CE SAFETY TEST REPORT
FOR THE
ROBO-FENCE, LLC
MACHINE GUARD

Prepared for:

Robo-Fence, LLC
33646 Lipke Street
Clinton Township, MI 48035
USA

Submitted by:

Green Mountain Electromagnetics, Inc.

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ACCREDITED
Test Lab
Cert 898.01

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For Robo-Fence

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Robo-Fence LLC
CE Safety Inspection
By
Green Mountain Electromagnetics (GME), Inc.

Unit: Robo-Fence Machine Guard
Received: 11/19/20
Tested: November 23 – 25, 2020

I. Applicable Standards

The system described in this report was evaluated for compliance with European Machinery Directive (2006/42/EC), Annex I "Essential Health and Safety Requirements Relating to the Design and Construction of Machinery (17 May 2006)," and ISO 14120, "Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards (2015)."

Inspections were made to determine compliance with ISO 14120 and 2006/42/EC.

II. Measurement Location

The GME product safety laboratory is located at 219 Blake Roy Road, Middlebury, VT. The laboratory operates in accordance with CE standards. GME is internationally accredited by the American Association for Laboratory Accreditation (A2LA) and meets the quality requirements in ISO/IEC 17025 (2017), "General Requirements for the Competence of Testing and Calibration Laboratories." For scope of accreditation, contact GME.

III. Unit Tested

The Robo-Fence LLC, Machine Guard is a mechanical, fixed distance guard used to provide protection from robotic equipment. The Robo-Fence has no electrical or electronic parts. It consists of multi-piece metal bars with metal mesh and associated fasteners. A typical sample of the product was used for evaluation.

Below is a photograph of the unit under evaluation.

The table below describes the unit that was subjected to inspections determining compliance with applicable safety standards:

Product	Manufacturer	Model	Serial Number
Machine Guard	Robo-Fence LLC	Robo-Fence	Prototype

The following table describes the system physical and electrical properties:

Product	Volts/Amps/Hertz	H/W/D in cm
Machine Guard	n/a	70/35/15

There are no system critical components

IV. Summary of Results

The Robo-Fence LLC, Machine Guard complies with the Machinery Directive (2006/42/EC) and ISO 14120 safety requirements.

The unit was modified for compliance with the safety inspection as follows:

1. The unit must be marked with a Model and Serial Number.
2. The unit must be marked with ISO/IEC-type warning label for “Caution – Read the Manual”.
3. The user documentation must contain:
    a. Installation/operation instructions including fasteners required and any standards needed.
    b. Removal instructions including tools required and a safe procedure.
    c. Any inspection or maintenance requirements.
    d. The ISO/IEC symbol for “Caution Read the Manual” with an explanation for safe use.

Testing and inspections were performed by Kyle R. Kowalczyk, president, Green Mountain Electromagnetics and requested by:

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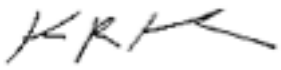

Kyle R. Kowalczyk
11/27/20

Machinery Directive Annex		
Compliance Checklist November 23, 2020 **Robo-Fence**	Compliant ?	Comments
Machinery Directive Annex		
Section 1 - Essential Health & Safety		
Section 1.1 - General		
Risk to users under normal condition.	Yes	
Risk reduction and personnel protection.	Yes	
Abnormal uses accounted for.	Yes	
Ergonomic factors addressed.	Yes	
Personal protective equipment.	N/A	None Required
All required specialized equipment provided.	N/A	None Required
Materials and by-products do not pose risk.	Yes	
Adequate lighting/special lighting required.	N/A	None Required
Safe handling, shipping & storing accommodations.	Yes	
Section 1.2 - Controls		
Safe/reliable - normal use and w/logic errors.	N/A	No Controls
Clearly visible and appropriately identified.	N/A	
Appropriately located.	N/A	
Movement consistent with effect.	N/A	
Located outside danger zones w/ no added risk.	N/A	
No unintentional risk generated.	N/A	

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Robust enough to withstand abuse.	N/A	
Appropriate display/confirmation for unmarked type.	N/A	
Considerate to personnel safety.	N/A	
Appropriate indicators are used.	N/A	
Operator can monitor danger zones or be info'd by light/sound.	N/A	
No automatic start or hazardous restart after halt.	N/A	
Light/sound warnings for multiple location start.	N/A	
Automation is easily restarted.	N/A	
Stop controls provided on equipment and workstations.	N/A	
Energy is cut to moving parts & actuators upon safe stop.	N/A	
Emergency stop: clearly identifiable, visible & accessible.	N/A	
Emergency stop: quickly stops machine w/o hazard.	N/A	
Emergency stop: triggers or permits trigger as necessary.	N/A	
Emergency stop: action is deliberate, no premature/auto-restart.	N/A	
Emergency stop: in complex installation stops up/downstream.	N/A	
Mode selector: selected mode overrides all modes except E-stop.	N/A	
Mode selector: locks into single position/mode.	N/A	
Neutralize protection mode: disables automatic modes.	N/A	
Npm: permits movement only by sustained action.	N/A	
Npm: enhance safety assoc. w/moving dangerous parts/linkage.	N/A	
Npm: disable internal sensors if they cause hazardous motion.	N/A	
Npm: parts are controllable at adjustment point.	N/A	
Power supply: interruption/re-establishment is non-hazardous.	N/A	

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Power supply failure: no unexpected start or prevent from stop.	N/A	
Psf: moving parts must not eject/fall/be prevented from stopping.	N/A	
Psf: protection devices remain in place.	N/A	
Control circuit: fault or failure is non-hazardous.	N/A	
Control circuit failure: no unexpected start or prevent from stop.	N/A	
Ccf: moving parts must not eject/fall/be prevented from stopping.	N/A	
Ccf: protection devices remain in place.	N/A	
Software is user friendly.	N/A	
Section 1.3 - Mechanical Hazard Protection		
No risk of overturning, falling or unexpected movement.	Yes	
Unstable machinery is provided with anchorage & instructions.	N/A	
Parts are adequate for intended mechanical stresses.	Yes	
Materials have adeq. fatigue, aging, corrosion & abrasion prop.	Yes	
Instructions have inspection/maintenance & worn parts criteria.	Yes	Modified: See Summary
In case of rupture or disintegration, moving parts are contained.	N/A	
Fluid carrying pipes able to withstand stress and no rupture risk.	N/A	
Automatic tools reach normal condition before feed begins.	N/A	
Auto. tools have feed and tool start/stop movement coordinated.	N/A	
No risk from falling or ejected objects.	Yes	
No risk from surfaces, edges or angles.	Yes	
No risk from combined machinery operation, sep. start/stops.	N/A	
No risk from variations in rotational speed of tools.	N/A	

Fixed or movable guards for moving transmission parts.	Yes	
Fixed or movable guards for moving process parts.	Yes	
Fixed or movable guards for moving accessible process parts.	Yes	
Section 1.4 - Guards		
Guards: robust, do not add risk, cannot by-pass.	Yes	Fixed Distance Guard
Guards: adequate distance from danger and allow viewing.	Yes	
Guards: allow essential work without removal if possible.	Yes	
Fixed guards: secure, tool required for opening/removal.	Yes	
Fixed guards: unable to remain in place w/o fixings.	Yes	
Moveable guards A: remain attached when opened and interlock.	N/A	
Moveable guards B: are p/o control system and disable motion.	N/A	
MgB: operator cannot reach parts in motion.	N/A	
MgB: intentionally adjustable only by tool or key.	N/A	
MgB: component failure/absence prevents starting/moving.	N/A	
Adjustable guards: manual or automatic, no tools/ejection risk.	N/A	
Protective devices: no reachable moving parts during start-up.	N/A	
Protective devices: no exposed moving parts after start-up.	N/A	
Protective devices: intentionally adjustable only by tool or key.	N/A	
Pd: component failure/absence prevents starting/moving.	N/A	
Section 1.5 - Other Hazards		
Electrical supply: designed, constructed & equipped against haz.	N/A	

Electrical supply: designed to rules in force.	N/A	
Dangerous electrostatic discharge is limited/prevented.	Yes	
Designed to eliminate hazards from energy other than electricity.	Yes	
Eliminate/doc. errors due fitting/direction of motion/faulty conns.	Yes	
No risk from extreme temperature/ejected hot & cold material.	Yes	
No fire/machine-overheat risk from gas, liquid, dust or vapor.	Yes	
Explosion: eliminate risk through design and construction.	Yes	
Explosion: no dangerous combination/concentration of products.	Yes	
Explosion: no combustion of potentially explosive atmosphere.	Yes	
Explosion: minimize any explosion and reduce danger.	Yes	
Explosion: include electrical & intentional exp. atm. installation.	N/A	
Explosion: no risk through design and construction.	Yes	
Designed and constructed to minimize noise.	Yes	
Designed and constructed to minimize vibration.	Yes	
Designed and constructed to minimize radiation.	N/A	
Designed and constructed to be immune to external radiation.	Yes	
Lasers: designed/constructed to prevent accidental radiation.	N/A	
Lasers: protected so radiation sources are not a health hazard.	N/A	
Lasers: protected so observation optics are not a health hazard.	N/A	
Designed/constructed to minimize gases, liquid, dust, vapor.	N/A	
Contain/evacuate any gases, liquid, dust, vapor at source.	N/A	
Designed/constructed to prevent trapping personnel.	Yes	
Designed/constructed to prevent slipping, tripping & falling.	Yes	

Section 1.6 Maintenance		
Adjustment, lube & maintenance points outside danger zones.	Yes	
All servicing is at a standstill unless technically impossible.	Yes	
No risk from servicing moving equipment if necessary.	N/A	
Automation has connector for diagnostic device.	N/A	
All areas of machine are safely accessible.	Yes	
Areas likely to be stood on are designed to avoid falls.	N/A	
Energy isolation: fitted, visible, lockable under hazard, plug OK.	N/A	
Energy isolation: plug OK.	N/A	
Energy isolation: unit energy must dissipate without risk.	N/A	
Energy isolation: stored energy is provided with precautions.	N/A	
Designed/constructed to minimize operator intervention.	Yes	
Designed/constructed for easy/safe operator intervention.	Yes	
Internal parts cleaning as required/safe.	Yes	
Section 1.7 - Information		
Information is unambiguous and easily understood.	Yes	Modified: See Summary
Information is not excessive and overloading to the operator.	Yes	
Warnings are unambiguous and easily understood.	Yes	Modified: See Summary
The operator can check warning devices at all times.	Yes	
Color and safety signal requirements are in compliance.	Yes	
Warnings of residual risks are made if necessary.	Yes	
Residual risk warnings are pictograms.	N/A	

Marking: name, address, CE mark, model no. and serial no.	Yes	Modified: See Summary
Marking: use in potentially explosive atmosphere.	Yes	
Marking: essential health and safety info. is on equipment.	Yes	Modified: See Summary
Instructions: name, address, CE mark, model no. and serial no.	Yes	Modified: See Summary
Instructions: intended use and operator workstation info.	Yes	
Instructions for safe: putting in service, use, handling w/mass.	Yes	Modified: See Summary
Ifs: assembly, dismantlg., adjustment, maintenance and training.	Yes	Modified: See Summary
Instructions: precautions against misuse.	Yes	
Instructions: in at least one sale/EC country language.	Yes	
Instructions: service, maintenance & inspection diagrams.	Yes	
Instructions: no contradicting sales literature.	Yes	
Instructions: provide airborne noise and vibration information.	N/A	
Instructions: assemb./install. require's for reducing noise/vib.	N/A	
In&v: indicate sound pressure is < 70 dBA or cite value.	N/A	
In&v: indicate inst. sound pressure is < 63 Pa or cite value.	N/A	
In&v: indicate sound power is <85 dBA or cite value.	N/A	
In&v: indicate values at multiple places for large machines.	N/A	
Instructions: potentially explosive atmosphere info if necessary.	N/A	
Instructions: account for non-professional operators.	N/A	
Section 2 - Health & Safety for Certain Machines		
Section 2.1 - Agri-Foodstuffs	N/A	Non-Agricultural
Section 2.2 - Portable and Handheld Machinery		
Sufficient handles, supports, surfaces for stability as required.	N/A	

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Can actuate on/off switch w/o releasing handle or exc. as req.	N/A	
No accidental start after release of handle.	N/A	
Visual checks of tool contact surfaces are possible.	N/A	
Vibration information is included in manual as required.	N/A	
Section 2.3 - Woodworking and Similar Machinery	N/A	
Section 3 - Health & Safety for Mobile Machines	N/A	
Section 4 - Health & Safety for Lifting Machines	N/A	
Section 5 - Health/Safety for Underground Machines	N/A	
Section 6 - Health & Safety for People-Moving Machines	N/A	

Compliance Checklist ISO 14120, Nov. 23, 2020 Robo-Fence	Compliant	Compliance Method Inspection or Review per 7.2	Comments
Clause 5.1.1 Machine Aspects General	Yes	Inspection	Guard design and application provides proper consideration of foreseeable aspects of the machine environment and operation throughout the foreseeable life of the machine.
Clause 5.1.2 Access to Hazard Zones	Yes	Inspection	Guard is designed as to enable routine adjustments, lubrication, and maintenance to be carried out without opening or removing the guards.
Clause 5.1.3 Containment of Ejected Parts and other Impacts	Yes	Review	Guard is designed and constructed so as to contain and withstand ejections and impact.
Clause 5.1.4 Containment of Hazardous Substances	N/A	N/A	Guard not designed for use with hazardous substances.
Clause 5.1.5 Noise	N/A	N/A	Guard not designed for noise reduction.

Clause 5.1.6 Radiation	N/A	N/A	Guard not designed for radiation protection.
Clause 5.1.7 Potentially Explosive Atmospheres	N/A	N/A	Guard not designed for use in potentially explosive atmospheres.
Clause 5.2.1 Human Aspects General	Yes	Review	Design and construction of guard gives proper consideration for reasonably foreseeable aspects of human interaction with machinery.
Clause 5.2.2 Safety Distances	Yes	Review	Guard is designed, constructed, and positioned to prevent parts of the body from reaching hazard zones.
Clause 5.2.3 Control of Access to the Hazard Zone	N/A	N/A	Not a movable guard.
Clause 5.2.4 Viewing	Yes	Inspection	Guard is designed and constructed to offer adequate viewing.
Clause 5.2.5.1 Ergonomic Aspects General	Yes	Review	Guard is designed and constructed taking into account ergonomic principles.
Clause 5.2.5.2 Size, Weight, and Design	Yes	Review	Removable sections of guard is of a suitable size, weight, and design to permit ease of handling.
Clause 5.2.5.3 Operating Force	Yes	Inspection	Removable sections of guard permits ease of operation.
Clause 5.2.5.4 Power Operated Guards	N/A	N/A	Not a power operated guard.
Clause 5.2.6 Intended Use	Yes	Inspection	Guard is designed to take into account foreseeable use and reasonably foreseeable misuse.
Clause 5.3.1 Guard Design and Construction Aspects General	Yes	Review	The design and construction of the guard itself does not create further hazard.
Clause 5.3.2 Crushing or Trapping Points	Yes	Inspection	Guard does not cause hazardous crushing or trapping points with parts of the machine or other guards.
Clause 5.3.3 Durability	Yes	Review	Guard is designed to perform its function properly throughout the foreseeable life of the machine.
Clause 5.3.4 Hygiene	N/A	N/A	Not for food or fluid.

Clause 5.3.5 Cleaning	Yes	Review	Guard can be easily cleaned.
Clause 5.3.6 Exclusion of Contaminants	N/A	N/A	Guard not designed to exclude contaminants.
Clause 5.3.7 Sharp Edges	Yes	Inspection	Guard does not have exposed sharp edges, corners or other hazardous projections.
Clause 5.3.8 Integrity of Joints	Yes	Review	Welded and mechanically fastened joints are of sufficient strength to suit reasonably foreseeable loading. No bonding agents are used. Mechanical fastenings have sufficient strength, number, and spacing to ensure the stability and rigidity of the guard.
Clause 5.3.9 Removal of Fixed Guards	Yes	Review	Demountable fixed parts of guards are only be removable with the use of a tool. Fixed guard is designed to prevent easy removal. No quick release fasteners used to secure fixed guards.
Clause 5.3.10 Mounting of Removable Fixed Guards	Yes	Review	Fixed guard is unable to remain in place without fixings.
Clause 5.3.11 Adjustable Guards	N/A	N/A	Guard is not adjustable.
Clause 5.3.12 Movable Guards	N/A	N/A	Guard is not movable.
Clause 5.3.13 Closed Position of Movable Guards	N/A	N/A	Guard is not movable.
Clause 5.3.14 Interlocking Guards	N/A	N/A	Guard is not interlocking.
Clause 5.4.1 Materials, Rigidity, and Impact Requirements	Yes	Review	Guard is constructed of suitable materials with properties maintained throughout the foreseeable life of the guard.
Clause 5.4.2 Impact and Ejection Resistance	Yes	Review	Guard is designed, and material is selected, to withstand and contain reasonably foreseeable impacts and ejections (3-mm thick steel). No viewing panels.
Clause 5.4.3 Rigidity	Yes	Review	Support posts, guard frames, mountings, and infill materials provide a rigid and stable structure and resist deformation.

Clause 5.4.4 Secure Fixing	Yes	Review	Guard has fixing points of adequate strength, spacing, and number to remain secure under any foreseeable loading or impact. 8-mm steel bolts spaced at 20 cm.
Clause 5.4.5 Reliability of Moving Parts	N/A	N/A	Guard does not have moving parts.
Clause 5.5 Containment	N/A	N/A	Guard not for use with harmful substances.
Clause 5.6 Resistance to Corrosion	Yes	Review	Materials selected are resistant to foreseeable oxidation and corrosion arising from the product, process or environment. This is achieved by the application of suitable protective coatings.
Clause 5.7 Resistance to Microorganisms	N/A	N/A	Guard not for use with bacterial and fungal growth.
Clause 5.8 Non-Toxicity	Yes	Review	Materials and finishes are non-toxic.
Clause 5.9 Machine Viewing	Yes	Inspection	Materials have suitable properties for viewing of machine operation through the guard. Wire mesh has adequate open area and suitable color to permit viewing. Perforate material is darker (black) than the area observed.
Clause 5.10 Transparency	N/A	N/A	Guard has no transparent material.
Clause 5.11 Shadows and Stroboscopic Effects	Yes	Inspection	Guard minimizes shadows and stroboscopic effects which can cause a risk.
Clause 5.12 Electrostatic Properties	Yes	Review	Guard has an electrical conductance high enough to avoid build-up of static charge (metal).
Clause 5.13 Guards with Electrically Conductive Parts	Yes	Review	Guard considered as “extraneous conductive parts of the machine”.
Clause 5.14 Thermal Stability	Yes	Review	Guard materials do not degrade when exposed to the range of foreseeable temperature variations or sudden changes in temperatures.
Clause 5.15 Fire and Flammability	Yes	Review	Guard materials are spark resistant and fire retardant and do not absorb or emit flammable fluid.

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Clause 5.16 Noise and Vibration Reduction	N/A	N/A	Guard not provided with noise and vibration reduction.
Clause 5.17 Radiation Protection	N/A	N/A	Guard not provided with radiation protection.
Clause 5.18 Climbing	Yes	Inspection	Climbing on guard is inhibited by design.
Clause 5.19 Retained Fastenings	N/A	N/A	Guards only liable to be removed when the machinery is completely overhauled, is subject to major repairs, or is dismantled for transfer to another site.
Clause 5.20 Vibration Resistance	Yes	Inspection	Fastenings are fitted with lock nuts.
Clause 5.21 Warning Signs	Yes	Inspection	Modified: See Summary.
Clause 5.22 Color	Yes	Inspection	Care is taken in the selection and combination of colors to avoid confusion. Perforate material is black – not painted in bright colors that might interfere with the viewing of the process.
Clause 5.23 Appearance	Yes	Inspection	Guard does not add adverse physiological and psychological effects.

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