SAFER | G

USER MANUAL & INSTALLATION INSTRUCTIONS

2025 SERIES SYSTEM
SG2025 v1.1

EQUIPE GROUP

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WARNING! Anyone who uses this system must read this instruction manual in its entirety to ensure safety before using the system for the first time.

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Contents

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1.0 INTRODUCTION

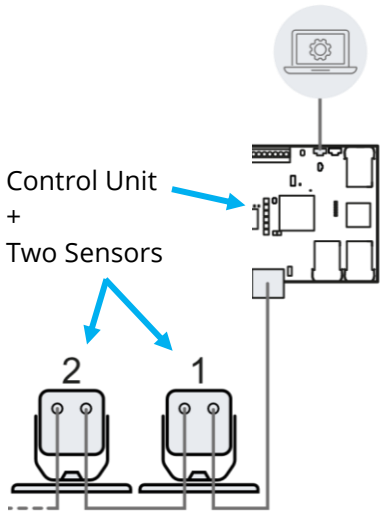
SAFER G was the world's first sensor based rotary machine guarding system and first received its certification as a compliant safety system in 2015. The system was upgraded in 2025 to incorporate state of the art sensing technology and CAN bus integration. The new system is called SAFER G 2025 Series System (SAFER G System) and this manual and installation instructions only applies to this system. Previous SAFER G systems have separate manuals and installation guides.

The SAFER G System builds upon its previous success and typically incorporates two short range radar sensors with a control unit. The SAFER G development team has over 15 years' experience of using short range radar technology within a safety system specifically designed for safety around drilling machines.

The team has worked with sensor manufacturers, drill rig operators and safety enforcement bodies to develop a robust safety system which specifically protects from encroachment and potential entanglement or crushing when working with or around a rotary drilling machine. The SAFER G team has carried out robust controlled trials and testing of the 2025 Series sensors including a field trial which lasted for over a year. Only through this clear understanding of the drilling machines, the environmental conditions and the legislation have the SAFER G team been able to develop a system which meets all of these requirements.

The SAFER G 2025 Series System has a bespoke configuration and enclosure which is suitable for most typical vertical rotary drilling applications. The standard system will comprise two sensors but additional sensors can be incorporated to allow the SAFER G system to be adapted for horizontal or angled drilling or other bespoke configurations. The sensors communicate with the control unit via CAN bus using diagnostic mechanisms in compliance with standard EN 50325-5 to guarantee SIL 2 and PL d.

Figure 1: SAFER G System (Standard 2025 Series unmounted)



The system has been designed to meet the requirements of *EN 61496-1:2013 Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests*. The safety application has been independently evaluated and approved by a Notified Body, TUV Italy. The system also meets the requirements of *EN 16228:2014 Drilling and foundation equipment – Safety*.

Clause 5.23 of EN 16228 provides guidance on the protection against moving parts and indicates that safeguards can be selected from fixed guards or interlocking movable guards or sensitive protective devices or a combination of these.

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SAFER G is a system which creates a three-dimensional safeguarded zone in front of the rotating drill shaft of drilling and foundation equipment. The standard system configuration operates up to a range of 1.4 metres. Distances can be modified for bespoke requirements up to a maximum of 5m. Total enclosure of the dangerous part is enabled by adding side guards but by using SAFER G, access from the front remains protected but unrestricted. The minimum width of the access at the front is 1.0 metres which conforms to the requirements for access openings. The SAFER G guarding system is designed to operate primarily on machines having drill string speeds of up to 1500 rpm.

The SAFER G system works in conjunction with an alternative control mechanism to existing hydraulic shut off control systems.

This manual explains how to integrate SAFER G for safeguarding rotary drilling machine operators and how to install it, use it and maintain it.

This User Manual and Installation Instructions includes all the information in accordance with IEC 61508-2/3 Annex D.

The functioning and safety of the machinery to which SAFER G is connected is out of the scope of this document.

2.0 COMPLIANCE WITH THE MACHINERY DIRECTIVE AND OTHER STANDARDS

European Machinery Directive 2006/42/EC is a European Union directive and conformity to this is a legal requirement in all of the European Member states and the United Kingdom.

In addition to the EU Machinery Directive, drilling safety systems must also conform to *EN 16228: 2014 Drilling and foundation equipment – Safety* which requires drilling and foundation machines to be safeguarded against the possibility of entanglement with rotating parts (e.g. the drill string, augers etc)

Clause 5.23 "Protection against moving parts" within EN 16228 states that:

"Where access to moving parts directly involved in the drilling and piling process is foreseeable during normal operation of the machinery, safeguards shall be selected from the following:

- *Fixed guard or;*
- *interlocking movable guard with or without guard locking or;*
- *sensitive protective devices, e.g. electro-sensitive protective equipment or pressure sensitive devices or;*
- *or a combination of the above."*

Clause 5.23.2.2.3 provides further guidance on sensitive protective devices and states that:

"Sensitive protective devices shall detect foreseeable access to rotating parts in a danger zone, during any dangerous movement. When the sensitive protective device is activated, the rotation and feed functions together with any moving parts identified with residual risks shall stop."

Clause 3.26.5 of EN 12100-1 defines electro-sensitive protective equipment (SPE) as follows:

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"Equipment for detecting persons or parts of persons which generates an appropriate signal to the control system to reduce risk to the persons detected. The signal may be generated when a person or part of a person goes beyond a predetermined limit – e.g. enters a hazard zone – (tripping) or while a person is detected in a predetermined zone (presence sensing), or in both cases".

The SAFER G system therefore complies as the system incorporates a combination of fixed side and rear guards and sensitive protective devices to prevent access from all directions.

In the United Kingdom, safety systems must also comply with the *Provision and Use of Work Equipment Regulations (PUWER): 1998*.

The SAFER G guarding system also satisfies these requirements.

3.0 SYSTEM CONFIGURATION

The SAFER G 2025 Series System has a bespoke configuration to provide a pre-determined safeguarded zone in front of a rotating drill string and integrates with the machinery control system. The SAFER G configuration when performing safety functions or detecting failures, deactivates the safety outputs and keep them deactivated, so the control system can put the area into a safe condition and/or prevent restarting of the machinery.

SAFER G should be integrated with the existing machine safety devices that control the drilling machine rotational safety system to ensure compliance to EN 16228.

The sensors in their 'out of the box' configuration perform the following functions:

- Detect motion in their field of view.
- Send the motion detection signal to the control unit through CAN bus.
- Signal to the control unit through CAN bus the failures or faults detected on the sensor during diagnostics.

Figure 2. Side and Front View of SAFER G Series 2025 System

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4.0 SAFETY SYSTEM COMPLIANCE

4.1 BACKGROUND

SAFER G incorporates sensors suitable for protecting the human body in the following scenarios:

- dangerous area protection in stationary and mobile applications
- indoor and outdoor applications

The sensors meet requirements of applications safety functions that require a risk reduction level of:

- up to SIL 2, HFT = 0 according to IEC/EN 62061
- up to PL d, Category 3 according to EN ISO 13849-1
- up to Performance Class D according to IEC TS 62998-1

SAFER G, in combination with additional risk reduction means, can be used for applications safety functions that require higher risk reduction levels.

4.2 REQUIREMENTS

The safety system must conform to the requirements of Clause 5.23.2.2.2 “Guards” of EN 16228-1:2014 “Drilling and foundation equipment — Safety, Part 1 Mobile Drilling rigs” and EN 14119:2013 Safety of machinery – Interlocking devices associated with guards – Principles for design and selection. The latching control circuit must achieve Required Performance Level PLr ‘c’ as detailed in EN 13849-1. The installer must also test the control circuit that shuts down a drilling machine as required by Clause 5.2.3.1 of EN 61496.

5.0 INSTALLATION STEPS

5.1 STEP 1 – SENSOR LOCATIONS

The mounting positions and locations of the SAFER G system are likely to be bespoke for each machine and the SAFER G team will work with the installer to determine the optimum configuration prior to installation. Actual configuration will depend upon many factors including guard configurations, driller location, hose and rotary head movements, rod racks or carousels and machine mounting configuration i.e. tracked/lorry/trailer.

The optimum height for mounting of the SAFER G guarding system should be approximately 1.80m from the ground or working platform. This height leaves a zone below the radar system of 500 mm or less and creates a safeguarded zone which enables rotation to stop prior to any potential for entanglement. These are the maximum heights that have traditionally been allowed by regulatory bodies. The height of the mounting of the sensors may be reduced for particular configurations but should never be less than 1.60m in accordance within EN 16228. All installations must be carried out in consultation with the SAFER G team.

The angle of the SAFER G sensors and their ranges determine the distance from the dangerous part which is governed by the reaction time of the sensors and stopping time of the drill string when it is free running. This must be determined by the installer prior to fitting the system.

Additional side guards must be fitted to prevent encroachment from behind the sensors. The length of the side guards must be determined by the stopping time of the drill string of a drilling machine. It must be noted that the stopping time is the response time of the SAFER G detection system plus the shutdown

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time of the drilling machine immediately following receipt of a shutdown signal from the SAFER G guarding system. The diagram below illustrates the use of side guards.

Figure 3. Image showing SAFER G 2025 Series Sensors mounted on side guards

When providing side guards, installers must conform to the requirements of Clause 5.23.2.2.2 "Guards" of *EN 16228-1:2014 "Drilling and foundation equipment - Safety Part 1 Mobile Drilling rigs* and *EN 14119:2013 Safety of machinery – Interlocking devices associated with guards – Principles for design and selection*. Guards must also be designed to satisfy the requirements of *EN ISO 13855:2024 Safety of machinery. Positioning of safeguards with respect to the approach of the human body*.

Before SAFER G is permanently installed on a drilling machine the installer must verify that the selected location provides the required detection zone. Figures 4 to 7 show the typical mounting positioning and the conical detection zones in front and side views. Validation of the system must be carried out as detailed in Section 5.5 prior to final fixing.

Figure 4. Schematic Drawing of SAFER G Positioning (IN PLAN)

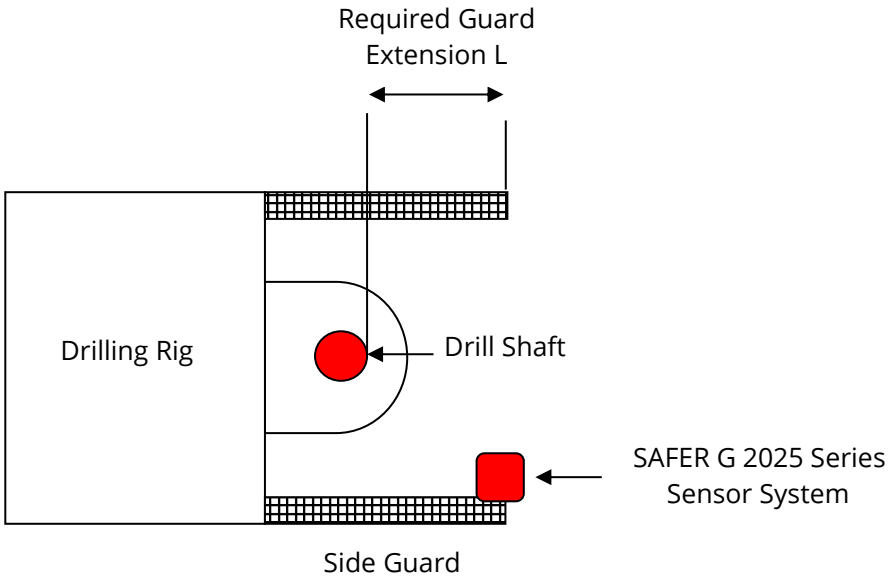

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Figure 5. Typical mounting – Side View

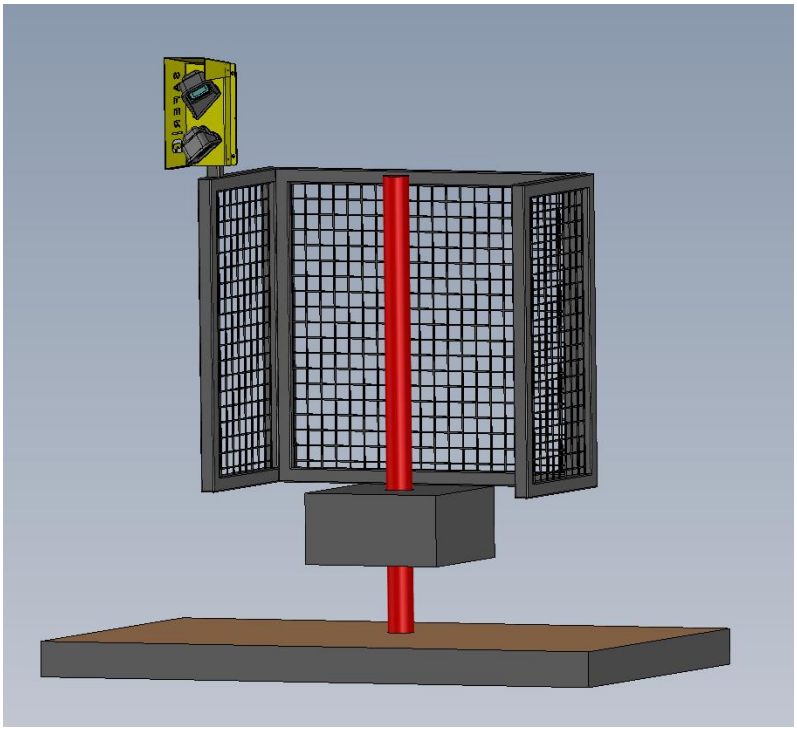

Figure 6. Typical Mounting – Front View

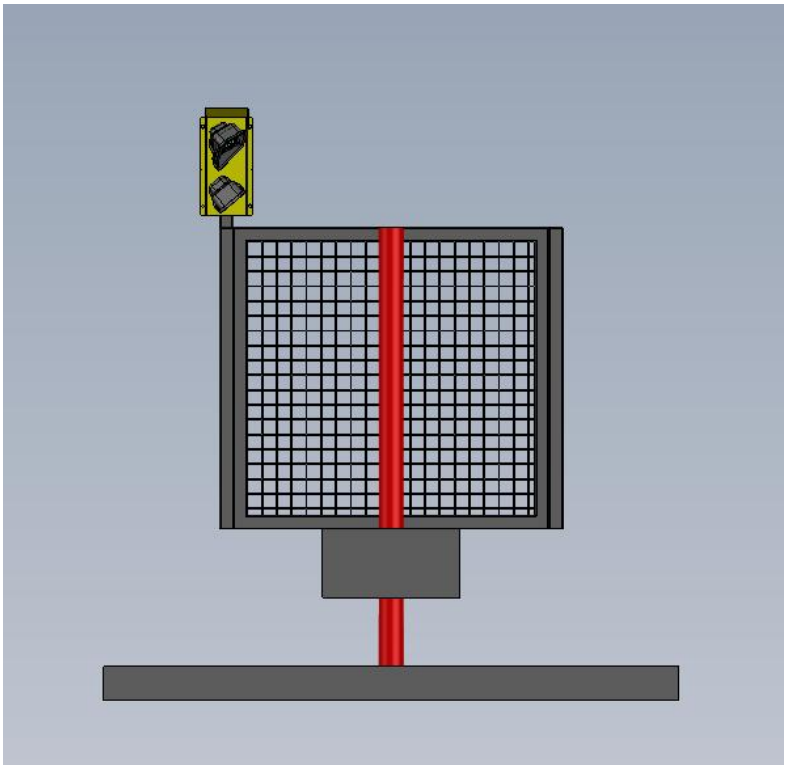

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Figure 7. Front view of SAFER G detection zone cones

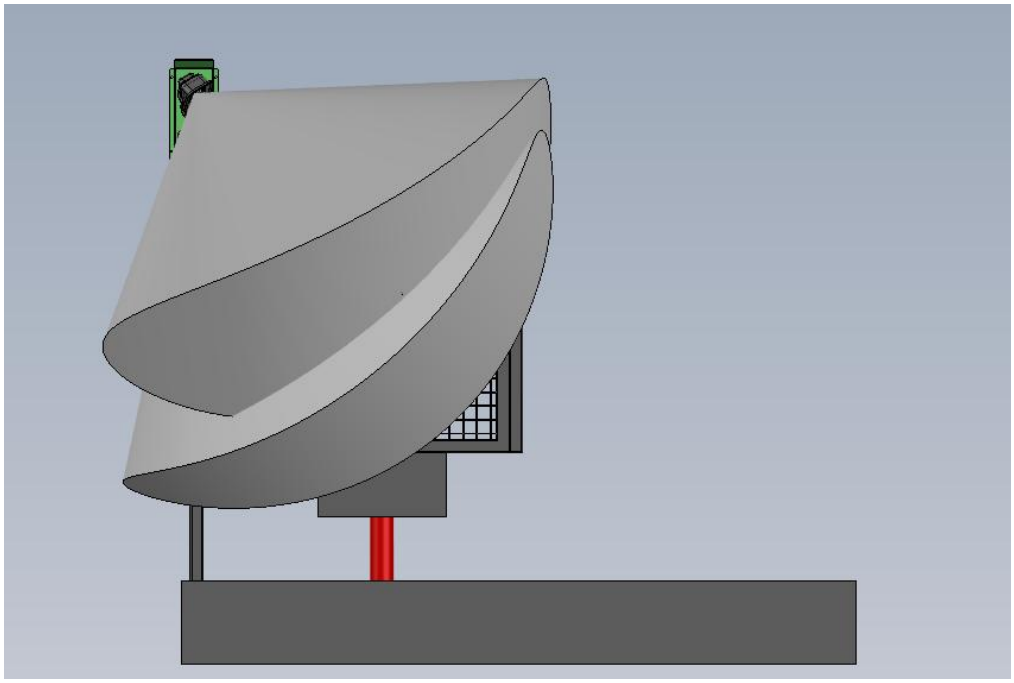
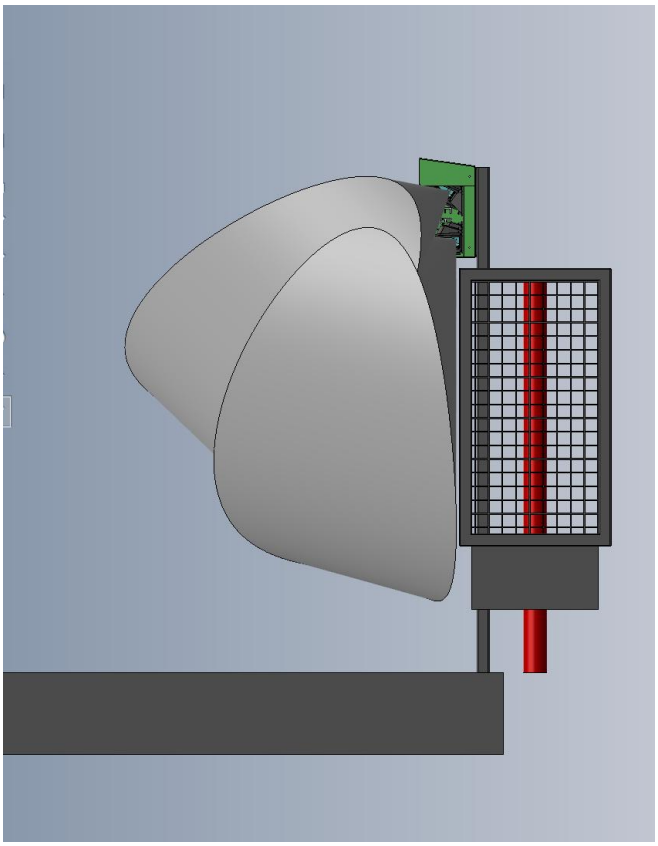


Figure 8. Side view of SAFER G detection zone cones



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5.2 STEP 2 – SET UP

The SAFER G system must be set up to safeguard the zones illustrated above where access by any person will automatically stop rotation of the drill string of the drilling machine. When the drill string has stopped due to triggering of the system or even when opening safety gates on machines, the machine must 'fail to safe'. This means that the rotation and/or feed system must shut down and cannot automatically restart.

Note: EN 16228 provides a number of machine operating modes e.g. Reduced Operating Mode (ROM) and definitions for these modes. All installers must be familiar with these operating modes and the machine control systems which will enable them.

EN 16228 also states:

'Following activation and for as long as the device remains triggered it shall only be possible to restart feed and/or rotation in restricted operating mode (ROM) as described in 5.23.2.2.4 by a separate, deliberate action.'

This positive restart action to re-set the control system would be expected to be the turning of a key or pressing of a button. It must also not be possible to restart normal operating mode (rotation speed >30rpm) until the following have been satisfied:

1. The persons or objects that triggered a shutdown have been moved out of the safeguarded zone

2. The driller has manually re-set the drilling machine shutdown control system that must be provided by the installer.

SAFER G requires machines to have a control system that meets the full requirements of EN 16228 and all other standards and national regulations relating to safety and safety of machinery including drill rigs. If the drilling machine has been designed to conform to EN 16228 the majority of these requirements should have already been met but the installer must carry out their own robust checks. If the installer is unsure then consultation with the SAFER G team would be required.

The SAFER G system does not provide 360-degree protection. Additional fixed side guards must be provided alongside and around the drill string of a drilling machine to protect against persons attempting to approach the danger zone from the side or behind the sensor if the sensor has been moved forward and fitted to the open end an extended guard to accommodate drill machines stopping times.

The SAFER G guarding system is designed to operate with a minimum of two sensors.

The SAFER G 2025 Series System incorporates a bespoke mounting system to receive SAFER G sensors so that they can be permanently fixed to the side guards. The machine owner must provide a suitable a mounting point for SAFER G at the optimum height and location agreed with the SAFER G team. Details must be agreed with the SAFER G team but may comprise a rigid post or bracket or plate above the guarding or within the guarding itself.

5.3 STEP 3 – CABLE INSTALLATION

The SAFER G guarding system can only be connected via an isolated power supply. The installer must consult with the SAFER G team and the following aspects should be considered but not limited to:

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- Wiring configuration
- Power supply type
- Power supply isolation
- Relays (safety)
- Cable integrity
- Cable insulation
- Length of cable
- Indicator lights

Once SAFER G has been mounted, routing of the cable should start at the enclosure to ensure there is no slack in any exposed areas. The cable should be routed within the metal enclosure of the drilling machine where possible and should not be exposed to mechanical damage or chemical attack. The cable must be suitably protected or routed through trunking where possible to prevent mechanical damage, snagging by foreign objects or chemical attack. Any exposed cable should be securely fixed to prevent snagging issues. Connections to the shutdown system provided by the installer must be terminated in a screw connector block, soldered or crimped.

The SAFER G team can provide bespoke wiring solutions on request.

5.4 VISUAL OPERATION INDICATORS

Each SAFER G System sensor is fitted with an integral status indicator LED and Appendix A provides details of the sensor status based upon LED colour or activity. Appendix A also provides details of the troubleshooting options relating to the status indicator.

Clause 4.2.5 of *EN/IEC 61496 Safety of machinery – Electrosensitive protective equipment – Part 1: General requirements and tests*, also requires the installer to provide a means of shutting a machine down and reporting on the status of the electrosensitive protective equipment. The installers may choose to use LED's, filament lamps or a display for this purpose but must ensure the requirements are satisfied.

Indicator lights and the means by which a SAFER G sensing system can be manually reset must be located in front of the operator of a drilling machine where the operator is normally expected to stand. Indicator lights and control devices provided by the installer must be marked according to the requirements of Clause 6.6.1 of EN 61496 to indicate their functions. The function of control and indicating devices must be identified according to the requirements of Clause 6.6.2 of EN 61496.

The installer is required to provide as a minimum a green indicator light when the SAFER G guarding system is in its reset or normal operating mode and a red indicator light when a SAFER G guarding system is in its shutdown state. Additional lights can be provided on the control panel, if required. These lights must meet the requirements of EN 60204-1.

The SAFER G System can be wired to an indicator beacon/signal tower which will satisfy this requirement and provide a much clearer indicator of the system condition to the driller. Two examples of these signal towers are provided in Figure 9 below.

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Figure 9. Signal tower and status

RED	=	SAFER G has been triggered. Machine rotation has stopped and cannot be restarted until SAFER G has been re-set. Machine can operate in restricted operating Mode (ROM)
ORANGE	=	SAFER G is operational but not active. Sensors have power but are not actively detecting until a scan has been completed within the safeguarded zone.
GREEN	=	SAFER G is active. Machine can operate in normal operating mode and sensors are in live detection mode.

Where a signal tower is used the operation is as follows:

On powering the system, the ORANGE indicator will illuminate to show system is running. The SAFER G System scans the safeguarded zone which will take up to 20 seconds. During this time any static objects in the detection zone are being logged and ignored if they do not move. When the system confirms that no persons are present the GREEN indicator will illuminate to instruct the operator that the machine rotational safety reset can be activated. If a person enters the safeguarded zone the RED indicator will illuminate and trigger the machine to shutdown rotation. When the person has exited the safeguarded zone the system will rescan for approximately 4 seconds before giving the all clear illuminating the GREEN indicator.

5.5 POST INSTALLATION VALIDATION

Once the SAFER G system has been mounted, wired, and connected it should be powered up and the system functionally validated by the installer. As the installer has final responsibility for ensuring that the system has been set up to meet all of the required operational and safety requirements, the installer shall determine the procedure to carry out final post installation validation.

The post installation validation and checks must include as a minimum the entirety of the wiring, electrical integrity, control system operations, operating modes, lights/indicators as well as correct functioning. It is recommended that the validation procedure is documented and all post installation validations recorded.

The correct functioning procedure is likely to be similar to the pre-use check procedure required to be carried out by the by the driller and as discussed in Section 6.2. These pre-use checks must be performed with a minimum of two people, one remaining at the control panel at all times while the test is being carried out.

If the post installation validation checks suggest that there may be a fault with the SAFER G System the SAFER G team must be contacted immediately and the machine isolated until a fully functioning safety system is operational.

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6.0 SAFE OPERATION, TESTING AND MAINTENANCE

6.1 SAFE OPERATION

Safety message to operators of SAFER G:

- SAFER G is a safety system which creates a safeguarded zone to prevent the entanglement of any of the drill crew or other site personnel with the drill string.
- SAFER G is an integral part of the safe system of work and should be used in conjunction with established safety procedures to augment the safe operation of the drilling machine.
- Should the system develop a fault, work must stop and a competent person must assess the system and rectify any faults prior to re-starting work. Failure to follow this could jeopardize the safety of those who depend on the system to protect them.
- Testing and inspection of the SAFER G System (See Section 6.2) must be carried out at the start of each shift and prior to re-starting drilling when the machine has been moved or if a new driller takes over the operation of the machine.
- The system is robust and protected from the elements but the driller must not subject the system to knocks, heavy vibration or any activity which may cause damage.
- Care should be taken not to snag or damage the wiring and any connectors in the wiring configuration.
- The driller should immediately report any concerns with regard to safe operation, functionality or installation and not operate the machine until rectified.
- Failure to follow all safety precautions and instructions may result in equipment damage, property damage, serious injury, or death.

6.2 PRE-USE CHECKS

The SAFER G guarding system must be tested and checked prior to drilling at each position and at the start of each day prior to use. This can be achieved by simple checks carried out by the drill crew.

These pre-use checks must comprise a visual check of the system as well as a functionality check. The pre-use check must be recorded.

The visual check should look for signs of damage, wear and general condition including the integrity of the wiring, connections, control panel, housing and sensors.

The correct functioning of the system must include correct functioning of the indicator lights, the rotation and feed operation and the re-set controls. An example of a pre-use check method is provided below. This example assumes the control system for the drilling machine has been equipped with the recommended signal tower as shown in Figure 9.

1. Turn on the drilling machine.
2. Wait for the ORANGE light to show to indicate that the SAFER G system is checking.
3. If no light shows, then carry out a further visual check including that
    a. the power is on and
    b. the wiring and all connections are tight
4. If the ORANGE light shows wait two minutes for the SAFER G System to complete the scanning operation.
5. If the RED light shows and remains lit, then check:
    a. for obstructions within the safeguarded zone
    b. that the sensors are not too low and detecting the ground or working platform

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    c. the wiring and connections
6. If the GREEN light shows then the machine should be in standard operating mode with no obstructions in the safeguarded zone. The drill crew should now carry out the operational checks as detailed below.

Once the GREEN light is showing and it has been confirmed that there is nothing in the safeguarded zone which may cause the sensors to activate some quick and simple walk in pre-use operational checks can be performed by the drill crew. This should comprise:

1. Raise the drill head to a height where there is no possibility of injury during checks
2. Put the drill string into full rotation
3. Ask a second person, normally the driller's assistant/support operative, to walk from outside of the safeguarded zone directly towards the rotating drill string.
4. If the indicator lights turn to RED and the drill string rotation stops when the person encroaches within approximately 1.40m of the drill string then:
    - ask the person to step back out of the safeguarded zone to ensure that the indicator light remains on RED **and** rotation does not automatically start **and then**
    - repeat Step 3 from at least two additional different directions ensuring that re-start only occurs through the deliberate action of the driller
5. If the person is allowed to encroach into the safeguarded zone without activation or change in the indicator light then do not start work and ensure the safety system has been rectified by a competent person.

Note: *Actual stopping distance from the drill string will vary depending upon the machine shut down system, direction of travel and configuration but the key point is that the drill string must stop and the light indicator change before the rotating part can be gripped. Users must satisfy themselves that the stopping distance is suitable for machine and activity being carried out.*

6.3 MAINTENANCE

Maintenance checks for the sensors which can be completed by the drill crew or installers are limited as they have no moving parts and rely upon the programming and adjustments to sensitivity of the sensors which the drill crew and installers will not be familiar with. The other area where maintenance could occur would be electrical and may also include the electrical and hydraulic safety systems. This type of maintenance should only be carried out by personnel with the skill and competence to work on electrical and safety systems for drilling machines.

Simple maintenance can be carried out by the drill crew as part of the pre-use checks. This should comprise inspecting the surface of the sensors and cleaning off any debris or dust which might cause false triggers, using a damp cloth. Cleaning of the sensors should also be carried out regularly when the machine is operating in a particularly dirty or harsh environment and/or the operator has reason to suspect the system is not functioning correctly.

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7.0 SYSTEM FUNCTIONING AND WARNINGS

7.1 FUNCTIONING PRINCIPLES

SAFER G is a human body detection system. The sensors are certified SIL 2 according to IEC/EN 62061, PL d according to EN ISO 13849-1 and Performance Class D according to IEC TS 62998-1.

SAFER G has been configured to perform an **access detection safety function** where access of one or more persons to the hazardous area directly in front of the drilling machine deactivates the safety outputs to stop the moving parts of the machinery.

The sensors are FMCW (Frequency Modulated Continuous Wave) radar devices based on a proprietary detection algorithm. They are also a multi-target sensor that sends pulses and receives information, analysing the reflection of the nearest moving target that it encounters within each detection field.

7.2 INFLUENCING FACTORS

The signal reflected by the object depends on several characteristics of the same object:

- Metallic objects have a very high reflection coefficient, while paper and plastic reflect only a small portion of the signal
- The greater the surface exposed to the radar, the greater the reflected signal
- All other factors being equal, objects positioned directly in front of the radar generate a more significant signal than objects to the side
- Motion speed
- Inclination

All these factors have been analysed for a human body during the safety validation of the sensors and cannot lead to a dangerous situation. These factors may occasionally influence the behaviour of the system causing spurious activation of the safety function.

7.3 OBJECT DETECTION

The signal analysis algorithm considers only those objects that move within the field of view, ignoring completely static objects (if the static object detection option is disabled).

Furthermore, a *falling objects* algorithm allows ignoring undesired alarms generated by small work waste products that fall in the first part of the sensor's field of view.

7.4 GENERAL WARNINGS

- Incorrect installation and configuration of the system decreases or inhibits the protective function of the system. Follow the instructions provided in this manual for correct installation, configuration and validation of the system.
- Changes to the system configuration may compromise the protective function of the system. After any changes made to the configuration, validate correct functioning of the system by following the instructions provided in this manual.
- If the system configuration allows access to the dangerous area without detection, implement additional safety measures (e.g. guards).
- The presence of static objects, in particular metallic objects, within the field of view may limit the efficiency of sensor detection. Keep the sensor field of view unobstructed.

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- The system protection level (SIL 2, PL d) must be compatible with the requirements set forth in the risk assessment.
- Check that the temperature of the areas where the system is stored and installed is compatible with the storage and operating temperatures indicated in the technical data of this manual.
- Radiation from this device does not interfere with pacemakers or other medical devices.

7.5 WARNINGS FOR THE RESTART PREVENTION FUNCTION

The restart prevention function is not guaranteed in blind spots.

If required by the risk assessment, implement adequate safety measures in those areas.

Machinery restarting must be enabled only in safe conditions. The button for the restart signal must be installed:

- outside of the dangerous area
- not accessible from the dangerous area
- in a point where the dangerous area is fully visible

7.6 RESPONSIBILITY

The machinery manufacturer and system installer are responsible for the operations listed below:

- Providing adequate integration of the safety output signals of the system.
- Checking the monitored area of the system and validating it based on the needs of the application and risk assessment.
- Following the instructions provided in this manual.

7.7 SYSTEM LIMITATIONS

The system cannot detect the presence of people who are immobile and not breathing or objects within the dangerous area.

The system does not offer protection from pieces ejected from the machinery, from radiation, and objects falling from above.

The machinery command must be electronically controlled.

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8.0 REGULATORY COMPLIANCE

Machinery Directive 2006/42/EC
Radio Equipment Directive 2014/53/EU
EN 16228-1:2014. Drilling and foundation equipment. Safety. Common requirements
EN 16228-2:2014. Drilling and foundation equipment. Safety. Mobile drill machines for civil and geotechnical engineering, quarrying and mining
EN ISO 13849-1:2008, Safety of machinery. Safety-related parts of control systems. General principles for design
EN ISO 13849-2:2012. Safety of machinery. Safety-related parts of control systems. Validation
EN 62061:2005+A1:2013. Safety of machinery. Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN ISO 12100:2010, Safety of machinery. General principles for design. Risk assessment and risk reduction
EN 61496-1:2013. Safety of machinery. Electro-sensitive protective equipment. General requirements and tests
EN 60204-1:2006+A1:2009. Safety of machinery. Electrical equipment of machines. General requirements
EN 61310: Safety of machinery – Indication, marking and actuation Part 1: Requirements for visual, auditory and tactile signals
EN ISO 13855:2024 Safety of machinery – Positioning of safeguards with respect to the approach of the human body
EN 14119:2013 Safety of machinery – Interlocking devices associated with guards – Principles for design and selection
EN 60947-5-1:2004 Low-voltage switchgear and control-gear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices
ETSI EN 300440:2015 Radio equipment to be used in the frequency range below 9kHz
ETSI EN 301489:2002 Electromagnetic compatibility and Radio spectrum Matters for radio equipment and services
Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment (EEE) Directive (2011/65/EU).
Compliant with FCC Part 15.249 (5725-5875MHz)
HSE: 1998, Provision and use of work equipment regulations (PUWER) (UK only)

8.1 OTHER STANDARDS AND DIRECTIVES

IEC/EN 61000-6-2:2019
ETSI EN 305 550-1 V1.2.1
ETSI EN 305 550-2 V1.2.1
ETSI EN 301 489-1 v2.2.3 (only emissions)
ETSI EN 301 489-3 v2.1.1 (only emissions)
IEC/EN 61326-3-1:2017
IEC/EN 61010-1: 2010
IEC/TS 62998-1:2019
UL 61010-1 *
CAN/CSA 61010-1 *
UL 61496-1 *
CRD of IEC 61496-3 *
IEC/EN 61784-3-3 for the PROFIsafe Fieldbus

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APPENDIX A DECLARATION OF CONFORMITY

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Italia

CERTIFICATE

Machinery Directive 2006/42/EC Annex. IX - EC type-examination certificate for safety components (ref. Annex IV – 19, 21)

Certificate No.:	**TÜV IT 0948 21 MAC 0197 B Rev.4**
Name and address of manufacturer:	INXPECT S.p.A. Via Serpente, 91 25131 Brescia (BS) Italy
Address of production site:	Via Serpente, 91 25131 Brescia (BS) Italy
Product:	Logic unit to ensure safety functions, designed to detect the presence of persons
Model/type:	SRE (Safety Radar Equipment) – 200 Series (SBV System Series)
Reference standards:	EN ISO 13849-1:2015; EN ISO 13849-2:2012 EN IEC 62061:2021 IEC/EN 61508:2010 EN 61496-1:2013 IEC TS 62998-1:2019
Test report:	TR 0948 MAC 0164 B (TR 0948 MAC 0164 B Rev. 4)

We herewith certify that the safety component for the respective scope of application stated in the annex to this EC type-examination certificate meets the requirements of the Directive:

2006/42/CE

First Issue date:	**15/03/2021**
Issue date:	**08/05/2023**
Expiry date:	**14/03/2026**

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TÜV Italia Srl Industrie Service 09 48 Notified Body

TÜV Italia S.r.l.
Notified Body, Identification N° 0948

Alberto Carelli
Industrie Service Division Manager

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PMA 01_M046_rev.00 del 21/02/2023

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APPENDIX B CERTIFICATE OF COMPLIANCE

CERTIFICATE OF COMPLIANCE

Certificate Number	E509636
Report Reference	E509636-20200630
Date	2023-June-01
Issued to:	Inxpect S.p.a. Via Serpente, 91 Brescia BS 25131 IT
This is to certify that representative samples of	PROTECTIVE DEVICES RESPONSIVE TO DIFFUSE REFLECTION OF RADAR See Addendum Page for Product Designation(s). Have been evaluated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	See Addendum Page for Standard(s).
Additional Information:	See the UL Online Certifications Directory at https://iq.ulprospector.com for additional information

This Certificate of Compliance indicates that representative samples of the product described in the certification report have met the requirements for UL certification. It does not provide authorization to apply the UL Mark. Only the Authorization Page that references the Follow-Up Services Procedure for ongoing surveillance provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.

Deborah Jennings-Conner, VP Regulatory Services

UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at

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APPENDIX C MANUFACTURER LIMITED WARRANTY AND LIMITATION OF LIABILITY

Manufacturer warrants that on the Date of Purchase this Product will conform to Manufacturer's published specifications for the product, which are available from Manufacturer on request, and Manufacturer warrants that the product is free from defects in materials and workmanship. This Limited Warranty extends for twelve (12) months from the date of manufacture. Manufacturer will, at its option, repair or replace any product found by Manufacturer to be defective and subject to this Limited Warranty.

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USER MANUAL AND INSTALLATION INSTRUCTIONS

2025 Series System

SG2025 - v1.1

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