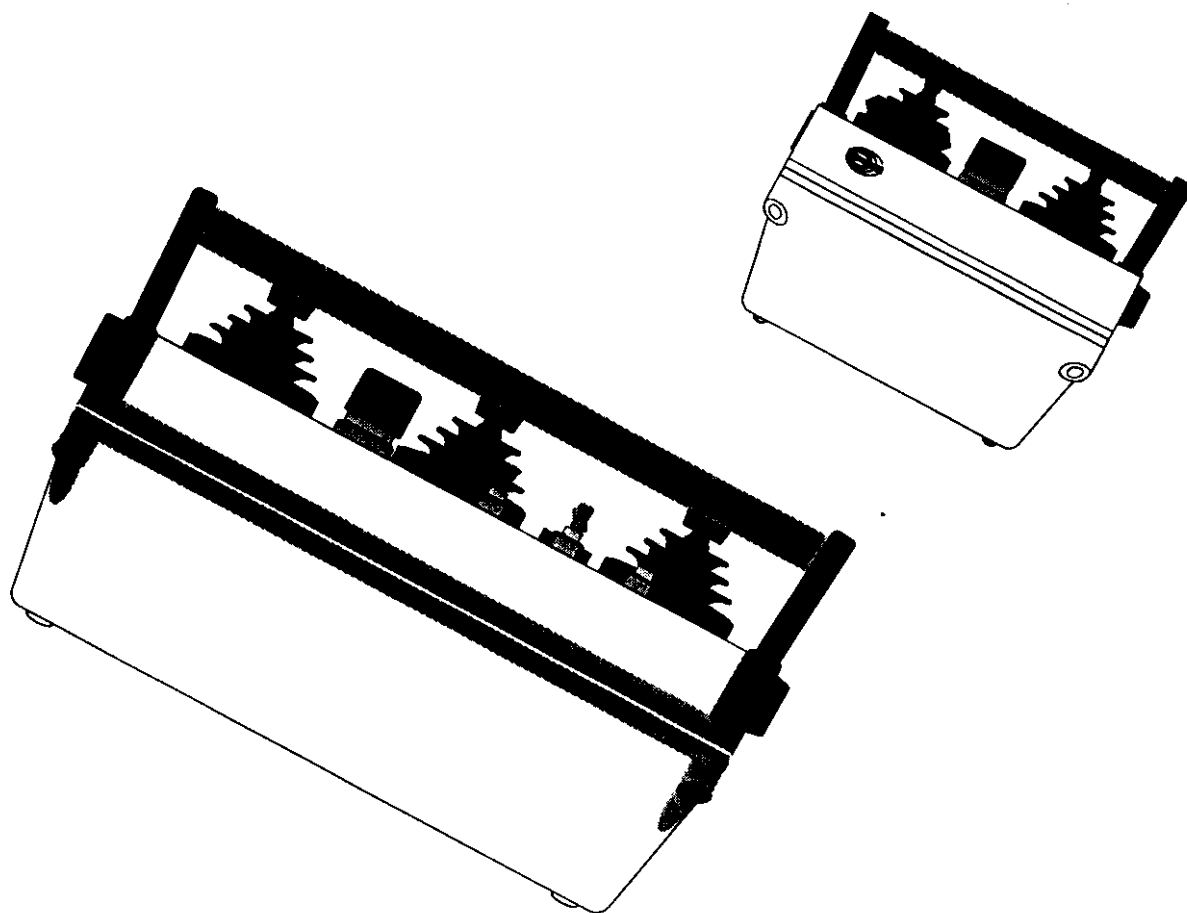


USER'S MANUAL

Owner's Manual



Installation , Operation and Maintenance

Before proceeding with the installation, operation or maintenance of the radio control equipment it is important that the installation, operating, and maintenance personnel read this bulletin carefully in order to ensure the safe and efficient use of the hoist or crane.

Also, it is strongly recommended that the personnel responsible for the operation, inspection, and servicing of the hoist or crane on which this radio controller is installed, read and follow the Safety Standard ANSI B30.16-1993 (or current revised edition) covering Overhead Hoists (underhung) as promulgated by the American National Standards Institute and published by the American Society of Mechanical Engineers. Copies of this publication are available from the Society at United Engineering Center, 345 East 47th St., New York, NY 10017.

If any instructions are unclear, contact the manufacturer or distributor of the radio controller before attempting to install or use the radio controller on a hoist or crane.



Note :

Electrical wiring diagrams have been packed with this manual to ensure installations without any problems.

If these items are missing, contact the manufacturer or distributor before attempting to install or use the radio control system to a machine.

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Radio Remote Control System

13.07.98

Table of Contents

1	Helpful Hints	4
2	Safety Regulations.....	5
2.1	Warning Notes	5
2.2	Safety Notes Regarding Operation.....	6
2.3	Safety Notes when Operating the Transmitter	6
	Safety Notes on the Charging Unit and the Battery.....	7
2.4	Safety Notes Regarding Maintenance.....	7
3	Description of the System	8
3.1	Application	8
3.2	Specification	8
	Dimensions and Operating Elements of the spectrum 1.....	9
	Dimensions and Operating Elements of the spectrum 2 / 5	9
	Dimensions and Operating Elements of the spectrum 3.....	10
3.3	Nameplate.....	10
4	Operation	11
	Transmitter Muting Function (APO).....	12
	Slewing Gear Release (on radio receivers FSE 735 / 740 / 760)	13
4.1	Special Operating Modes (Options)	13
	Scanner	13
	Infrakey	14
	Catch – Release (C/R)	15
	Tandem Operation.....	16
4.2	Battery Chargers	17
5	Maintenance	18
5.1	In Case of a Defect.....	18
6	Trouble-Shooting	19

1 Helpful Hints

Following symbols are used in the operating instructions at hand :

Warnings



This symbol will show situations that could be dangerous for people or machines.

Pay particular attention in reading the parts of this manual.
Be careful and try to avoid these situations.

Notes



This symbol will show important operating hints to guarantee a long working life to the apparatus.

Do not forget to observe these notes. The radio control could become unreliable.



This symbol will show general information.

Others



This symbol will show regulations, e.g. notes on local, regional and federal regulations on labor safety and accident prevention when operating a radio controlled system.



This symbol will identify the "Operation" section.



This symbol will give you helpful maintenance notes in the corresponding section.



This symbol will identify the trouble-shooting section.

In this section, possible troubles occurring when operating the radio remote control system, their causes and remedies will be given.



2 Safety Regulations

- ⇒ Strictly observe and always adhere to the respective regulations on labor safety and accident prevention when operating a radio controlled system !
- ⇒ Retrofitting of a radio control to a crane or machine is considered to be a major modification. The crane or machine must therefore be subject to an approval inspection. The user of the crane or machine is responsible for a proper entry of this inspection in the crane's or machine's inspection record.
- ⇒ The commissioning of the radio equipment is only possible if you dispose of a special authorization from the postal authorities.
- ⇒ Before using the radio control, it is necessary to be familiarized with this system ! Therefore, only authorized and sufficiently instructed personnel who are familiar with the instructions should be allowed to use the radio control.
- ⇒ In case of a defect, an emergency situation and whenever a malfunction occurs in the working area of the radio system, it is required that it be switched OFF immediately until the cause of the defect has been located and repaired !
 - Switch OFF the transmitter via the EMERGENCY-STOP push-button.
 - Disconnect the connecting cable from the receiver.
- ⇒ Have defective radio systems repaired only by an expert. Use only original replacement parts of the manufacturer for any repair.



2.1 Warning Notes

- ⇒ The crane operator is required to control the crane in such a way that no danger may possibly occur, even if the radio transmission is interrupted so that no counteraction is possible anymore (e.g. for the turning of slewing tower cranes). If necessary, stops limiting the slewing range may have to be installed on the slewing tower crane in order to ensure that the crane may not be moved into a hazardous area.
- ⇒ The remote control transmitter may be switched ON only as long as a visual contact exists with the machine.
- ⇒ The minimum duration of the command and the response time are slightly increased by the radio control (cf. specifications of the radio control system).
- ⇒ The radio control transmitter may only be connected to cranes suitable for the installation of a radio control system via the appropriate cable connections.



2.2 Safety Notes Regarding Operation

- ⇒ Before using the radio control system for the first time, read these operating instructions completely and carefully.
- ⇒ In case of a defect, an emergency situation and whenever a malfunction occurs in the working area of the radio system, it is required to de-energize the radio equipment immediately until the cause of the fault has been located and repaired !
 - Switch OFF the transmitter via the EMERGENCY-STOP push-button.
 - Disconnect the connecting cable from the receiver.
- ⇒ During breaks and at the end of work, disconnect the transmitter by means of the key switch or the EMERGENCY-STOP push-button and disconnect the receiver from mains supply.
- ⇒ Be cautious when working with the radio control. – When using the radio control, choose a stable location from which you can see the entire working area.
- ⇒ Usage of radio remote control systems outside of manufacturer's guidelines (section 3.1 : "Application") may result in invalidity of the guarantee.



2.3 Safety Notes when Operating the Transmitter

- ⇒ Before you start working, always verify the operation of the EMERGENCY-STOP push-button.
- ⇒ It is not allowed to leave a connected transmitter and not supervise it.
- ⇒ In case of an emergency and in case of all sorts of problems in the working range of the machinery or in case of a technical failure of the radio control, you must stop the crane or machine by pressing the EMERGENCY-STOP push-button !
- ⇒ During breaks, disconnect the transmitter by means of the key switch or the EMERGENCY-STOP push-button.
- ⇒ At the end of work, switch OFF the transmitter by means of the key switch, pull out the key and store it at a safe place.



Safety Notes on the Charging Unit and the Battery

- ⇒ Operate the charging unit at about room temperature and protect it against overheating (e.g. direct sun radiation).
- ⇒ Boost charging of NiCd batteries only in a temperature range between 50 °F and 104 °F (10 °C and 40 °C).
- ⇒ Protect the battery contacts against accidental shortening! – Use the protective caps delivered.
- ⇒ Do not store the batteries in a tool box or carry them loosely in your pocket. – A bunch of keys for example is enough to shorten the battery.
- ⇒ Pay attention to the correct polarity ! – After inserting the battery into the charging duct of the charging unit, the nameplate must be visible. Operation of the transmitter will not be possible otherwise !
- ⇒ The NiCd batteries are shipped from the factory uncharged and must be charged before use. It is normally necessary to remove the battery from the transmitter for charging processes.



2.4 Safety Notes Regarding Maintenance

- ⇒ Pay attention to smaller deficiencies. They are often the symptoms of a major defect and may result in severe malfunctions of the radio system.
- ⇒ Have defective radio systems repaired only by an expert. Use only original replacement parts of the manufacturer for any repair.

3 Description of the System

HBC-radiomatic®, *HBC-technos®* or *HBC-radiobus®* are radio systems to control cranes and hoists.

The system consists of a joystick transmitter with either two or three 2-step joysticks for three motions and a selector switch, one key switch and an EMERGENCY-STOP push-button, a battery charger with two rechargeable batteries and a receiver with an antenna. The transmitter housings (HSG 190 for spectrum 1, HSG 230 for spectrum 2 and spectrum 5, HSG 290 for spectrum 3) are made of ABS plastic with a built-in antenna each.

3.1 Application

The radio transmitter spectrum 1, spectrum 2 / 5, spectrum 3 enables – in combination with a corresponding receiver – control of cranes and other machines in construction and industry.

State of the art radio technology complying with the latest guidelines of the FCC and the use of highly developed microprocessor technology guarantees optimal operating safety, availability and longevity.

The radio transmitter spectrum 1 / 2 / 3 / 5 – suitable for construction, industry and mobile cranes – is equipped to control receivers with 16 up to 32 operating commands and work within a 30 cm or 70 cm frequency band.

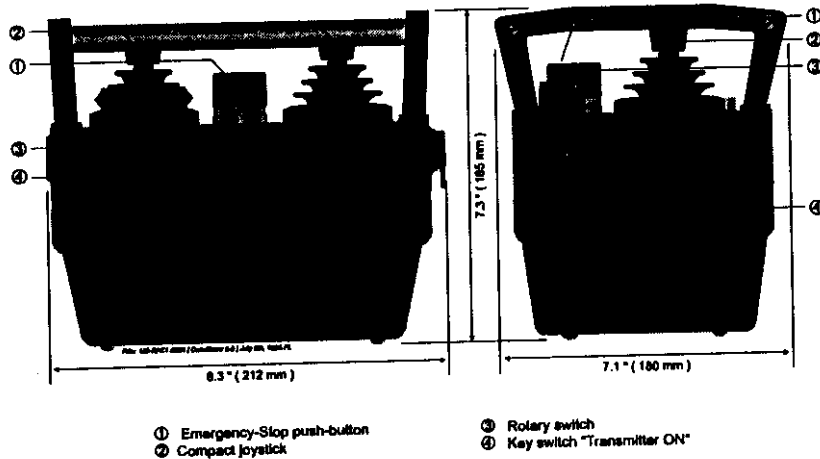
Following radio receivers can be controlled by this transmitter type :

FSE 716 FSE 722 FSE 730 FSE 735 FSE 740 FSE 760

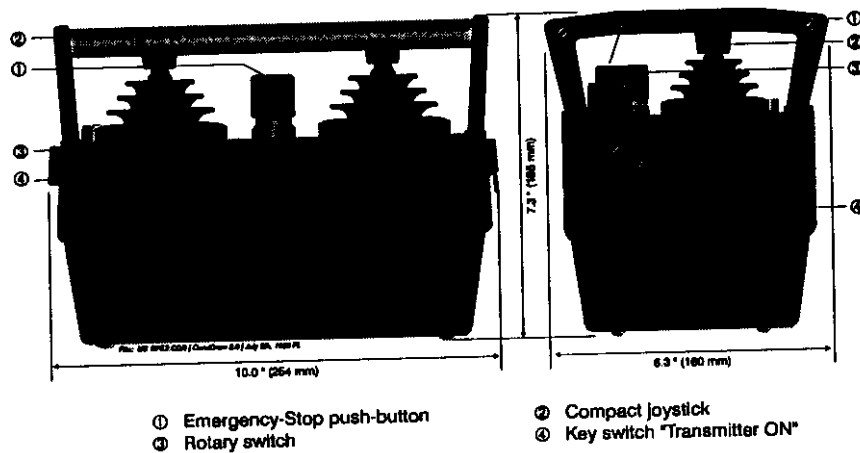
3.2 Specification

General Technical Data			
System	spectrum 1	spectrum 2 / 5	spectrum 3
Number of control commands	16	12 ... 16	12 ... 16
Exclusive system address	65,000	65,000	65,000
Special Technical Data			
Transmitting power (FuS 671/3)	10 mW (synthesizer)		
Power supply of NiCd battery	spectrum 1/2/3: 6 V DC / 1200 mAh spectrum 5: 6 V DC / 600 mAh		
Approx. Duration of operation	16 / 8 h (50 / 100 % ON)		
Approx. Weight of transmitter	4.4 lb (2 kg)	4.4 lb (2 kg)	6.6 lb (3 kg)
Operating temperature range	-13 °F ... +167 °F (-25 ... +75 °C)		
Protection class	IP 55		

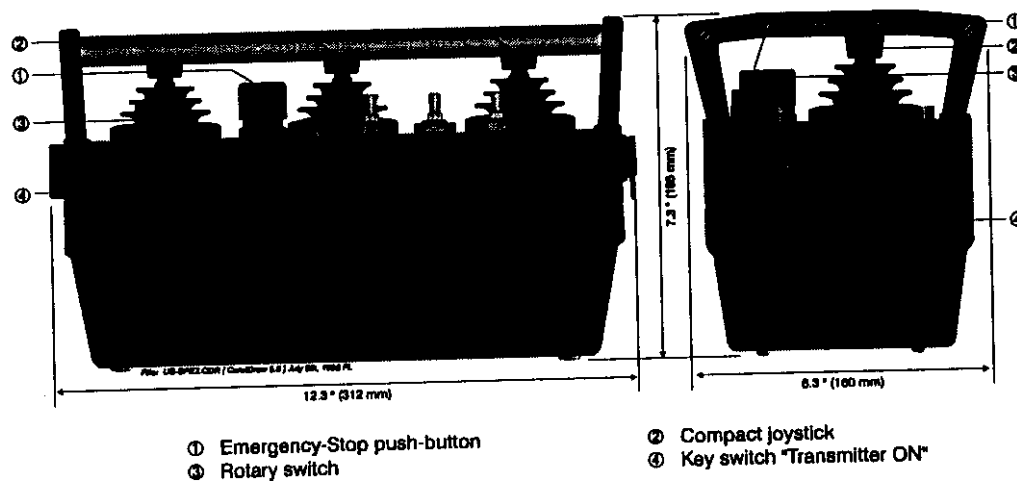
Dimensions and Operating Elements of the spectrum 1



Dimensions and Operating Elements of the spectrum 2 / 5



Dimensions and Operating Elements of the spectrum 3



3.3 Nameplate

The nameplate indicates all important data of the radio equipment. Besides the service voltage, radio frequency and the address of the system, this plate also indicates the production number which is necessary in case of possible further inquiries or spare part orders. It also contains the European control number for Homologation in the Telecommunication.



Note : Please make sure that the nameplate is always clearly visible to allow for a verification by the authorities.



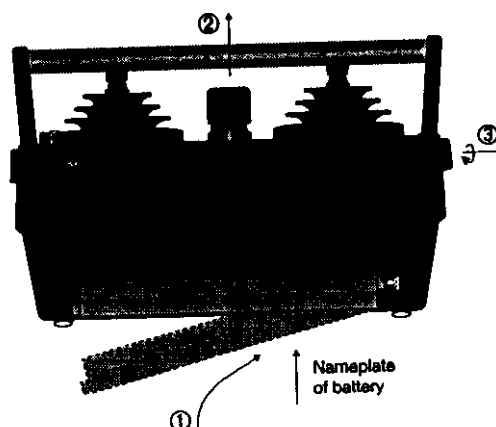
4 Operation



1. Before you start working, insert a charged battery into the battery compartment (item. ①). The battery supplies the voltage required for the operation of the transmitter (6 V DC).

Note : After inserting the battery, the nameplate must be visible.
Operation of the transmitter will not be possible otherwise !

2. Unlock the EMERGENCY-STOP push-button (item ②) by turning it.
3. Switch ON the radio transmitter via the key switch (item ③) Operating voltage is now present at the transmitter.



A radio connection to the receiver is established when the red LED "RF" on the receiver will be extinguished and the green LED "Si1" is illuminated, i.e. the radio system is ready to operate and the control commands may be input via the transmitter.

Fig. left shows radio transmitter spectrum 2 with battery type FuB 10 AA.

If the red LED on the transmitter (see transmitter layout) flashes and / or an acoustic signal comes, this indicates that the battery is almost fully discharged. Then proceed as follows :

- Replace the discharged battery by a charged one.
- Recharge the discharged battery (cf. "Battery Chargers").



Note : If the discharged battery is not replaced by a charged one, the transmitter will automatically be switched OFF after a few minutes.

Since switching OFF the transmitter when it is not used is quite often forgotten, it is equipped with an automatic deactivation (auto OFF function). The transmitter will thus be switched OFF automatically about 15 minutes after the last control command has been input.

The automatic transmitter deactivation offers a positive side effect : it helps to save the energy of the rechargeable batteries.

Transmitter Muting Function (APO)

The transmitter features an auto muting function (APO = Auto Power Off) for current saving reasons. Whenever the transmitter APO function is activated, the radio transmitter will automatically be switched OFF about 15 minutes after the last move command has been input.

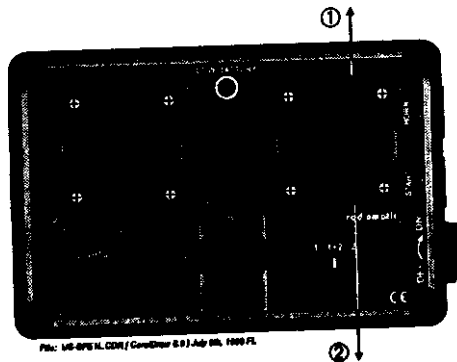


Fig. left shows radio transmitter spectrum 2.

The transmitter APO function is activated respectively deactivated via the right-hand compact joystick. The switch positions ① and ② (fig. above) have the following functions :

Deactivate the transmitter APO function (①)

1. Switch OFF the transmitter
2. Move the compact joystick forward to the first switch position (away from the operator)
3. Switch ON the transmitter
4. Release the compact joystick

Activate the transmitter APO function (②)

1. Switch OFF the transmitter via the key switch
2. Move the compact joystick backwards to the first switch position (towards the operator)
3. Switch ON the transmitter
4. Release the compact joystick

Reactivate the transmitter

For reactivating the transmitter, i.e. after the APO time has elapsed :

- either switch OFF and then ON again the transmitter
 - or depress the "crane ON" key (if so equipped)
- All standard-transmitter functions will then again be available.

Slewing Gear Release (on radio receivers FSE 735 / 740 / 760)

Whenever the command "slewing gear release" is actuated by means of the remote control, it is important that the respective check be made.
Due to the above, a clearly visible indicator lamp should be installed on the crane
– possibly a flashing one.

4.1 Special Operating Modes (Options)

Scanner

With the option (auto) scanner, the transmitter is equipped with 4 radio frequencies (refer to wiring diagrams).

If the radio channel used is currently occupied by another operator, another radio channel may be selected via a rotary switch. The (auto) scanner in the receiver will automatically follow the transmitter to the radio frequency selected.

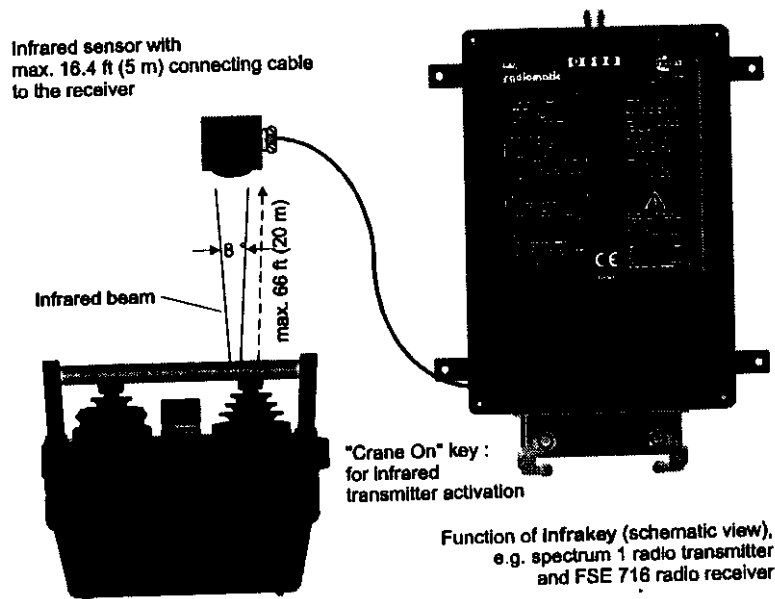
After switching ON the transmitter (key switch ON, EMERGENCY-STOP push-button unlocked) or after a frequency change during operation, it will last only a few seconds until the receiver has "followed" the transmitter to the frequency selected.

Changing the radio frequency :

- Set the new radio frequency by means of the rotary switch.
 - Switch OFF and then ON again the transmitter.
- After a few seconds, the receiver will be ready to receive.

Infrakey

Infrakey is an option that uses an infrared sensor to control the main contactor of the crane. The crane can only be started if the operator is in the field of the infrared sensor and not more than max. 66 feet (max. 20 meters) from the crane.



Infrakey uses an additional infrared module on both the transmitter and the receiver. Crane activation via infrared link it increases the safety of operation by preventing accidental starting.

The range of the infrared beam is max. max. 66 feet (max. 20 meters) and the angle of radiation is 8°.

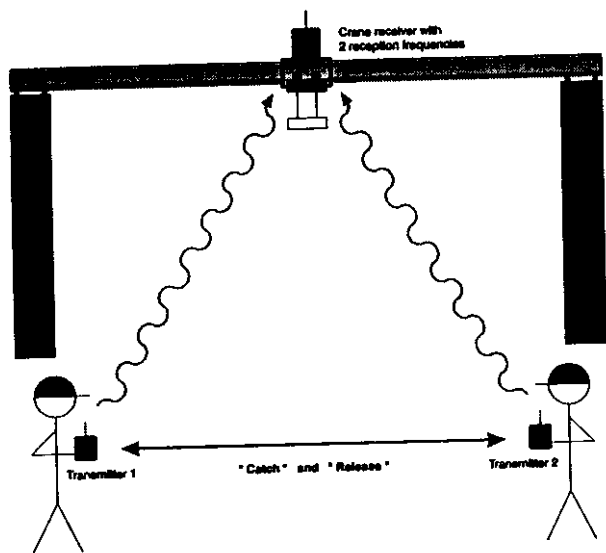
To activate infrakey, press the "Crane On" key on the transmitter. A green LED near the IR. sensor lights to indicate that the crane has received the start signal.

Catch – Release (C/R)

In the operating mode "catch – release" two or more crane operators may use one radio transmitter each to operate one and the same crane. The possibility also exists to couple multiple transmitters with multiple receivers.

The crane is equipped with a radio receiver which is capable of receiving and monitoring both radio frequencies.

After the crane receiver has been switched ON, both radio transmitters at first have equal access.



The first radio transmitter is switched ON in order to take over the crane and the command "catch" via a selector switch is input. After the own transmitter is switched OFF, the right of access will remain with the 'takeover' transmitter.

If the crane is to be handed over to the second radio transmitter, the command "release" must be input via the selector switch first and then the first transmitter switched OFF. The right of access of the first transmitter to the crane is thus canceled.

The second radio transmitter may now start to operate by inputting the command "catch" and control the crane. The right of access will now remain with the second transmitter until it is again transferred to the first by means of the "release" command.

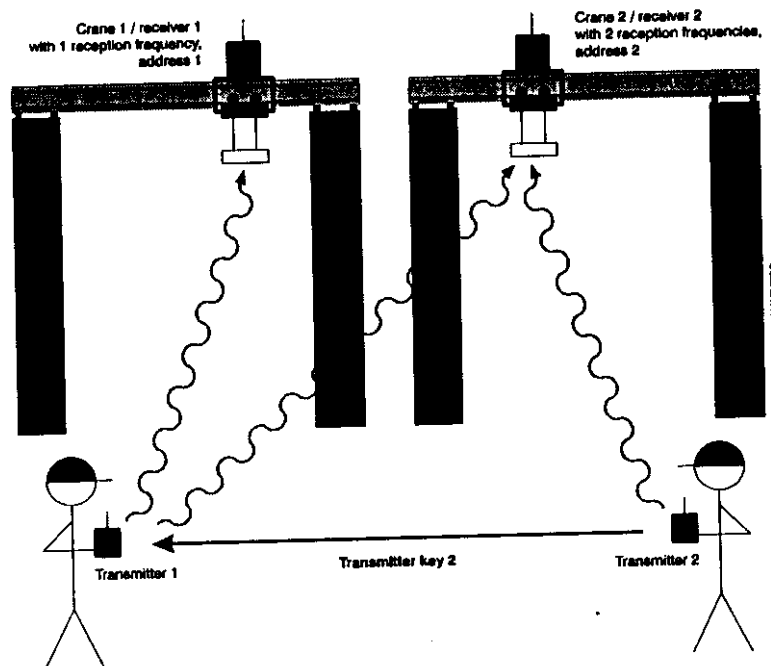


Note :

- In the event of voltage loss, the crane receiver will automatically go back to starting condition. The crane receiver is now able to respond to any transmitter, or the crane receiver has to receive the catch command again.
- If the operator forgets to input the command "release" and disables his own transmitter (or if the transmitter fails to operate due to a defect), then the second transmitter will have no right of access. It is required to switch OFF the receiver supply voltage in order to recreate the aforementioned start conditions.
- Due to the above, the commands "catch" and "release" should be assigned either to keys or a rotary switch. An indicator lamp on the crane furthermore shows when the receiver is occupied (occupied display).

Tandem Operation

Tandem option T1 allows two cranes to be operated in tandem (crane 1 or crane 2 or both) using only one transmitter.



Tandem option T2 includes two complete radio control sets for two cranes. Tandem operation is enabled using keys. If the key from transmitter 1 is inserted into transmitter 2, then transmitter 2 can control either crane, or both. Transmitter 1 is inactivate when its key is out. Similarly, the key from transmitter 2 can be inserted into transmitter 1 to allow transmitter 1 to have tandem control.

Tandem option T2 can also be set up so that one transmitter is a master and the other is a slave, only the master transmitter has tandem control.

4.2 Battery Chargers

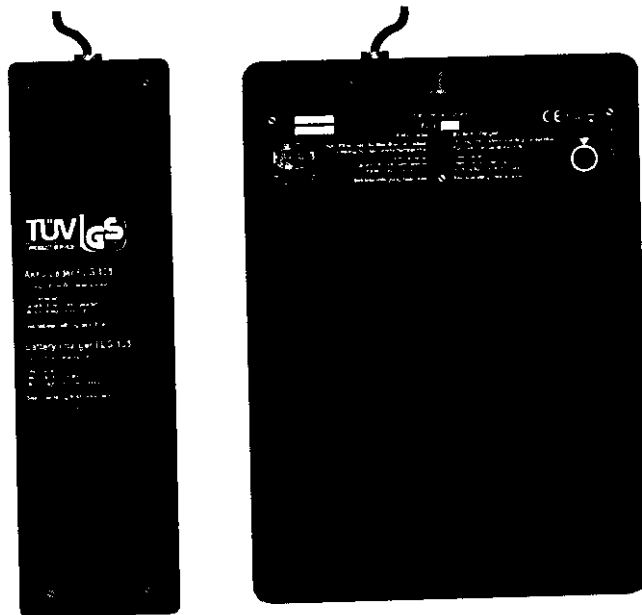


Fig. left shows battery charger, type FLG 105 that is suitable for one each of the battery types FuB 05 AA or FuB 3A (with adapter).

Fig. right shows battery charger, type FLG 102 which is suitable for two each of the battery types FuB 10 AA, FuB 05 AA and FuB 3A (with adapter) or mixed.

Charge battery

Insert (push) the battery into the battery compartment (item ②) : The red LED (item ①) is illuminated.



Note :

- Pay attention to the correct polarity !
- The nameplate of the battery must be visible after it has been inserted !

Display of the state of charge (red LED)

LED illuminated : The battery is being charged.

LED off or flashing : The battery is charged (ready for operation).

LED flashes when inserting the battery : The Battery is exhausted or defective.

Remarks :

- A discharged FuB 05 AA battery is fully charged after about 4 or 5 hours. Overcharging of the battery is prevented by the integrated electronic that will limit the charging process to a maximum of 5 hours.
- Boost charging of NiCd batteries only in a temperature range between 50 °F and 104 °F (+10 °C and +40 °C).
- Protect the battery contacts against accidental shortening ! Use the protective caps delivered.
- Do not store the batteries in a tool box or carry them loosely in your pockets. A bunch of keys is enough to shorten the battery.
- Operate the charging unit at about room temperature and protect it against overheating (e.g. direct sun radiation).



5 Maintenance

The radio system is largely maintenance-free. The following items should nevertheless be taken into account :

- ⇒ Make sure that the EMERGENCY-STOP push-button moves easily. Mortar residue and dirt may interfere with the operation of the switch or even render it impossible.
- ⇒ Inspect the rubber bellows of the compact joysticks regularly for leak-tightness. Replace immediately if cracks appear since the penetration of dirt and humidity may damage the function of the compact joysticks.
- ⇒ The batteries of the transmitter should be completely discharged and charged again on a regular basis.
- ⇒ Never "clean" the transmitter with a pressure or with a steam cleaner.



Note : Should any problems occur with the radio system contact your local dealer.

5.1 In Case of a Defect



Caution : It is not permissible to use a defective radio system !

- ⇒ Never try to carry out any repair on the electronic components of the radio system. This would result in a rejection of possible warranty claims.
 - It is recommended to have the unit sent to the manufacturer as fast as possible. The unit will then be in the hands of an expert, an expert who is familiar with the system and who has the required special replacement parts at his disposal.
 - Always send in the transmitter **and** receiver together and enclose a detailed description of the defect.
 - Do not forget to state your phone number in addition to your address. This will allow us to contact you directly, should we have any inquiries.
- ⇒ In order to prevent any transport damages from occurring, please use the specifically molded two-way packaging in which the unit was shipped to you from the factory or pack the unit in a way so that it is protected against shocks. Please send the unit to the following address, freight prepaid :

HBC-electronic Funktechnik GmbH
Haller Straße 49 - 53 • D-74564 Crailsheim
Postfach 1561 • D-74555 Crailsheim
Telephone : +49 (0) 79 51 - 3 93 - 0 • Fax : +49 (0) 79 51 - 3 93 - 50
Railroad station : D-74564 Crailsheim
- ⇒ Should you decide to personally return a defective radio system to the factory or to your local dealer, then please make an appointment first.



6 Trouble-Shooting



Note : Check the functions with the cabin or the cable control unit first !

Trouble	Possible Cause	Remedy
No reaction whenever the transmitter is switched ON.	No operating voltage present.	- Charge battery or insert a charged battery. - Check battery contacts for damage or contamination.
Undervoltage warning output already after a short period of operation	- Battery not charged or - Battery defective	- Charge battery fully. - Check if charging process is executed properly. - Check battery contacts. - Verify operation with a functional battery.