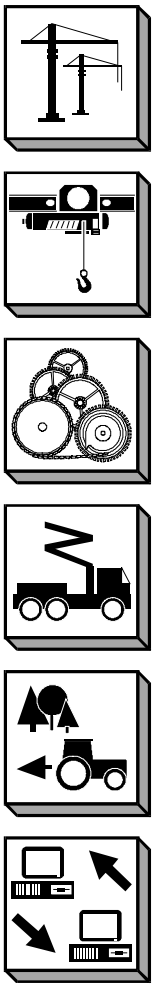
HBC – Radio Control

Radio Transmitter cubix



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1 Description

The cubix transmitter is designed to transmit command instructions for controlling industrial cranes, hoists and machines.

10 control commands plus the integrated STOP commands are available to the operator.

A non-interchangeable system address ensures the functional safety of the radio control system when operating cranes or machines. This feature is particularly important when several cranes or machines are in use, for example in halls and shops. The system address is exclusively allocated to each HBC radio transmitter and its respective receiver.
It is not possible to activate crane or machine functions using a radio control system allocated to another crane or machine.

The radio control system consists of the cubix transmitter an internal rechargeable NiMh batteries, a battery charging-power-supply and a receiver. The transmitter housing with integrated antenna is made of impact resistant plastic.

The transmitter is powered by rechargeable batteries, charged with a memory effect-free technology.

State of the art radio technology complying with the latest guidelines of the regulations on labor safety and the use of highly developed microprocessor technology guarantees optimal operating safety, availability and long life time.
The transmitter has general telecommunications approvals. It is not necessary to have or to apply for a license to operate the transmitter with the respective receiver. The transmitter must be operated in USA in the 902 MHz to 918 MHz range or 910 MHz to 928 MHz bandwidth. For Europe we offer the 869 bandwidth.
Operating the radio transmitter using a different frequency range or transmitting power requires the approval of the competent regulative authorities for telecommunication.

Note :

The improper use, operation or deployment of the device renders the manufacturer guarantee void of any legal substance !

2 Safety Instructions

2.1 Pictographs

The following pictographs will be used throughout the present operating instructions :

Indicates a possible shock hazard

Contacting components under voltage may lead to death. Housing (e.g. hoods and lids) marked with this symbol may only be opened by qualified electricians after having disconnected the device from the mains supply (supply voltage, operating voltage or input terminal voltage).

Indicates safety relevant passages

You will find this pictograph as an indicator for occupational safety measures. The neglecting of such measures poses a serious hazard.
Always observe the instructions and be particularly attentive and careful.
Avoid any situations that could at any time be a danger to persons or machines.

Indicates important information

This symbol brings your attention to important information on how to secure a long serviceable life of the radio control system.
Pay attention to the comments and instructions given. Ignoring the information provided may permanently impair the reliability and operability of the equipment.

2.2 General Safety Instructions

Radio controls facilitate and increase the operating efficiency of cranes and machines. Nevertheless, the operator must thoroughly understand and be in a position to properly use a radio control system !

- Read the operating instructions manual carefully and thoroughly before working with the transmitter for the first time !
- The operator undertakes to strictly adhere to the instructions and proceedings described in this manual, as well as to follow the general rules and regulations for worker safety and accident prevention. Ignoring any such instructions or regulations could pose a fatal threat to the operator or others.
- Keep this manual on location and readily available at all times !
- Only authorized and properly trained personnel may operate the transmitter.
- Anyone who is under the influence of drugs, alcohol or medication that has a detrimental effect on a person's reactions may at no time commission, operate, maintain or repair the transmitter.
- Before switching on the transmitter ensure that no-one is or can be endangered by the initiated operation.
- With the first signs of any malfunction related to the operative safety and reliability of the device the operator must immediately shut down or not activate the transmitter. For the purpose of the present manual "shut down" implies :
  - switching OFF the transmitter,
  - storing the transmitter in a safe place and ensuring no unauthorized access,
  - de-energizing the receiver,
  - unplugging the connection cable on the receiver !
- Defects must be repaired and sources of interference must be removed immediately !
- A defective transmitter may only be repaired by qualified and competent personnel. Use only original HBC-radiomatic spare parts. The use of any other spares will render the technical inspectorate approval invalid as well as substantially impede operative safety.
- Observe all periodical tests and inspections that are required by law or recommended in the present operating instructions !
- When using the cubix transmitter always observe the regulations and instructions stipulated in the authoritative worker safety and accident prevention regulations (VBG 9)
  - The cubix transmitter has been manufactured in accordance with the regulations and guidelines stipulated in the German Trade Association's "Safety and Accident Prevention Regulations for Operating Cranes by Radio Controls" (VBG 9; ZH 1/547) and pr EN 12077-1.
  - The cubix transmitter has been tested and approved in accordance with EMC guidelines and complies with the authoritative standards for emitted interference and interference immunity.
- Use the transmitter cautiously and properly, in particular when using a transmitter to radio control a machine or crane for the first time.

2.3 Operator Safety Instructions

- Before beginning crane operation, position yourself so that you have a clear and complete overview of the working radius of the crane or machine.
- To operate, hold the transmitter securely in your hand. Use the optional belt-clip. Follow these instructions to ensure personal safety.
- Depending on your angle or position to the crane or machine, the transmitter control commands “trolley left” and “trolley right” appear to interchange ! It is essential that you take your bearings to the crane or machine into due consideration before operating equipment.
- In case of an emergency or any disturbances within the working range of the crane or machine, switch the transmitter off immediately by pressing the STOP pushbutton. Should the transmitter show signs of technical failure or breakdown, disconnect the radio control system immediately !
- Switch the transmitter OFF during breaks and after finishing work to avoid any misoperation of crane or machine by unintended activation of the operator controls.
  - These precautions are particularly important whenever changing your position or climbing over an obstacle.
- Never leave an activated transmitter unattended. The operator undertakes to follow and comply with the authoritative regulations for worker safety and accident prevention (e.g. VBG 9).

Note :

- In the event of an interruption of the radio link during a working cycle – what can occasionally happen – both transmitter and receiver automatically shut down (so-called "**compulsory switch-off**").
  To reactivate the system release all operator controls, such as pushbuttons or momentary contacts, and allow the control elements to return to their zero position. Press the "Start" pushbutton. The system must be reactivated before the crane or machine can react to control commands! This feature hinders any uncontrolled or unwanted crane or machine movement, should the radio link be interrupted.

- When operating a crane by means of a radio control system for the first time, you may miss the physical contact to the crane that you were used to in the operating stand. As you are no longer in the crane and can no longer sense the starting of the crane movements as distinctly, crane reactions will appear sluggish or dull.

2.4 FCC-Regulatory Information

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada.

Operation is subject to the following two conditions:

1) this device may not cause harmful interference, and
2) this device must accept any interference received, including interference that may cause undesired operation

WARNING:

Changes or modifications made to this equipment not expressly approved by HBC-radiomatic GmbH may void the FCC authorization to operate this equipment.

RF EXPOSURE NOTICE:

The radiated output power of the cubix is far below the FCC radio frequency exposure limits. Nevertheless, the cubix shall be used in such a manner that the potential for human contact during normal operation is minimized.

3 Operation

Caution :

The operation of the transmitter is permissible only with the carrying set included with the transmitter (possibility of mixing up the operator controls) !

Switching ON the Transmitter

1. Before commissioning the transmitter or initial operation, be sure that the transmitter is fully charged. The battery supplies the necessary working voltage (3.6 V DC).
2. Press the START pushbutton to the 1st step (pos.ℵ) and release it.
3. Within the next 6 sec press the STOP pushbutton (pos. ℑ) to the 2nd step and release it too.
4. Follow by pressing again the START pushbutton (pos.ℵ) to the 1st step and release it.
5. The dual color LED (pos. ℜ) flashes **green** and a beep will appear, i.e. the transmitter is operable.

While activating the commands the green LED is flashing very fast (5 times per sec.). After releasing the pushbuttons and without giving any other command the LED will turn to flash slowly (1 time per sec.) for being in Energy-Safe-Mode. By pressing any pushbutton the command will be transmitted immediately, and the status of the green LED will turn to fast flashing.

Important Information :

After switching ON the transmitter **and** before operating the crane or machine you must always :

– trigger the acoustic signal by pressing the "Horn" pushbutton. This warns all colleagues that the crane or machine is about to move;
– test the operativeness of the STOP pushbutton.

A radio connection to the receiver is established when the red LED "HF/RF/H.F./HF" on the receiver will be extinguished and the green LED "Si1" is illuminated (see radio status panel of the receiver), i.e. the radio system is ready to operate and the control commands may be activated by the transmitter.

Status of the LED (pos. ℜ) while working / switching on:

The dual color LED flashes green: The transmitter is operable.

The dual color LED flashes red: Battery is on low voltage. Only one hour max. till the transmitter shuts down completely.

The dual color LED flashes red together with a beep:
Battery is almost discharged. In approx. 10 min The transmitter will shut down completely.

Should the operator – intentionally or unintentionally – switch OFF the transmitter with the STOP pushbutton, press only the START pushbutton again for further use of the radio control.

Switching OFF the transmitter

To switch off the transmitter completely follow these instructions:

- Press the STOP pushbutton (pos. ℑ) to the 1st step and hold it pressed.
- Press the START pushbutton to the 1st step as long the STOP pushbutton is pressed.
- Release both pushbuttons simultaneously
- The transmitter will switch off, confirmed by an acoustical signal.

Automatic Switch-OFF (APO Function)

For safety reasons we have equipped the transmitter with an automatic switch-OFF (APO = **A**utomatic **P**ower **O**ff function). The transmitter is automatically put out of circuit after 6 minutes of non-use. It also saves battery power.

Note :

The automatic switch-OFF (APO function) does not relieve the operator of his responsibility to turn OFF the transmitter when not in use !
The transmitter can be reactivate by means of the "START“ pushbutton.

3.1 Special Operating Modes

Release Transmitter (optional in case of a spare transmitter)
To release the control of the receiver by a transmitter press and hold the STOP-pushbutton while pressing the START-pushbutton. The transmitter will be shut down after releasing both pushbuttons. The LED of the transmitter is off.
Now the receiver can be controlled by an other cubix with the same system-datas !

Take over (optional in case of a spare transmitter)
To take over the control of the receiver switch ON the cubix. Therefore press the START-pushbutton to the 1st step, press the STOP-pushbutton within the next 6 seconds to the 2nd step, and then again the START-pushbutton to the 1st step.

Parking
To lock the pushbuttons while working provides uncontrolled usage of the crane / machine while working at the crane / machine. The pushbuttons are completely locked that means without any control of the receiver except the pushbutton HORN.

Activate Parking-Mode
- press the START pushbutton to the 1st step and hold it pressed for more than 2 seconds.
- Now the parking-mode is activated. (HORN keeps still functional !) and the green LED flashes twice a cycle.

Deactivate Parking-Mode
- Press the STOP-pushbutton to the 2nd step and release it
- Press now the STOP-pushbutton to the 1st step.
- Press the START-pushbutton to the 1st step.
- Parking-mode is now deactivated. Receiver can be controlled in normal manner.

3.2 Charging

3.2.1 Internal Battery

The cubix-transmitter is fitted with an internal NiMh-Battery (3.6V, 650 mAh). To charge the battery, connect the powersupply with the plug of the cubix transmitter (See picture 1, Pos ℵ).

Picture 1

The age and ambient temperature are decisive for the length of the battery applications. Older batteries lose capacity over time. Temperatures under zero also have a negative effect on battery charge.

The duration of serviceable battery life depends on how the battery is treated. When handled properly, it can exceed 500 charging cycles. Do not totally discharge or short-circuit contacts as this can permanently
destroy the battery.
We recommend recharging the battery only when it is empty,
i.e. when the LED flashes red.

Picture 2

3.2.2 Internal Battery Charger

The charging electronic is on board of the cubix transmitter. The charging status is indicated by the LED of the transmitter.

3.2.3 Charging the battery

1. Connect the power-supply with the supply-voltage (100-240V AC) with the help of the right adapter (See also chapter 3.3).
2. Connect the plug of the power-supply (picture 2, pos. ℑ) to the cubix charging-plug (picture 1, pos. ℵ)
3. The dual LED indicates the charging-mode with a constantly illuminated red LED.
4. The battery is fully charge when the LED is flashing red.

Status of the LED (pos. ℜ)while charging:

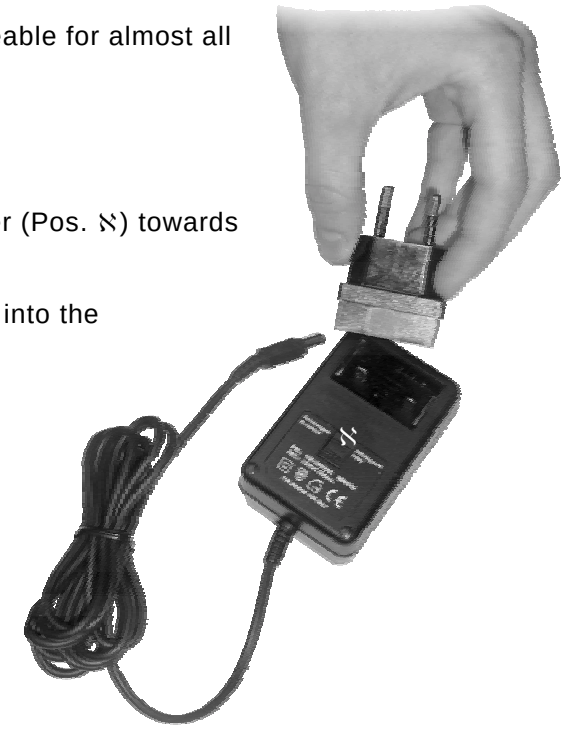
- The dual color LED illuminates red continuously after connecting the power-supply-plug:
  - Battery will be charged
- The dual color LED flashes red 2-times a cycle immediately after connecting the power-supply-plug:
  - Battery is in over- or under-temperature (to hot / to warm)! After getting the right temperature the charging-mode will be activated automatically and the LED will change to red (illuminated without flashing).
- The dual color LED flashes red 3-times a cycle:
  - Battery is defective ! Disconnect the power-supply from the cubix !

Note :

– A discharged battery recharges in approx. 1.5 hours.
– The charging of NiMh batteries should only take place at temperatures between 0 °C and +40 °C (32 °F and 104 °F).

3.3 Power-Supply

The connector of the power-supply is changeable for almost all kind of plugs.



Changing the plug

- Release the plug by moving the locker (Pos. ℵ) towards the cable outlet.
- Select the right plug
- Put it onto the power-supply. Press it into the compartment till it clicks.

Pay attention to the input voltage.
The Power-supply is designed for an input voltage of 100-240 V AC

The following additional plugs (Norm-adapters) can be used:

US plug

Australien plug

Euope plug

UK plug

4 Fault Correction

Note :

Please check the transmitter functions using the cabin or cable controls first !

Problem	Possible Cause	Remedy
The transmitter does not react when switched on.	– There is no power.	– Charge the transceiver – Exchange the transmitter.
Transmitter-LED flashes red 1-time a cycle	– The battery is not charged	– Recharge the internal battery by connecting the power supply
Transmitter-LED flashes red 2-times a cycle	– Battery is to hot or to cold	– Wait til the temperature is in between 0°C and 40°C (32°F and 104°F)
Transmitter-LED flashes red 3-times a cycle in combination with a beep (while charging)	– Battery is defective	– Disconnect the power-supply from the cubix
Transmitter-LED flashes green 3-times a cycle	– Keyboard (pushbuttons) are defective or moisture inside	– Contact your service-agent or HBC-radiomatic GmbH
	–	–

5 Maintenance

The radio control system is virtually maintenance-free. The following points, however, should be taken into consideration :

- Ensure that the STOP pushbutton works smoothly.
  Mortar residue and contaminants of any kind can reduce or fully block the switch function.
- **Never** use a high-pressure cleaner or steam jet cleaner to "clean" the transmitter.
  Use a soft brush or cloth only !

Note :

Should you have any problems with the radio control system, contact your local distributor or HBC-radiomatic GmbH.

5.1 In the Event of a Fault

Warning :

Never operate a crane or machine with a faulty or defective radio control system !

- Never try to repair the transmitter electronics ! Opening the transmitter housing terminates the manufacturer guarantee.
  - Send any defective or faulty equipment to you local distributor or to the manufacturer. They are experts and have the necessary know-how and OEM spare parts.
  - Always send both transmitter **and** receiver and enclose a detailed description of the problem.
  - Do not forget to enclose your address and telephone number so that we can get in touch with you quickly if necessary.

- To avoid damage during transport, use the original packing supplied with the transmitter and receiver, otherwise pack securely. Send the consignment to your distributor or to the following address :

  HBC-radiomatic GmbH
  Haller Strasse 49 – 53
  74564 Crailsheim
  Germany

- Should you chose to deliver a defective radio control system personally to your distributor or our factory, please call and arrange an appointment.

  HBC-radiomatic GmbH
  – Customer Services / Repair Service –
  Tel.: +49 (0) 79 51 – 3 93 - 800

6.1 Technical Data transmitter cubix

General Technical Data	
System	cubix
Number of control commands	10 + STOP
Unique system address	over 65.000 combinations
Internal Battery type	3,6 V DC; 650 mAh / NiMh
Charging time for internal battery	approx. 1,5 h
Battery life at 100 % duty cycle	approx. 16 h
Operating temperature range	–20 °C ... +55 °C
Housing material	impact resistant plastic
Housing color	orange or yellow
Housing dimensions	155 x 64 x 29 mm (6,1 x 2,5 x 1,15")
Weight	approx. 220g
Protection class	IP 44
RF Specific Technical Data (TC690)	
Transmitting frequency	902,125 MHz to 927,875 MHz
Channel separation	250 kHz
Transmitting power	92,9 dBµV/m
RF-sensitivity	better than –95dBm @ BER=10^{-3}
number of channels	103
Type of modulation	115KF1D
RF antenna	internal

6.2 Technical Data power-supply

Power-supply Specific Technical Data	
Type	ML 150P060F
Isolation	4 kV
Input voltage	100-240V AC / 50-60Hz / 170 mA
Output voltage	15V DC
Output current	530mA at 100V AC / 600mA at 240V AC
Operating temperature range	0°C ... +40°C (0°F ... +104°F)
Housing color	black
Housing dimensions	80 x 52 x 39 mm (3,15 x 2,05 x 1,54 ")
Weight	approx. 200g
Protection class	IP 20

6.1 Dimensions