

Instruction manual

Thank you for choosing a GROSS FUNK radio remote control.

A Control panel

Our long time experience in this field provides you with the assurance that you have purchased a quality product, which conforms to the highest in safety standards. Even in the roughest conditions, our products give you total satisfaction with respect to operation and safety.

To get familiarized with the functions of the remote control unit, please read the following operation instructions.

This instruction manual is part of the technical documentation for the radio remote control and it contains all information which is necessary for the whole phase of life of the product, especially concerning initiation, operation, inspection, maintenance and service of the product.

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A Control Panel

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1. Advices

This instruction manual contains important information which is required for the safe application of the product in all operating phases. It describes the intended use or the predictive misuse.

Following the guidelines given in this instruction manual there is no risk of health or safety hazards to the operating personnel or third parties to be expected.

Each operator has to read and understand this instruction manual, specifically the chapter „security advice“ before operation.

Operating personnel includes all people which are responsible for installation, operation, setting, maintenance, cleaning, repair or also the transportation of our radio remote control.

The operating and especially the setting and maintenance personnel has to be able to revert to this instruction manual at any time, because they may be exposed to more questionable situations than others.

If there are any doubts concerning the application please contact Gross Funk. Gross Funk can assist with expert advise.

1.1 Instruction manual / scope

This instruction manual applies to the radio remote control systems SE 889 ... and type GF 2000 ...

The systems consist of one or more transmitters and one or more receivers.

The instruction manual is part of the technical documentation of an overall system. The technical documentation of the individual producers remains unaffected of this instruction manual.

Based on the linkage of individual machines possible dangers may arise which requires evaluation of the machine interfaces.

Any statements made in the individual chapters are initially valid for the whole system. Section/phase-related regulations are addressed as called for and listed separately.

This instruction manual includes all information, needed for installation, operation, inspection, repair and maintenance of the appliance.

The instruction manual is addressed to trained operators as well as to specially instructed maintenance and service personnel.

Any person dealing with setting-up, installation, starting up, service and maintenance of the machine has to read and understand the instruction manual, especially chapter 6.1 safety instructions each and every time **before** commencing the work..

The operating and maintenance personnel has to have access to the instruction manual at any time. Therefore at least one copy of the instruction manual has to be stored readily available to the operator's place of work.

1.2 Dangers and residual risks

The design of the machine- and equipment components ensures that the operation, setting-up, rigging, cleaning and maintenance can be carried out in the intended use without hazards. All risks have been kept to an absolute minimum, e.g. areas presenting possible risk have been secured with appropriate protection devices.

When used appropriately, fatigue, exhaustion and psychical effects to the operator are reduced to a minimum. Ergonomic principles are taken into consideration.

Inspection, repair and maintenance may be executed without special safety measures, while they rest in intended use according to the extended instruction manual.

However, different risks with different residual risks may be caused by the equipment especially in the phases of maintenance, troubleshooting and setting up. These residual risks have to be reduced to a tolerable level by administrative safety measures. In addition to the risk assessment, this includes training and education.

Residual risks can further arise, if operations and user interventions are executed by personnel that is not trained in operation, repair and maintenance or if they are executed inappropriately or contrary to the intended use.

This includes inappropriate maintenance work for example the inappropriate securing of machine elements as regards unintended movements or interventions not considering electrical safety-measures.

Special dangers on use of portable transmitter systems

Compared to cable wired control panels or fixated control panels the radio transmitters allow considerably more movement. The advantage is controlling a machine away from hazards and better visuals of the work being performed. This freedom of movement however may present some danger. To avoid any dangerous situation, please pay attention to the following:

- Instruction manual of the radio remote control and machine needs to be read and understood
- Acquaint yourself with the functions of the radio remote control in a simulation mode if possible (e.g. without loads, without product, on straight and clearly visual environments)
- Never leave the radio transmitter unsupervised
- Operate machine only with good visibility and do not create further risks (e.g. ferraria effect by changes start and stop, environmental influence)
- Never place the control panel anywhere on or at the machine where it could be crushed or fall down due to movement or vibration of the machine.
- Protect control panel from mechanical impact and environmental influence (movement, and vibration of the machine, oils, emissions)
- When used appropriately, fatigue, exhaustion and negative psychical effects to the operator are reduced to a minimum. Ergonomic principles are taken into consideration.

1.3 Effects of incorrect operation, of non observance of safety advices

The effects of incorrect operation of the machine, particularly the non-observance of safety advice in relation to the machine may be:

- Danger of personal injury or even mortal danger
- Danger of damage of the machine and the lost of asset of the operating company
- Loss of assured features and quality reductions of the process
- Loss of the unit functionality and thus loss of production
- Environmental damage through burning / detonation

1.4 Integration

The starting up of the built-in radio remote control is only allowed after successful testing. The test run is only admissible if all protective devices are provided for.

Technical organisationally arrangements for the integration of a radio remote control in an existing machine

Gross-Funk is not responsible for the functionality and safety of the machine or equipment in which the control is installed in. The machine operation intended by the manufacturer is not interfered with by the installation of the radio remote control.

The user is responsible for the interface or signal transmission of the radio remote control information to the machine. In particular it has to be assured by a machine specific risk assessment that is no possibility of deviating from, delaying, overriding or changing of any protective or safety measures. The radio remote control has to be considered as an additional control device falling under the same specific function and safety levels. If the radio remote control has resulted in any changes or additional functions, the instruction manual of the machine has to be changed correspondingly. Any regulations with respect to conformity of the machine being controlled are not affected.

When operating a machine with a radio remote control the same regulations for the prevention of industrial accidents are valid as with direct operation of the machine without a radio remote control. The instruction manual or the machine which is expanded with a radio remote control remains fully valid with the exception of the control mode and needs to be adhered to.

The integration of a radio remote control in a machine requires safety procedures as well as planning and manual accuracy to avoid disturbances of especially the safety of the machine. Furthermore the machine which has been marketing within the limits of EU-regulations should not be modified and the achieved safety goals should not be compromised.

The integration of a radio remote control (hard- and software) is only permitted by especially skilled or qualified personnel. Therefore the assembly and the electrical connection of the components may only be undertaken by qualified electricians with special knowledge in control engineering.

The following work steps are required for the correct integration of a radio remote control:

- Determination of the intended functions of the radio remote control, the priorities of the functions and the possible modes.
- Validation of the existing machine control and fixing of the hardware interface.
- Description of the measures to integrate the receiver in the existing machine control and implementation of a risk assessment under consideration of the objective target of the industrial norm DIN EN 13849.
- Hardware installation
- Performance of electrical test and functional check with data recording of the results
- Supplementation of the existing technical documentation of the machine.
- Inclusion of the Gross-Funk documentation
- You will be supported by Gross-Funk

1.5 Obligations of the operator to the safe operation

The operator of a machine or a piece of equipment which is supplied with a radio remote control is responsible for the operation safety according to legal regulations. All documents which are supplied for the operation are to be consulted.

1.5.1 Instruction of the operating personnel by the operating company

Any activities at the product which are not described in the instruction manual may only be executed by skilled personnel.

The operating personnel of the machine has to receive the information, explanation and instructions tailored to the individual working and activity situations, in order to recognize the safety and health hazards and be able to respond accordingly.

The machine-specific instruction with the radio remote control is necessary to enable the user to act in a safety and health conscious manner. The operator of the machine is responsible for the instruction, whereas the experience on handling the machine, the manual instruction as well as the regulations for the prevention of industrial accidents have to be taken into consideration.

1.5.2 Other obligations of the machine operator

If there are safety deficiencies during the integration of a radio remote control with the machine, these have to be eliminated prior to integration of the radio remote control until the conformity of the machine is assured within the appropriate regulations and operator specifications.

After integration of the radio remote control the time interval for the examination of the entire machine has to be validated.

Upon appropriate integration of the radio remote control the operating phase of the machine remains untouched, with the exception of the mode (radio remote control / local machine control). The intended use of the machine remains unmodified by the re-fitting.

The operator is obligated to establish effective test protocols whereby the radio remote control has to be visually checked for damages before each use.

The operator is responsible for using the machine only in faultless condition and under consideration of all protection measures and any security devices and regulations have to be considered.

The operator is obligated within the limits of the legal regulations to check the necessity to wear personal protection devices and to obligate the employees to wear the protection devices.

The operator has to ensure that the key for the mode switch (radio remote control / machine control) is only accessible to the personnel which is qualified and authorised to operate and work at the machine.

Within the process of the risk assessment, the operator of the equipment has to check if the changed procedures may cause dangers of the operating personnel and if further measures are necessary.

In addition, the operator has to evaluate the operator stations in conjunction with the effective range of the machine / equipment as well with respect to the principles of a safe working environment.

The operator has to evaluate the dangers possibly resulting from combined effects which individually may be considered minor. Single minor dangers can arise to substantial dangers when they are combined.

1.6 Conformity, modification of the equipment

The declaration of conformity of the overall system is subject to the form and content of the legal regulations. With the declaration of conformity the manufacturer confirms that the equipment supplied complies with all the relevant EG regulations as regards health and safety. The EG declaration of conformity is basis for the CE conformity of the machine.

The conformity declaration is based upon the conformity declarations of the manufacturer, the supplier of any sub-systems, the risk assessment of the equipment interface as well as the suppliers documentation

The equipment is based on the respective risk assessment furnished with every essential protection device to ensure a maximum of safety. On assortment and accomplishment the adequate European harmonised safety regulations are considered.

The declaration of conformity is based on the results of considerably risk assessments, the electrical protective devices and on data collections. The system is furnished with every possible protection device to ensure a maximum of security. The European harmonised safety regulations have been considered.

1.6.1 Declaration of conformity



Wir, die Gross-Funk GmbH, Wiesenstraße 6 in D- 67707 Schopp erklären in alleiniger Verantwortung, dass die Produkte

Funkfernsteuerungsanlage Typenreihe: SE889.. und Typenreihe: GF2000..

bei bestimmungsgemäßer Verwendung den grundlegenden Anforderungen des FTEG und der Richtlinien
2014/35/EU *Niederspannungsrichtlinie*
2014/53/EU *Funkanlagenrichtlinie (RED)*
entspricht

Folgende Normen wurden herangezogen:

EN 12100:2010	Sicherheit von Maschinen: Allg. Gestaltungsgrundsätze: Risikobeurteilung
EN 300 220-2 V3.1.1	Elektromagnetische Verträglichkeit und Funkspektrumangelegenheiten (ERM)
EN 300 328 V2.1.1	ERM für Breitbandübertragungsanlagen 2,4GHz
EN 301 489-1 V1.9.2	Elektromagnetische Verträglichkeit Funkspektrumangelegenheiten (ERM)
EN 60204-1:2006 + EN 60204-1:2006/A1:2009	Sicherheit von Maschinen - Elektrische Ausrüstungen von Maschinen, Einrichtungen der Informationstechnik-Sicherheit.
EN 60950-1:2006/A2:2013	

Gesundheit und Sicherheit gemäß §3(1) FTEG

CE approval following rules (FTEG)
Gross-Funk GmbH, Wiesenstraße 6 in D- 67707 Schopp declares that

Radio remote control unit type SE889.. and type GF 2000 ..

is conform to the rules of FTEG (Art 3 from R&TTE) and
2014/35/EU electrical equipment designed for use with certain voltage limits
2014/53/EU Radio equipment (RED)

Consulted standards:

Selected standards:	
EN 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN 300 220-2 V3.1.1	Low Power Device
EN 300 328 V2.1.1	Electromagnetic compatibility and Radio spectrum Matters (ERM)2,4 GHz
EN 301 489-1 V1.9.2	Electromagnetic compatibility and Radio spectrum Matters (ERM)
EN 60204-1:2006+	Safety of machinery – Electrical equipment of machines – Part 1: General requirements
EN 60204-1:2006/A1:2009	
EN 60950-1:2006/A2:2013	Information technology equipment - Safety - Part 1: General requirements

Healthy and security: §3(1) 1.(Art 3(1) a)

Déclaration de conformité suivant les lois et règlements concernant les appareils de transmission radio (FTEG) et les règlements 1999/5/EG (R&TTE)

La société Gross-Funk GmbH, Wiesenstraße 6, D-67707 Schopp, Déclare que les produits

Radio commandes de type : SE889.. et type : GF2000..

respectent dans le cadre d'une utilisation conforme aux données du fabricant les recommandations du §3 et suivants énoncées par les règlements du FTEG (Article 3 de la R&TTE).

2014/35/EU DIRECTIVE BASSE TENSION
2014/53/EU RED

EN 12100:2010	Sécurité des machines –Appréciation du risque et réduction du risque
EN 300 220-2 V3.1.1	Équipement courant base tension
EN 300 328 V2.1.1	Electromagnetic compatibility and Radio spectrum Matters (ERM), 2,4GHz
EN 301 489-1 V19.2	Electromagnetic compatibility and Radio spectrum Matters (ERM)
EN 60204-1:2006+	Securite des machines -Equipement électrique des machines
EN 60204-1:2006/A1:2009	
EN 69050-1: 2006/A2:2013	material de traitement de l'information - sécurité-

Sécurité : §3(1) 1 (Article 3(1) a)

Schopp, 12.06.2017

Dokumentationsverantwortlich/responsible autor/Auteur du document: QM

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1.6.2 Considerable modifications

Any modifications or re-work on our product results in annulations of our declaration of conformity. Depending on the extent and the manner of modification, the establishment of a new declaration of conformity is necessary.

Therefore, any modifications and add-ons are only permitted after arrangement with and upon examination by Gross-Funk GmbH.

1.6.3 Replacement parts and accessories

Only factory original replacement parts may be used. The installation and/or the use of unintended or not approved equipment or system components may possibly change engineering designed features and/or affect the active or passive safety measures..

Any liability is waived for damages or performance losses based on using non factory parts.

1.7 Product liability (see 1.2 terms and definitions)

The producers assume liability for damages to property or persons only for proven malfunctions of equipment. No liability is assumed for inadequate use, misuse or abuse. Only fully qualified personnel should operate the equipment.

For any equipment manufactured by us we will cover a warranty of 12 months for material defects or manufacturing errors.

The period of the warranty starts with the sale of the product. Relevant is the date of delivery.

Warranty Coverage:

The warranty extends to free substitution of the necessary spare parts and/or improvement of the parts concerned or to reconditioning of freight-free devices sent to us. Travel expenses are not covered by this warranty for on-site trouble-shooting by our customer service and will be billed. Reimbursement of costs for working hours, travel expenses, or other costs is excluded.

The warranty causes no extension of the warranty term. The customer is responsible for determining that the devices and procedures are adequate for the intended targeted purpose. If the suitability for a certain intended purpose was not explicitly assured by us, either at the confirmation order or within our documentations, which are based on the given contract, no claims can be made because of missing features or limited possibilities of usage. Claims must be made immediately, when possible in writing, not later than 14 days after becoming known. If the condition of the device is criticized rightfully, or is missing one of its assured features, a replacement or reconditioning by our choice will take place. For these measurements, a sufficient period should be available to us. Our warranty doesn't cover defects which occur from normal wear and tear or inappropriate treatment.

We are not responsible for defects which occur because of incorrect or neglectful operation, improper modifications, unauthorized supplies or the usage of our devices for other purposes as stated by us. Our liability is also voided if changes or modifications of the devices supplied by us were not made through our explicitly authorized personnel. In any case the one performing the work is responsible for the regular execution of repairs, reconstructions, or changes of the cables and / or changes of the connection cable. As far as our deliveries contain 3rd party products, the terms of the warranty of our vendors apply.

2. Personnel requisition

Only trained persons which are as well authorised by the plan operator are permitted to operate the appliance.

3. Description of equipment

Our radio remote controls are composed of one or more transmitters and one or more receivers as well as the appropriate accessories. They are designed to remote control machines and equipments with safety relevant features, e.g. cranes, self propelled machines, winches, production lines, railroad engines, locomotives and numerous types of construction machines.

The radio remote controls are manufactured for the professional use in industrial environments, on construction sites and in forestry applications.

3.1 Intended use

The Gross-Funk radio remote controls are based on the application of radio signals to operate a technical device from a separate location, whereas the operating elements of the radio remote control substitute the existing operating elements of the machine.

It serves to the safety operate machines, vehicles and other working appliances as well as transfer of information.

Based on the high degree of versatility of the system it is not possible for the manufacturer to precisely determine which sequence of the control panel is allocated to which function of the machine.

The intended application takes into consideration the technical, organisational regulations to integrate a radio remote control into an existing machine, equipment or vehicle.

The Gross-Funk radio remote control may only be used in a technically correct condition by instructed stuff and consideration of the valid safety standards and the regulations for the prevention of industrial accidents. This includes also the adherence of the operating and maintenance conditions of the instruction manual. The product is an equipment to use on the rated voltage indicated on the label.

3.2 Not compliant / incorrect use

Non-compliant /incorrect uses includes:

- The unauthorised usage in ranges which are subject to special regulations (elevators, application in explosive environments, mining, medicine, aviation)
- Operation of the radio remote control in a technically objectionable condition
- Operation by untrained stuff
- Non observance of the valid safety standards and the regulations for the prevention of industrial accidents.
- Operation on differing, incomplete or untested integration of the machine.

3.2.1 Possible health or material damage

This product is a device for the use with a rated voltage as noted on the label. When performing repairs, the appropriate main breaker has to be switched off. During operation or if the cable connection is not switched off there may be residual voltage inside the machine. This voltage could be life endangering.

Serious health hazards or material damage may occur with

- incorrect removal of covers

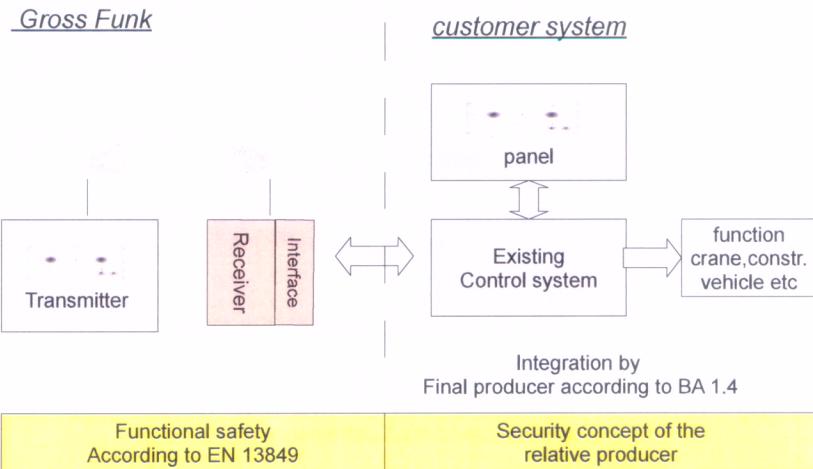
- Inappropriate use of the product
- Wrong operation
- Insufficient maintenance
- Working on components which are under power.
- The corresponding safety regulations have to be considered when working with the machine as well as during installation or operation of the radio transmitter system.
- Any machine service, maintenance or electrical connections, including electrical plug-ins have to be performed with the machine fully disconnected from power.
- All work relating to initial installation or the repairing of a device is only permitted to be performed by qualified personnel

3.3 Reasonably predictable wrong appliance

Considered Reasonably predictable wrong usage of the radio remote control are applications which do not take this instruction manual or result out of easily predictable human behaviour.

4. General instruction manual

4.1 Section of equipment / functionality and characteristics



5. Technical Data

5.1 Transmitter

• = possible equipment	K2 Standard	K2 plus	Handy	GF-T53	ergo	GF-T24	GF-T14	GF-T23	Cab control
dimensions	250x170 x180	360x170 x180	260x190 x80	195x112 x150	125x50 x125	180x120 x180	195x75 x50	250x125 x125	220x120 x180
cage design	T30	T31	T20	T53	T06/T07	T24	T14	T23	R61
weight (approx. depending on equipment)	1700 g	2400 g	850 g	1400 g	400 g	1300 g	380 g	1100 g.	3500 g
degree of protection	IP65	IP65	IP65	IP65	IP65	IP65	IP65	IP65	IP65
emissions	<110 dBµV/m								
operating temperature	-20 - +60°C								
battery durability (ca. depending on options)	10h	10h	10h	10h	10h	10h	10h	10h	
frequency hopping	•	•	•	•		•	•	•	•
Transceiver (bi-direction radio path)	•	•		•		•	•	•	•
multiple transmitting operation	•	•	•	•	•	•	•	•	•
multiple receiving operation	•	•	•	•	•	•	•	•	•
receiver stand-by	•	•	•	•	•	•	•	•	•
abdominal belt	•	•		•	•	•		•	
neck belt	•	•	•			•	•		
transmitter carrier bag	•	•		•	•				
adapter for charger (12 or. 24V-DC)	•	•	•	•	•	•	•	•	•
dockingstation					•			•	
belt clip						•			
carrier system						•		•	

5.2 Receiver

• = possible equipment	K2.3	K2.2	GF-R46	GF2000i V1	GF2000i V2	SE889 CAN	GF2000a	GF2000
dimensions	260x160 x90	330x230 x110	230x160 x90	200x130 x100	200x130 x100	270x120 x80	270x120 x80	380x230 x110
cage design	R61	R64	R46	R99	R94	R60	R60	R65
weight (approx. depending on equipment)	3500 g	6800 g	1200 g	1950 g	1950 g	2550 g	2550 g	6000 g
degree of protection	IP65	IP65	IP65	IP20	IP20	IP65	IP65	IP65
operating temperature	-20 - +60°C	-20 - +60°C	-20 - +60°C	-20 - +60°C	-20 - +60°C	-20 - +60°C	-20 - +60°C	-20 - +60°C
upgradeable	•	•		•			•	•
reflectomat	•	•	•	•	•	•	•	•
Transceiver (bi-direction radio path)	•	•	•	•		•		•
receiver stand-by							•	
adapter for charger on receiver box	•	•						•

• = optional, possible equipment

¹⁾ general approved

2) notifiable / chargeable

free of charge

subject to alterations

each figure perceive as sample

5.3 Electrical power supply

Insert/change power pack (only valid for portable units with power packs)

- Turn unit off when changing the power pack
- Insert power pack
- Insert power pack into the slot of the transmitter until it snaps into place
- Remove power pack
- Slightly pull back the retaining clamps on the charger shaft.
Use handle to remove pack



Power pack warning

If the voltage of the power pack gets too low while in use, the LED will flash rapidly. The control will turn off after 10 Minutes have passed.
If an empty power pack is inserted, the control-LED will flash.

Charge power pack

To charge the power pack, insert it into the slot of the charger. The light of the control LED at the charger indicates that the power pack is loaded.

If the power pack is loaded, the LED flashes green.

The full capacity will possibly be reached only after some load cycles.

If new batteries are to be connected, the charger must idle for approx 15 sec. to make sure all parameters in the microprocessor have been reset.

When the charger has been reset the LED changes to yellow, and a new charge cycle can begin.

- The power packs have to be protected from humidity
- Damaged power packs may not be disposed or in household trash
please collect, give them to our field staff or return to us.
- **Do not throw the power pack into fire**



Safety instructions

Do not use damaged cells

Under no circumstances may damaged cells be used. Indicators for damaged cells are, damages to the package, deformation of the cells, smell of electrolyte or leaking electrolyte. In these cases continuing use of the power packs is not permitted.

Damaged or unusable cells are hazardous waste and have to be disposed of accordingly.

Battery charger

A battery charger serves to charge a power pack. Not every battery charger is suitable for every power pack.

Safety device

Prior to operation verify that the power supply and the power of the unit are the same current.

There are different types of power packs such as lithium-polymer , lithium-ionic and nickel metal hydride with different loading capacity and different construction types.

A battery charger always is suitable only for one type of power pack with a certain charge current.

A wrong battery charger may have fatal consequences for humans and material.

Under no circumstances may commercial batteries be inserted into a battery charger. awa

Charger	GF item number	Charging devices	GF item number
7,2 V 500 mA NiMh	100-001-885	LA 98 KFZ	100-004-684
		LA 990 (100-230VAC)	100-012-132
		LG 60 (Forst)	100-005-861
12wxxx V 1300 mA NiMh	100-000-134	LA 14 KFZ	100-002-954
		LA150 (100-230AC)	100-012-130
12 V 2400 mA NiMh	100-006-635	LA 14 KFZ P	100-006-634
		LA 15 P	100-006-882
		LA 150-P	100-015-794



Unless otherwise noted, all battery packs are only designated for work in dry, inside environments, please do not use or store outdoors.



The ambient air temperature may only be between +10°C and +40°C.

5.4 Environmental condition

operating temperature	-20° C bis +60° C
storage temperature	-30° C bis +80° C
humidity	0-90% relativ
IP-safety class	Siehe technische Daten im hinteren Teil dieser Anleitung. See technical data in the annex

6. Transportation and handling

Usually the device is delivered by parcel service. Detailed information is listed in the delivery documentation.

The completeness of the delivery has to be checked by the bill of lading and the packaging list. Variations to the supplied documentation as well as obvious damages to the package or the goods have to be reported immediately.

7. Installation and initial operation

The installation and the electric connection is only allowed to be executed by qualified personnel. The personnel has to be instructed and authorised by the plant operator.

Only personnel which is authorised by the plant operator are allowed to operate the appliance.

Special safety devices are indicated in the individual chapters.



For the installation of the receiver there are various possibilities depending on the type of construction. Depending on the type of hardware, the corresponding instructions have to be followed.

Warning instruction concerning cable connection

We cannot exclude errors in the circuitry since the layout was performed according to the diagrams of the manufacturer of the machine. As a rule, the correct connection has to be verified in any event before initial operation.

Fixed installation

The transmitter may be mounted to the outside of the control panel of the equipment to be controlled. 4 pre-assembled M6 screws are provided. The distance of the holes to be drilled are indicated at the back of the transmitter's housing. Please assure that no metal shavings are left inside the control panel.



Transmission loss due to shields

The antennas cannot be surrounded by metal! Do not install components inside the control box without external antenna as this can lead to a shielding effect causing interference with the transmission. When mounting inside an operator cab, the antenna has to be in the vicinity of a window, otherwise an external antenna is necessary. A badly placed antenna can cause frequent transmission interruptions and passive emergency stops.



Water damage

The receiver has to be mounted so that the antenna faces upwards. Otherwise water can enter into the receiver through the plug housing. The advised protection class is only given if receiver is installed correctly.



Welding

When welding at the machine it is absolutely necessary to disconnect receiver from the power. Otherwise the electronics inside the receiver may be damaged.



Connecting cable

If ordered, the device is supplied with a connecting cable. Depending on the customer's order the connecting cable may be manufactured complete with plug or with bare ends. The connecting cable is manufactured by Gross-Funk according to customer's details and drawings. Wrong or misleading instructions can lead to mistakes or potential damage.

- Prior to initial operation check the drawings
- Make sure that the wiring diagram of the machine corresponds to the actual condition.

Gross Funk assumes no liability for damages caused by incomplete or wrong diagrams or wrong terminal connections.

The connecting cable has to be installed in a manner that it is not possible to pinch it by movements of the machine being controlled.

7.1 Electromagnetic compatibility (EMC)

The receiver is tested concerning the electromagnetic compatibility. The interference resistance far exceeds the required parameters. But there are limits. Malfunctions and potential damage can occur in the receiver by strong interfering electromagnetic fields.

Electromagnetic malfunctions can occur through

- induction currents in relay or contactor coils
- power regulators
- frequency converters
- radio transmitter with high performance
- spark gaps
- high-voltage generators
- power inverter
- and similar

EMC-interferences can be avoided by:

- connecting cables as short as possible
- Radio interference suppression by using free-wheeling diodes directly at the source of interference

To meet the EMC-conditions during installation in an overall system the following points have to be observed.

- EMC-compatible installation of the electronic components
- Use of required or permitted cables, if required shielded cable
- Adherence to minimum clearance in cable routings with different voltages

Switching output in direct current systems Free-wheeling diodes prevent high induction voltages and provide for safe and failure-free operation of electrical appliances. In direct current systems the inductive components such as directional valves, actuators, motors etc. have to be supplied with free-wheeling diodes, ideally installed next to the component to prevent interferences at the point of origin.

The protection provided by free-wheeling diodes inside our systems is less efficient.

Operation display Next to the receiver is the operations display. The red LED flashes when the receiver is switched on. The display indicates that all operating voltages are available and all fuses are in order, except the fuse in the emergency stop circuit. Potential voltage fluctuation may not be recognized.

Electrical connection Depending on the layout ordered, the unit is delivered with terminal strip, cable connections or with installed plug connector

7.2 Safety devices / General information (see 8.2)

7.3 Safety check

Operate machine only with good visibility. See 1.4

0-position monitoring The 0-position monitoring may be carried out in the transmitter, the receiver as well as in both. Functions which may be hazardous have to be protected against inadvertent or defective starting

0-position monitoring in the transmitter The electronics of the transmitter monitors operational elements, which have to be in the resting position for safety reasons when the transmitter is switched on. If one of the operating elements is not in resting position when switching on or the electronic indicates a failure, the transmitter will not transfer a control command. The failure will as a rule be indicated in an acoustic or optical manner in the transmitter (see as well operational indicator LED in transmitter).

0-position monitoring in the receiver As is the case in the transmitter the 0-position is as well monitored in the receiver. With each switching on of the receiver or after a stand-by the receiver expects a 0-position signal of all functions which are involved in the monitoring. If the receiver does not receive an initial 0-position indication (e.g. after a transmission interruption), it does not engage any functions.

10 rules for the safe operation with a radio remote control

1. When operating a machine with a radio remote control the same regulations for the prevention of industrial accidents are valid.
2. A machine is to be operated in such a manner that the user has visibility into the machine and can easily follow the movements of the machine. Any hazardous areas have to be visible.
3. The control panel always has to be protected against unintended use, even if left only for a short period.
4. A radio remote control is a highly technical electronic piece of equipment. Please handle with care.
5. Safety first. No matter how slight a defect or malfunction, consult technical support and have unit checked. Only units in 100% working order allow safe operation.
6. Prevent dirt or moisture getting into the unit. Immediately replace damaged or poor condition seals and gaiters.
7. The emergency stop switch is the most important feature of your remote control. Check functionality at regular intervals. This is for your own safety.
8. Very often dirty conditions are unavoidable and thus the control panel is subject to adverse conditions. Clogged particles can impede with the functionality of the control switches. Keep control panel clean and assure that the main control switch can freely revert to O-position.
9. Use the radio frequency remote controller only with the machine it is intended for. Connecting to other machines can lead to heavy damage to machine and controller.
10. Depending on local conditions, short frequency interruptions can be normal. Very often the source can be found. When interrupted, the emergency stop function activates and the machine needs to go into „safe mode“, i.e. the machine turns off. This needs to be taken into consideration when controlling the machine.

7.4 Trials and test run

The test run is only permitted when all safety devices are in place.

7.5 initial operation

Prior to initial operation and prior to any maintenance work the instruction manual has to be read.

8. Operation**8.1 Areas of operation which have to be taken over by the personnel during operation**

Areas of operation and handling are dependent on the intended use. In any event, the safety features described in 6.1 have to be taken into consideration.



Stop functions and operational functions

Depending on the type of machine, stop could cause the immediate diminishing of the functions in progress. Under these circumstances dangerous situations may occur. Therefore avoid unessential signal interruption while the machine is moving. A radio signal interruption or other events in the radio remote control can cause a passive emergency stop if the interruption is longer than the passive emergency stop period (the standard passive emergency stop period is 0,5 seconds).



Multi-level master switch and analogue joysticks



Avoiding mix-ups

To avoid mistakes, the inoperative radio-remote control for machines, which have further control panels has to be put away and be kept inaccessible for other people. This is especially important for systems with spare transmitter. Spare transmitters have to always be locked away and the exchange has to be clearly defined in written instructions. The users are to be instructed in the possible danger resulting out of simultaneous use of additional controllers or control panels.

8.2 General safety devices for operation



Alert of dangerous condition

The symbol warns of a possibly dangerous condition and needs to be regarded as a general safety warning. Disregarding this type of advice can lead to malfunctions, damages or disturbances of the correct working order.
In the worst case operating personnel or third parties can be endangered.



Alert of dangerous electrical voltage

When the housings are opened the electrical shock protection is interrupted and live electrical parts may be touched if the supply voltage was not disconnected prior.



Alert of automatic start-up

When using the radio remote control hazards may occur through the lack of attention paid to the interconnection of the machines being controlled with other working materials.



Alert of the operator slipping

When using the radio remote control hazards may occur due to not paying attention to the location of the user.



Alert of the operator falling

When using the radio remote control hazards may due to not paying attention to the location of the user.



Alert of operator collapse

When using the radio remote control hazards may occur due to not paying attention to the location of the user.



Alert of risk of stumbling

When using the radio remote control hazards may occur due to not paying attention to the location of the user.

8.3 Safety devices

8.3.1 Overview of safety devices

- Emergency-stop active
the active emergency stop is only engaged through manual, planned activation of the emergency stop switch.
- Emergency stop passive
The passive emergency stop is automatically engaged, e.g. on radio interruption

8.4 Operation and use of the equipment

Instructions for use to transmitters / receivers and rechargeable batteries / chargers

Operating and display elements and functions

With your radio remote control of GF you have a control panel which is individually planned and constructed for your application. The buyer of the equipment defined and confirmed the functions and the labelling as well as the location of the panels. We are not informed as to which functions the radio remote controls executes or which risks and dangers may occur based on the machine functions. Please carefully observe the instructions of the appliance being controlled. If anything is doubtful, obtain information from your machine manufacturer, respectively from the installer of the machine as to how the panels are allocated with respect to the functions of the machine.

Only the manufacturer of the machine or an authorised representative can supply information concerning functionality. The allocations of the panels and the functions of the machine are described in the operating manual of the machine.

Operation display

The portable panels are equipped with an operational display-LED which shows different operating modes as well as faults.

LED doesn't flash	Transmitter is switched off
LED flashes permanently	Transmitter is switched on
LED flashes fast	Warning: power pack is empty (see power pack description)
LED blinks slowly directly after switching on the machine. (once per second)	0-position alert

Feedback signals (LEDs and displays)

Depending on layout, systems with feedback signals dispose of indicators e.g. display LEDs or displays at the panel.

When manufacturing the radio remote control, we are not necessarily aware which functions the radio remote control is responsible for. Carefully follow the instructions supplied by the manufacturer of the machine being controlled. If anything is doubtful, obtain information from your machine manufacturer, respectively from the installer of the machine as to the meaning of the displays.

If all LEDs flash simultaneously, the feedback transmission is interrupted. It is however possible that the transmission of the control command still exists and therefore the machine can still be operated.

Turn on the device
Device with stop button

Turning the device on is performed by unlocking the stop button.
Stop buttons can be unlocked in two ways.

- Pull stop button
- Turn stop button
(This stop button is indicated with an arrow)

Devices with stop button and separate on-switch

- Release stop button
- Activate on-switch

Devices without stop button, but with separate on-switch

Activate on-switch

Devices without stop button and without on-switch

- Push the intended function
- (Device is turned on)
The transmitter remains on until the function is released.

Turning on the device with a buzzer

- Turn off the device
- Push and hold buzzer and brake
- Turn on by emergency stop but hold horn and brake for approx. 1 minute
(→ continuous tone = Confirmation of turned on)

Turning of the device
Devices with stop button

- Push stop button
(The device turns off with 2 seconds delay.)

Devices with stop button and separate on switch

- Push on-switch to off position

Devices without stop button, but with separate on-switch

Push on-switch to off position

Devices without stop button and without on-switch

The device is automatically switched off when an operating function is released.

Stop

(Optional functions, not available with all devices)

The stop function is comparable to an emergency stop function.

Push red stop button.

Emergency stop circuit and all functions switch off immediately in the receiver. The transmitter only turns off after 2 seconds.



Attention when switching off the control panel

When switching off the control panel, the receiver will be given an immediate stop command. Provided the emergency stop circuit is correctly implemented, your system then works in the same manner as if the emergency stop function were released.



Attention when exceeding the operating distance

The receiver stops automatically, when

1. the maximum operating distance of the radio remote control is exceeded
2. the shield interferes with the radio signal (→ passive-stop)
3. This results in immediate machine operation interruption. The abrupt halt of the machine operation may cause danger.

**Devices with key switch
(classic or magnet key)**

**Devices with key switch
(classic or magnet key)**

- Switch off device, remove and store key

Devices with ID key

- Switch off device, remove and store ID key

Devices without special protection

- Remove and store power pack
- oder
- Lock up device

Stand-by

(optional function, not available with all equipment)

When the device is not in use, it automatically goes into stand-by after a programmed time (generally 240 s).

Activating any function will reactivate operating mode.

Switching off stand-by

- Switch off device
- Activate 1 function with 0-position monitoring and hold
- Switch on device
- Hold function
- Operation display LED flashes
- Stand-by is turned off after one minute
(short acoustical turn off signal)
- Release function

Switching on stand-by

- Same procedure as switching off

ATIS

(optional function, not available with all equipment)

Some radio remote controls with analogue functions allow adjustment of the radial cam (beginning and end value) directly at the control panel. Please refer to the detailed description at the end of this manual in the system specific section.

Frequency change

(optional function, not available with all equipment)

If you suspect that the radio frequency is used by another transmitter, a frequency change has to be performed.

Sporadic or lasting switch on and switch off of the transmitter indicates a disturbance of the frequency. Such disturbances often occur when more radio operations are performed in the vicinity.

If the frequency is changed during system operation, the receiver stops for a few seconds until it automatically finds a new transmitter frequency. During the frequency change no functions may be activated.

Changing the frequency

Unit with turn switch
Put **FREQ** button to 1, 2, 3 or 4.



→ **Unit with frequency change button**

Push button (see figure) and keep pushed until a long signal sounds. Release push button.



Continuing pushing of the button → next channel.

Check of the adjusted frequency

Shortly push the button to indicate the presently adjusted channel.

Channel 1 → 1 short signal
Channel 2 → 2 short signals
and so on.

9. Support and cleaning / Intervals

Support

The radio remote control doesn't need any specialized technical maintenance.
You should consider the following directions:

In regular intervals the equipment should be checked by visual inspection concerning damages, e.g. fractures or breaks. Equipment with patent seals consisting of rubber or silicone are to be checked concerning damages. On visible damages the equipment has immediately to be repaired by Gross-Funk or authorized personnel. Further operating could occur fatal consequences.

We don't issue any guarantee about water damage / dust damage



Water damage

Cleaning and care

The radio remote control has to be kept in a clean condition. Contaminations e.g. by rests of concrete or rests of grout may affect or damage the panels of transmitter. Clean up your transmitter after work with a cleaning cloth or a paint brush to remove from contamination.
Don't use a water jet (tube, water-tap) and no steam blaster to clean your device.

Bellows and sealing caps avoid infiltration of water and dust. Damaged bellows and damaged sealing caps have to be replaced immediately..

10. Defects

The responsible personnel has to take the device out of operation and keep it secured to prevent any inadvertent use until the defect is corrected.

11. Taking out of service / detachment / disposal

Before taking out of service the power to the device must be disconnected. Only trained personnel authorized by the owner of the machine are allowed to operate the device.

If the transmitter/receiver has to be disposed of, this has to be done in accordance with local environmental codes and laws or has to be returned to the manufacturer..

The manufacturer reserves the right to charge for the disposal of these transmitters / receivers.

The producer reserves the right to charge the disposal of these transmitters / receivers.

12. Emissions (see item 5 and 7)

13. Testing

The radio system is to be safety tested in regular intervals

STOP

As regards safety, the stop function of a wireless control system is the most important part of the radio remote control. Therefore it has to be checked regularly.

Recommendation: Check daily at start of operation.

Stop test (not available for all equipment)

- Transmitter is switched-off
- Select a function on your transmitter which allows a visible and safe movement
- Switch-on transmitter
- Press and hold selected function
- press stop
- The function has to stop immediately
- **The push-button has to snap into place and should not rebound**

Dead man's switch

All important and safety relevant functions are controlled by the dead man's switch function to avoid any unintentional movements. Please obtain information on these functions of your control from the attached wiring diagram.

Inspection of dead man's switch

Serves to avoid unintended start caused by adhesive panel or defect in data input electronic, for the matter that functions with momentary-contact movements release a movement.

- Transmitter is switched-off
- Select a function of your transmitter which executes as much as possible a visible and safe movement
- Press and hold selected function
- Switch on transmitter
- The machine may not make any movements and the operation display LED flashes fast
- At certain modes there is an additional acoustical signal)
- Release the function now
- The warn signal stops, the operation display LED flashes permanently
- Push the same button again
- **The selected function has now to work as usual.**

Master switch

(optional function, not available with all equipment)

The functionality of the master switches could be affected by dirt. Occasionally it needs to be verified that the master switch rebounds reliably to the 0-position when it is released.

Move the switch to the first function and release it.
If the switch does not return immediately to the home position:

- Take the equipment out of operation

Request repair through by authorised service specialists

14. Signs and symbols

Warning of dangerous situation



The symbol warns against a possible danger, respectively is to be considered as a general safety advice.

If such devices are not adhered to, malfunctions, damages or interruptions of the operating processes can occur.

In a worst case scenario, operating personnel or third parties can be endangered.

Instructional Signs



Refer to Operation Manual

The technical documentation has to be referred to.



Refer to our instructions

Operate according to the work instructions, take technical specifications into account



Use personal protective equipment (general)

Depending on the application area of the radio remote control personal protective equipment has to be used. Type and scope of the protective equipment are conform to the regulatory requirements and the risk assessments of the operator.



Do not open before power switch is turned off

Unauthorised personnel are not allowed to open the box of the radio remote control.

Device Labelling



Our devices have (except GF 2000i on top hat rail mounting) the protection class IP65. They are applicable for the use in humid rooms and on outside locations



On hat rail mounted GF 2000i devices have the protection class IP20 according to DIN EN 60529.



CE-conformity label

By fitting the CE-label, we confirm that our product correspond to the effective European directives. The conformity assessment has been executed according to all effective directives.



Earth conductor



To keep dry

(Only for use in dry inside environments)

15. Terms and definitions

AC	Alternating current
ATIS	The Analogue Teach In System serves to adjust the analogue control signals to the corresponding components such as e.g. frequency converter, valves, drive controls etc. This function allows to determine the beginning and end values of the analogue signal.
Operating personnel	Persons which are responsible for the operating of the machine, transportation, cleaning and the simple fault clearance. The operating personnel is in particular prohibited to remove safeguarding equipment or to open the devices. The operating personnel has to be introduced in the operation of the GF product before using it. In particular the operator has to be familiar with the effects in the mode of operation in conjunction with the machine being guided i.e. The functioning of the machine. Particular danger situations have to be considered and the safety instructions have to be observed. The responsibility for the personnel and qualification rests with the customer, respectively with the operator according to the legal regulations.
Instruction manual	The instruction manual is addressed to trained operators as well as to specially instructed maintenance and service personnel. Prior to start-up and prior to any maintenance whatsoever this manual is to be consulted. Any person which is concerned with the initiation, operation, inspection, maintenance and service of the product has to read and to understand this instruction manual, especially the chapter 8.2 safety devices before working with the device. The operating personnel as well as the maintenance personnel have to revert to the instruction manual at any time. Therefore at least one copy of this instruction manual has to be stored near the operator's workplace. In general, the instruction manuals, the operating guidelines and directions for use belong to the generic term user information or product information or general technical documentation. Before initial operation and before maintenance work the instruction manual has to be despatched to read. Any devices manufactured according to specifications supplied by a customer do not include any additional details as the purpose of use, this location and other conditions are known to the manufacturer (Gross-Funk). All data in these operating instructions are of general nature. Customer specific diagrams are supplied separately. Based on the interlinking of machines risks and dangers may occur which are not subject to this documentation. The overall machine assembler is responsible to make a risk assessment as to the interface situation of the various machine components. This instruction manual is only related to a part of a system and may be consulted in the evaluation of a comprehensive conformity procedure. It contains all information which is necessary for the all operating phases of the product, especially concerning initiation, operation, inspection, maintenance and service of the product.
Operating voltage	The voltage, the charger is connected to.
CE label	Label which documents at the product the full accordance with the requirements and conditions to the applied directive. The mounting process depends on the particular directive (e.g. the EC machinery directive).

CODEC	Coder/Decoder module
DC	Direct current
Debugger interface	The debugger interface serves for online error diagnostics
Electrically instructed person	An electro-technically instructed person is a person, which is instructed and trained if necessary by a skilled electrician about the delegated duties and the possible dangers on incorrect performance. The electro-technically instructed person has to be instructed about the necessary protection devices and precautions (DIN VDE 0105-100). The regulations for the prevention of industrial accidents BGV A3 demands in §3(1): „The contractor has to make sure that the electrical devices and equipment are to be erected, modified or kept in good condition only by an electro-technical expert or under the supervision of a qualified electrical engineer and in accordance with the corresponding electro-technical regulations.
Trickle charging	The charging which is necessary to reach the 100% charging after charging the battery to counteract self-discharge.
Qualified personnel	Based on their professional experience, on their training and continuing work environment, qualified personnel has to be able to recognize possible dangers and, especially as records maintenance and upkeep, has to perform assigned tasks in a responsible manner. The qualified personnel has to perform necessary checks and tests in line with repairs and maintenance work and be able to evaluate the results. The qualified personnel carries qualified responsibility. The qualified personnel needs to include a qualified electrician
	The selection of the personnel and their qualification is responsibility of the customer, respectively the operator in line with legal regulations.
Fail save	➔ On failures, the system gets into a safe status.
GF product	Radio remote control, data link, GF rechargeable battery, charging adapter, connecting cable
GROCOM128	Safety- data link system, in-house development of Gross-Funk, already proven since 1986 and tested in 1995 within the scope of an examination test by the Technical Supervisory Association (TÜV).
Hamming distance	Is a characteristic number which expresses how many BIT are allowed to be modified in a transfer telegram without there will occur a dangerous failure.
manufacturer	Person or company which is responsible for the design, construction and production as well as for the conformity of the components, devices, machine or assembly group to the appropriate directives. It has to be pointed out that the responsibility of the manufacturer concerns only the radio remote control itself.
Manufacturer's declaration	Written confirmation of the manufacturer or his agent located in Germany, that the product which is placed into the market corresponds to all relevant directives and is e.g. suitable for an installation. The manufacturer's declaration is an important notice, that the end user is responsible for the correct integration and overall declaration of conformity for the final systematic safety review
Declaration of conformity	Written confirmation of the manufacturer or his agent located in Germany, that the product which is placed into the market lists all requirements in the declaration of conformity and thus fulfils the directives which apply to the product.
	Modifications made to the GF product void the Declaration of Conformity. Therefore any modifications made to the GF product are only permitted after arrangement with and upon examination by Gross-Funk GmbH.

Charging voltage	Voltage with which the battery is charged.
Charge rate	Charge with which the battery is loaded.
Charge time	Time which is necessary to a 100% charging of the battery
Li-Ion	Lithium-Ionen
LiPo	Lithium-Polymer
MCU	Micro control unit with program memory integrated.
Rating	The indication of the charge time refers to the rating. If the real capacity of the battery is higher, so the charge time increases accordingly.
NiMH	Nickel-metall-hydride
Emergency switch active	The emergency stop is only activated through intended, manual operation of the emergency switch.
Emergency switch passive	The passive emergency stop is automatically activated by radio discontinuity.
Periphery	Peripherals are all external components such as e.g. relays modules, I/O modules, analogue input and output modules etc.
Product liability	<p>The Gross-Funk company is responsible only for damages to property and person, who result with intended application from particularly instructed personnel, if the safety devices were fully functional and the manual, the manual of the manufacturers of the single components as well as the safety references are considered.</p> <p>Gross Funk GmbH assumes liability for damages to property or persons only for proven malfunction of equipment. No liability is assumed for inadequate use, misuse</p> <p>The liability for professional and adequate service and maintenance work lies with the individual performing of the work. No liability is assumed by Gross-Funk for work performed by Non-Gross-Funk personnel. In addition the warranty on any parts or components not installed by Gross-Funk is valid only for parts installed according to the instructions and guidelines given and authorized by Gross-Funk personnel.</p> <p>The condition of any GF products leaving the factory is in full accordance the corresponding safety standards. No liability is assumed for any changes and/or modifications, which are not performed by Gross-Funk GmbH.</p>
PWM	Pulsweitenmodulation
Self-discharge	Over time, each battery losses capacity, even if not used.
Safety zone	Safety zones are all accessible assets areas which are performed with protection equipment, as well as zones in which there is without any safety devices no danger of impending disposal and physical endangering with risk of injury.

**Safety functions
(generally)**

The functional safety of electrical, electronic or mechanical systems is guaranteed according to the demands of international norms on the basis of the reliability of the individual functions.

The reliability of the safety functions is assured through the interaction of carefully chosen and proven components. Whether and how reliable a control command causes the expected reaction of a machine can only be evaluated to the point of the interface unless further individual evaluations are undertaken.

We **emphasize** that the end user is responsible for the correct integration of our controls into the machine controls at hand.

It is possible, that a faulty integration of the interface a stop signal sent by the remote control causes the machine not to stop with the desired reliability.

In order to obtain the desired safety level with the control command for e.g. starting or braking the operator has to establish the following procedure:

The safety functions of the machine are to be established in a functional diagram and need to be adapted to the interface of the controls.

The personnel responsible for the integration of the radio remote control into the machine has to be qualified in the evaluation of safety related machine controls.

In order for this safety to cover your application, a safety related integration of the GF product into the control structure of the machine is required.

The manufacturer of the final product, i.e. the manufacturer of the machine who integrates the controls is responsible for the overall integration.

Due to its regulated and redundant structure the passive stop function fulfils the high safety requirements up to the interface point.

In order to assure that this safety is present in your application, a safety related integration of the GF products into the controls structure of the machine is required. This is the responsibility of the machine manufacturer.

SIL

Safety integrity level = classification of safety according to Norm EN 61508.

**Instructions (See also
well EUP)**

Instructions are the explanations and assignments as they relate to the explicit work or task given by the manufacturer to provide for a safety conscious behavior of the insured which can be expanded through practical exercises. Based on legal regulations the employees have to be sufficiently and appropriately instructed during the course of their working hours. Manner and method as well as comprehensiveness of an instruction need to be in appropriate relation to the present risk of danger and the qualification of the employee. The instruction is the responsibility of the owner/operator.

Instructed person

An instructed person is somebody who has been informed and if necessary trained about the assigned tasks and the possible dangers in the event of inappropriate behaviour and who has been informed about the necessary safety devices and safety procedures. The owner/operator determines who its person is.

Major modifications

Modifications on a machine which changes the coverage of the equipment and product with respect to safety laws and regulations in relation to additional or elevated risks of danger and where present safety related measures are not sufficient and require a new declaration of conformity for the modification.

