mandatory	Actuate for a condition requiring mandatory action	Reset function	GREEN	Normal	Actuate to initiate normal conditions	(See 10.2.1)	WHITE	No specific meaning assigned	For general initiation of functions except for emergency stop	START/ON (preferred) STOP/OFF	GREY	START/ON STOP/OFF	BLACK	START/ON STOP/OFF (preferred)		
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12.	Conductors and cables		P																												
12.7.8	Construction and installation of conductor wire, conductor bar systems and slip-ring assemblies		—																												
	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).		P																												

IEC60204_1A - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
17.	Technical documentation		P
17.2	Information to be provided 3) information on the physical environment (for example lighting, vibration, atmospheric contaminants) where appropriate;		P
18.	Verification		P
18.1	General (5 th paragraph) For tests in accordance with 18.2 and 18.3, measuring equipment in accordance with the EN 61557 series is applicable. NOTE For other tests as required by this standard measuring equipment in accordance with relevant IEC or European Standards should be used.		P

ZA	ANNEX ZA, Normative references to IEC standards (normative)	P
	<p>Normative references to international publications with their corresponding European publications</p> <p>The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.</p> <p>NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.</p>	—

ZZ	ANNEX ZZ, Essential requirements EC directives (informative)	P
	<p>Coverage of Essential Requirements of EC Directives</p> <p>This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers only the following essential requirements out of those given in Annex I of the EC Directive 98/37/EC:</p> <ul style="list-style-type: none"> – 1.1.2 – 1.2 – 1.5.1 – 1.5.4 – 1.6.3 (for isolation of electrical supplies of machinery) – 1.6.4 (for access to electrical equipment) – 1.7.0 – 1.7.1 – 1.7.2 (for residual risks of an electrical nature) – 1.7.4(c) <p>Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.</p> <p>WARNING: Other requirements and other EC Directives may be applicable to the products falling within the scope of this standard.</p>	—

TRF No. EU_GD_IEC60204_1A

SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD
ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.

IEC60204_1A - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

-End of Attachment to Test Report IEC60204-1-

Annex: Technical Information

File No: MD-TCF-190211-16904-5

Applicant:

SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD

Address of applicant:

ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT,

SHANGHAI.



A.1 Declaration of conformity with signature

A.2 Safety pictures of the machine

Legal Person: _____

Product: HIGH SPEED INDUSTRIAL DOOR

Model: /

EC DECLARATION OF CONFORMITY

THIS IS HEREBY DECLARED THAT FOLLOWING DESIGNATED PRODUCT COMPLIED WITH THE ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF MACHINE DIRECTIVE 2006/42/EC and Low Voltage Directive 2014/35/EU ON THE APPROXIMATION OF THE LAWS OF THE MEMBER STATES RELATING TO IT.

MANUFACTURER

SHANGHAI EVERBESTEN INTERNATIONAL TRADE CO., LTD
ROOM 208, SECTIONAL 10, 2999 HU TAI RD, 200444 BAOSHAN DISTRICT, SHANGHAI.

PERSON AUTHORISED TO COMPILE THE TECHNICAL FILE:

DESCRIPTION OF MACHINERY

PRODUCT NAME: HIGH SPEED INDUSTRIAL DOOR
MODEL TYPE: /

APPLICABLE STANDARDS

EN12978:2003+A1:2009,
EN13241-1:2003+A1:2011,
EN 60204-1:2006+A1:2009+AC:2010.

HIS DECLARATION APPLIES TO ALL SPECIMENS MANUFACTURED IDENTICAL TO THE MODEL SUBMITTED FOR TESTING / EVALUATION. ASSESSMENT OF COMPLIANCE OF THE PRODUCT WITH THE REQUIREMENTS RELATING TO SAFETY STANDARDS LISTED ABOVE WAS PERFORMED BY MANUFACTURER.



SIGNED ON BEHALF OF

SIGNATURE: _____

TITLE: Person in Charge of Technical

PLACE: , China

DATE: 2019/03/10

Annex 2: Safety pictures of the machine

Photo documentation

Type of equipment, model: HIGH SPEED INDUSTRIAL DOOR

Details of:

View:

general

front

rear

right

left

top

bottom



Details of:

View:

general

front

rear

right

left

top

bottom



Details of:

View:

general

front

rear

right

left

top

bottom



Details of:

View:

general

front

rear

right

left

top

bottom



- End of Photo Documentation -