



INSTALLATION MANUAL

Remotus Jupiter Era 4/6/8B, 10BD, Era 100

AQ80, TX50, MC110, RX161, RX110



Revision History

Version	Date	Reason
A0	2023-03-22	1 st released version (replaces the manuals 954045-000 & 954121-000)
A1	2023-08-18	Updated information in "8.1.7 Remote type", updated transmitter in "9.3 Multi-crane and Multi-operator Operation".

Reference

Program Option guide, RX161: 959125-100, RX110: 959125-101.

Multi-crane and Multi-operator operation, guide 959125-200.

RX161/110 Configuration Tool, manual 952576-000.

Operating manual: Era 100: 959125-300, Era 100 Configurable: 959125-301, Era 100 Customized: 959125-4xx. Era 4/6/8B/10BD: 959125-302.

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Scope

1 Introduction

Remotus is Åkerströms product family for radio remote control of safety critical industrial and mobile applications. Remotus Jupiter is Åkerströms' standardized industrial remote control product line.

The manual must be used when installing Åkerströms Remotus system to ensure a secure and safe operation. This manual only covers the installation of the Remotus radio remote control system. Remotus does not include a complete system for remote control: it has only a set of outputs that is controlled by the operator with the transmitter switches and joysticks. How the outputs are used to control the object (for example, a machine's movements and brakes) depend on the specific installation and is outside the scope of the Remotus system.

It is the responsibility of the Systems Integrator or Machine builder to safely incorporate the Remotus radio remote control into the complete system or machine. The System Integration has to be made by qualified personnel applying the appropriate standards for the system or machine including making the necessary safety investigations and risk analysis.

It should be noted that the information obtained from the controlled object is not processed by the Remotus receiver, but is used for informational purposes.

For the reasons stated above, the safety of Remotus covers mainly the status of the relay outputs, regardless of the object that is controlled by the relays.

The interface between Remotus and the controlled object should be a special interface that is not included in Remotus system and therefore is not included in this installation manual.

The approvals for Remotus refer only to the Remotus system not the complete system.

The complete radio control system must be tested and approved in accordance with applicable standards. It is not part of Åkerströms Björbos responsibility.

Type Model Symbols Receiver RX161 J-RX161 _ **RX110** J-RX110 _ Button transmitter AQ80 Jupiter Era 4B Jupiter Era 6B Nordic, DIN, CS, numbers or Jupiter Era 8B customized **TX50** Jupiter 10BD MC110 Jupiter Era 100 Nordic, DIN, CS or customized Joystick transmitter



Figure 1. Location of the Type Label

3 Use of warnings and notes in this manual

Read all safety instructions throughout this manual and on safety signs attached to this equipment.

Failure to follow all safety instructions could result in death or serious injury.

The safety alert symbol is used to alert about potential personal injury hazards. To avoid hazards, obey all safety messages that follow this symbol. Inform all personnel that are working with the product. The following safety alert symbols and signal words are used in this manual to inform the user of hazards.



Indicates a potentially risk of high voltage which, if not avoided, could result in death or serious injury or property damage.



Indicates a potentially hazardous situation which, if not avoided, could result in death or severe injury or property damage.



Indicates a condition which, if not avoided, could result in damage to or poor functionality of the product.

Electrostatic sensitive devices warning tells you about the risk of electrostatic discharge which can cause damage to the product.

4 Warnings regarding installation and maintenance work

This manual must be read and understood before installing and starting the radio remote control system to ensure safe and secure operation.

The installation and/or maintenance work must be carried out by a qualified and educated person in accordance with country installation rules and regulations. Only a correct installation can ensure the necessary level of safety during use.

The equipment can be supplied by different energy sources e.g., for the relay contacts or the regular power supply of the equipment!

Before starting ANY maintenance work ensure by using the external separators / fuses of the permanent installation, that **ALL terminal blocks are free from dangerous voltage!**

 $\overline{4}$ $\overline{4}$ caution double pole/neutral fusing



Risk of high noise level, hearing protection required

If a siren is mounted on the receiver unplug it before any maintenance action. Put it back when the maintenance is done.

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5 Specifications

General	
Operating frequency:	433-434 MHz
Power output:	< 10 mW
Baud rate:	9600 b/s
Transmission principle:	GFSK, TDMA
Channel Separation:	25 kHz
Functional sensitivity:	≤-107 dBm BER 10 ⁻³
The radio full-fills:	Directive RED 2014/53/EU
Reaction time on STOP function:	Maximum 550 ms
Safety category for the Stop function:	ISO 13849-1 Category 3 PL d

Receiver	RX161	RX110	
 Relay outputs: safety relays (NO) for movements change-over relays (NO/NC) normally open relays (NO) 	16 Relay outputs:6 (NO) safety4 (NO/NC)6 (NO)	 11 Relay outputs: 1 (NO) safety 4 (NO/NC) 6 (NO) 	
	Expansion board 16 Relay outputs: • 4 (NO/NC) • 12 (NO)		
Main contactor NO/NC safety relays:	 2 (NO/NC) safety 		
1 Digital output for horn (siren/signal):	12V		
1 Analogue input (RX161):	0 (4) -20 mA or 0(2)-10 V	-	
2 Digital inputs (RX161):	24/48 V AC/DC (Opto-isolated) or 115/230 V AC (Opto-isolated)	-	
1 Serial port (RX161):	RS422/RS485	-	
Input voltage:	24/48/115/230 V AC, power consu or 24 V DC 0.5 A. Shall be connec	mption less than 14 VA ted to SELV circuits.	
Dimensions:	277x217x115 mm		
Weight:	~ 1.6 kg		
Degree of protection:	IP67 (plastic enclosure)		
Operating temperature:	-25 °C – +55 °C		
Storage temperature:	-40 °C – +85 °C		

Transmitter	AQ80	TX50	MC110
Dimensions:	181x65x43 mm	243x77x41(49mmincl.quickstop)	260x165x150 mm
Weight:	265 g	450 g	~1.3 kg
Degree of protection:	IP67	IP65	IP67
Display, Graphic LCD:	128x64 pixels	102x64 pixels	128x64 pixels
Operating Temperature:	-20 °C – +55 °C	-20 °C – +55 °C	-20 °C - +50 °C
Battery specification:	3.7V 1.95Ah Li-Ion		
Battery life (depending on config.):	~ 32 hours	~ 12 hours	~ 17 hours
Operating Temperature for battery:	-20 °C – +55 °C		
Storage Temperature for battery:	-20 °C – +35 °C		
Charging Temperature for battery:	+10 °C – +35 °C NOTE! For chargin	g see charger documentation	

Table 1.Technical specifications

6 Functional Description

6.1 Design

The receiver consists of a MAIN board, antenna board (default, otherwise external antenna) and a radio module. The radio module is located on top of the MAIN board.

The MAIN board holds all logic components, relays, power supply and the connectors.

For RX161 there is a possibility to add an expansion board, see chapter 7.5 on page 15.

The enclosure is made of fire-resistant UL 94-5V plastic.

6.2 Functional Diagram

The Remotus Jupiter Era system uses a dual channel architecture in the receiver to achieve high degree of safety. For additional safety the receiver is equipped with eight (RX161)/three (RX110) safety relays whereof two safety relays are intended for safety stop. The other safety relay/s is used for crane movements and provides protection against unintended movements due to welded relay contacts (UMFS Category 3 PL d ISO 13849-1:2006).

The dual channel architecture in the receiver will significantly increase the safety of the crane system providing that the installation is carried out correctly. To achieve category 3 Pl d for the STOP function according to ISO 13849-1:2006 both safety stop outputs from the receiver shall be connected to two independent stop inputs on the crane (two safety stop channels).



Figure 2. Receiver functional safety description

7 Installation

The permanent installation of the receiver must include fuses to protect the equipment and wiring from over current and short circuit. In detail the power supply of the receiver and all relay contacts must be fused.

All fuses are used as disconnecting devices. The fuses shall be easily accessible, must submit a contact-gap of at least 3.0 mm and have to be placed in the line pole (L). NOTE! The neutral line fuse on the PCBA is NOT sufficient as a disconnecting device. After removal of the fuse, parts of the equipment will remain energized and might represent a hazard during servicing.

7.1 Mechanical installation

Note! Make sure to install any optional accessories inside and/or on the receiver enclosure before mounting the receiver on the crane. Refer to each accessory kit for assembly instructions.



Figure 3. Mount receiver

When drilling the hole for the cable gland, make sure not to damage the printed circuit board or the transformer inside. Place some protection inside the enclosure to stop the drill from damaging the interior.





7.2 Connections and switches on the MAIN board

Figure 4. Connections and switches on the MAIN board

RX161/RX110:

- 1. Rotary switch, SW1
- 2. Rotary switch, SW2
- 3. Dipswitch, SW3
- 4. Pairing button
- 5. Horn (siren)
- 6. DC supply 24 V DC
- 7. Connection for radio module
- 8. MC2
- 9. MC1
- 10.AC supply
- 11. Support for cabling

Only for RX161:

- 12.Digital input 0
- 13.Digital input 1
- 14.RS422/485
- 15.Analogue in
- 16.Connection expansion board

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7.3 Cable installation



If the receiver and/or receiver terminals are connected to more than one line phase the voltage between any connector must NOT exceed 250 V. If voltage of one phase is 230 V AC the corresponding three phase voltage is 380 V AC and thus NOT allowed.



Max loading by relay may not be over 1 A.

Current loops containing relay contacts SHALL therefore have a protection fuse not higher rated than 6 A.

A protection fuse for the receiver main supply shall be rated 6 A.



Do not mix SELV and NON SELV signals in the same cable.



After the installation of the equipment, the installed cables must be bound together in pairs (e.g., by using a cable tie) very close to the terminal blocks (see Figure 5). This is important if a cable become loose. The cable should not be able to end up in an unsuitable location of the receiver.

Fasten with a torque of 0.4-0.5 Nm.



Figure 5. Installation of cables

Cabling





Figure 6. Relay symbol explanation

7.3.1 Functional diagram / Program Option

The receiver functional diagram shows how to connect the equipment, in this manual the functional diagram is written as different program options, see appendix RX161: 959125-100, RX110: 959125-101.

7.3.1.1 Cable drawing / functional diagram

If you have bought a cable, there is a diagram for that cable and a specific program option. See documentation supplied with the cable.

7.3.2 Principle connection of the Main contactors

The radio remote control system is, for the safety stop function, designed for category 3 Pl d according to ISO 13849-1:2006. To achieve this safety level for the object (crane) both safety stop outputs MC1 and MC2 shall be used as two separate independent outputs (two safety channels). This means that there must be two main contactors on the machine. See the connection example below.



Figure 7. Connection with the two main contactors in parallel, category 3

If category 3 is not desired, the two safety stop outputs MC1 and MC2 shall be used connected in series. See the connection example below. The maximum level of safety for the safety stop function in this case will be category 1.



7.3.3 AC supply Carefully check the power supply voltage level.

7.3.4 DC supply

The connection cable for the DC supply shall be routed through its own cable gland.



 Δ Do not mix with NON SELV signals.

7.3.5 Digital inputs, RX161

Carefully check the signal voltage level. Terminal marked 24/48V: 24/48V AC or DC Terminal marked 115/230V: 115/230 VAC

These two signals appear as symbols on the transmitter display.

7.3.6 Analogue input, RX161

This signal may be used for weight information from a scale, shown on the transmitter's display. See section 11.2.3.



7.3.7 RS422/485, RX161

This signal may be used for weight information from a scale, shown on the transmitter's display. See section 11.2.3.



 Δ Do not mix with NON SELV signals.

7.3.8 Connection cable

The cable cross-sectional area shall be at least 0.75 mm^2 and with an outer insulation diameter of 10-16 mm.











7.4 Antenna placement

The antenna is by default placed internally in Jupiter receiver, see figure below.



- 1. Antenna board
- 2. Antenna connector

Figure 9. Internal antenna

7.4.1 In case of external antenna placement

When mounting the antenna separately it must be placed as open (in free air) as possible preferably below the crane beam.

A covered antenna contributes to a considerably less effective radio reception. An antenna can not be mounted in a cabinet.



Recommended placement

Figure 10. Recommended and wrong placement of the antenna

The antenna must never come into contact with metal parts.

If the antenna is installed outdoors, there is a risk of dangerous voltages entering the antenna cable. To minimize this risk a DC block shall be used. DC blocks are coaxial components that prevent the flow of low and direct current (DC) frequencies while offering minimum interference to RF signals. Suitable models have capacitors in series with both the inner and outer conductors.

Åkerströms can provide one suitable DC block 944498-000.

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7.5 Expansion board for RX161

Number of relay outputs: 12 normally open (NO) and 4 normally open/normally closed (NO/NC).

7.5.1 Installation

7.5.1.1 Connections and indications

In front of every relay there is a LED indicating an active relay.



Figure 11. Connection, relays, and LEDs on the expansion board

7.5.1.2 Mechanical installation

The expansion board is fastened to the MAIN board with 5 screws.

When remounting the expansion board use a torque of 1 Nm. Connect the expansion board to the MAIN board.



Figure 12. Screws holding the expansion board

7.5.1.3 Cable installation

See section "7.3 Cable installation" on page 11. Normally the expansion board is connected upon delivery. But if the expansion board needs to be connected to the relays, see the appendix for Program Option. For connecting the expansion board to the MAIN board see Figure 11 and Figure 4.



Max loading by relay may not be over 0.5 A (1 A for MAIN board).

8 Transmitter configuration mode

8.1 Configuration Era 4/6/8B, 10BD

Enter configuration menu

Press the button on the bottom right (2nd step) while pulling up the safety stop button. Hold down the button 3 seconds until the status indicator glows yellow showing that the transmitter is in configuration mode.

Submenu

Browse submenu with the top buttons. Choose submenu with the button on the bottom right. To return to the main menu while you are in a submenu, press the button on the bottom left.

Submenus:

- "Shutdown"
- "PIN-code"
- "Frequency"
- "433 MHz"
- "Button function"
- "Radio comm power"
- "Remote type"
- "Heavy weight PIN-code"
- "System info"

Exit/Save

Finish by turning the transmitter off by pushing the safety stop button down. This also saves the changes that have been made.

8.1.1 Shutdown Time of the Transmitter

The transmitter shuts down automatically if not used for a certain amount of time. This time can be adjusted in the transmitter configuration menu.

- 1. Enter the configuration menu.
- 2. Then select "Shutdown"; with bottom right button (browse with top buttons).
- 3. Then browse the desired shutdown time with top buttons:
 - "2 minutes"
 - "5 minutes"
 - "15 minutes"
 - "no shutdown"

Already selected shutdown time is indicated by top left button LED.

- 4. Select shutdown time by press down bottom right button.
- 5. Automatic return to the main menu or restart the transmitter.



Enter config menu









Shutdown time



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The transmitter is equipped with a user configurable PIN-lock to prevent unauthorized access to the system. The PIN-lock is disabled by default.

- 1. Enter the configuration menu.
- 2. Then select "PIN-code"; with bottom right button (browse with top buttons).
- 3. Enter PIN:

For **enable** enter the factory setting 3333 and for **disable** enter the old PIN-code. Press top left button repeatedly to select number and bottom right button to choose the number. Delete a number with top right.

- 4. Enter new PIN: Enter the new 4-digit PIN. For enable enter the new PIN (not 3333) and for disable enter the factory setting 3333.
- 5. Repeat PIN: Repeat the PIN code.
- 6. Automatic return to the main menu or restart the transmitter.





8.1.2.1 Entering PIN-code at start-up

When PIN is enabled, the transmitter will not start to transmit before the correct PIN-code is entered. If the transmitter is PIN locked at startup status indicator shows red continuous light. Display will show "Enter PIN".

Enter the 4-digit PIN-code by pressing top left button repeatedly to select number and bottom right button to choose the number. Delete a number with top right button. When all 4-digit are selected, press bottom right button once again to select the PIN code.

At successful login the status indicator shows green flashing. Display shows "PIN OK!". The unit is now in operating mode.

8.1.3 Radio Frequency Setting in the Transmitter

Note before setting the frequency channel set the region "EU" or "Other" first. If there is a change between "EU" or "Other" in the settings, the frequency channel must be set again!

If multiple systems are used on the same site, careful frequency planning is recommended.

To change the settings, do the following:

- 1. Enter the configuration menu.
- 2. Then select "Frequency"; with bottom right button (browse with top buttons).
- 3. Then browse to the desired setting with top buttons:
 - "Channel 0-XX"

Already selected setting is shown when entering the frequency setting menu.

- 4. Select setting by press down bottom right button.
- 5. Automatic return to the main menu or restart the transmitter.



Channel: Sets a specific channel. See "8.1.4.1 Fixed frequency" on page 19.

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8.1.4 433 MHz

In frequency band 400 there is an opportunity to select region.

- 1. Enter the configuration menu.
- 2. Then select "433 MHz"; with bottom right button (browse with top buttons).
- 3. Then browse to the desired setting with top buttons:
 - "EU" 30 channel
 - "Other" 60 channel

Already selected setting is indicated by top left button LED.

- 4. Select setting by press down bottom right button.
- 5. Automatic return to the main menu or restart the transmitter.
- Note. If the equipment is being operated in EU-region the 433MHz setting must be set to EU mode to fulfill EU radio regulations! See "Appendix 1 - European Radio Regulation" on page 42.
- For 433MHz setting "Other": Make sure to fulfill any rules or regulations or any applicable local, state, or federal governing laws.
- Make sure that correct choice of "EU" or "Other" is set in both the transmitter and the receiver. For the receiver refer to Configuration Tool (manual 952576-000). Default setting is "EU".



8.1.4.1 Fixed frequency

Channel no	434MHz EU	433-434MHz Other	
0	434,05	433,3	1
1	434,075	433,325	1
2	434,1	433,35	1
3	434,125	433,375	1
4	434.15	433.4	Not
5	434,175	433,425	ope
6	434,2	433,45	ting
7	434.225	433.475	for
8	434,25	433,5	See
9	434,275	433,525	Reg
10	434.3	433.55	
11	434.325	433.575	· For
12	434,35	433,6	sur
13	434.375	433.625	reg
14	434.4	433.65	
15	434.425	433.675	ing
16	434,45	433,7	1
17	434,475	433.725	
18	434.5	433.75	
19	434.525	433.775	1
20	434.55	433.8	
21	434.575	433.825	
22	434.6	433.85	
23	434.625	433.875	
24	434.65	433.9	1
25	434.675	433.925	
26	434.7	433.95	-
27	434.725	433.975	
28	434.75	434	1
29	434,775	434.025	
30		434.05	1
31		434.075	
32		434.1	
33		434,125	
34		434.15	1
35		434.175	
36		434,2	1
37		434.225	
38		434.25	1
39		434,275	
40		434.3	
41		434,325	
42		434.35	1
43		434,375	
44		434,4	1
45		434.425	1
46		434.45	1
47		434.475	
48		434.5	1
49		434,525	
50		434.55	1
51		434,575	1
52		434,6	1
53		434,625	1
54		434,65	1
55		434,675	1
56		434,7	1
57		434,725	1
58		434.75	1
59		434,775	Tahla O
			1 aut Z.

- Note. If the equipment is being operated in EU-region this setting must be set to 434MHz EU for correct fulfill the regulation! See "Appendix 1 - European Radio Regulation" on page 42.
- For 433-434 MHz Other make sure to fulfill any rules or regulations or any applicable local, state, or federal governing laws.

2. Fixed frequency list

20 (44)

8.1.5 Adjustment of the Push Buttons Remaining and Momentary Functions

The buttons either have momentary functions, which give a signal for only as long as you keep pressing, or remaining functions.



Note that this function needs support from the receiver PLC. Before changing these parameters, check the program options. Only qualified personnel may make these changes.

- 1. Enter the configuration menu.
- 2. Then select "Button function" with bottom right button (browse with top buttons).
- 3. Press down the buttons for which you want to have a remaining/momentary function. Lighted button LED indicates remaining function. **Note:** The three pair of buttons 1-2, 3-4 and 5-6 must have the same settings within the pair. For 10BD must also buttons 7-8 have the same settings within the pair. Otherwise, the momentary function is disabled on the button that is not remaining.
- 4. Restart the transmitter.

8.1.6 Radio communication power

To change the settings, do the following:

- 1. Enter the configuration menu.
- 2. Then select "Radio comm power"; with bottom right button (browse with top buttons).
- 3. Then browse to the desired setting with top buttons:
 - "100 % power"
 - "25 % power"

Already selected setting is indicated by top left button LED.

- 4. Select setting by press down bottom right button.
- 5. Automatic return to the main menu or restart the transmitter.



8.1.7 Remote type

NOTE! The functionality of the transmitter is depending on this setting. This setting also alters the placement and symbols on the transmitter, see section 14.1.

DIN DIN standards, different from the rest when it comes to relay outputs and buttons, see the program selection		
The Jupiter Era 8B transmitter can be set to 8/9 or 10 Buttons. For 9 an 10 more functions can be admitted with a SHIFT-function (B8 2 nd step)		
8 Buttons Era 8B standard		
9 Buttons Era 8B standard + selection of 1&2 and A&B function		
10 Buttons	Era 8B standard + selection of 1&2 functions	

To change the settings, do the following:

- 1. Enter the configuration menu.
- 2. Then select "Remote type"; with bottom right button (browse with top buttons).
- 3. Enter PIN-code (see the box to the right). Press top left button repeatedly to select number and bottom right button to choose the number. Delete a number with top right button.
- 4. Then browse to the desired setting with top buttons:

Era 8B	Era 4B/6B, 10BD	
• "8 BUTTONS"	 "Nordic/CS layout" 	
• "9 BUTTONS"	"DIN layout"	
• "10 BUTTONS"		
• "8 BUTTONS DIN"		
• "9 BUTTONS DIN"		
• "10 BUTTONS DIN"		

Already selected setting is indicated by top left button LED.

- 5. Select setting by press down bottom right button.
- 6. Automatic return to the main menu or restart the transmitter.



before them 0XXXX.

8.1.8 Heavy weight PIN code

The transmitter is equipped with a user configurable heavy weight PIN-lock to prevent unauthorized access to heavy weight lift. The heavy weight PIN-code is disabled by default.

NOTE! The program needs to have a function X.

Following program has support for Heavy weight PIN code: 1, 2, 3, 4, 5, 6, 9, A, B, D, E, 10, 12.

Enable Heavy weight PIN code:

- 1. Enter the configuration menu.
- 2. Then select "Heavy weight PIN code"; with bottom right button (browse with top buttons).
- 3. Enter PIN: Enter the four last numbers of the CIM ID.
- 4. Enter new PIN: Enter the new 4-digit PIN (not same as the four last in CIM ID).
- 5. Repeat PIN: Repeat the PIN-code.
- 6. Automatic return to the main menu or restart the transmitter.

Disable Heavy weight PIN code:

- 1. Enter the configuration menu.
- 2. Then select "Heavy weight PIN code" with B8 (browse with B1 and B2).
- 3. Enter PIN: Enter the old PIN-code.
- 4. Enter new PIN: Enter the four last number of the CIM ID.
- 5. Repeat PIN: Repeat the PIN-code (four last number of the CIM ID).
- 6. Automatic return to the main menu or restart the transmitter.

8.1.8.1 Enter and activate heavy weight PIN during operation

When heavy weight PIN is enabled, the system will not lift heavy weight (over 5-ton) before the correct heavy weight PIN code is entered.

- 1. Press and hold down the bottom left button (step 2) for more than 3 seconds. This will activate the heavy weight PIN-code entry mode.
- 2. Enter the 4-digit heavy weight PIN-code by pressing top left button repeatedly to select number and bottom right to choose the number. Delete a number with top right button.
- 3. After the four digits have been entered the transmitter returns to normal operation mode. If the correct 4-digit PIN code is entered, bottom left button LED will light and the remaining function for bottom left button will continue to be active (heavy weight activated).

8.1.8.2 Deactivate heavy weight during operation

Press and hold down the bottom left button (step 2) for more than 3 seconds until bottom left button LED goes out.

8.1.9 System info

Shows firmware version for the CIM card, ID number and transmission packet rate. Press any of the two bottom buttons for exit this menu.





PIN-code (CIM ID):
Go to system info (see 8.1.9).
ID=XXXXX:YY Z/Z take the
four last numbers (X). This is
the PIN-code.

8.2 Configuration Era 100



8.2.1 Enter Configuration menu

There are two levels of access to the configuration menu, one for users and one advanced. For users only the first page in the advanced menu is available, also the advanced menu is PIN locked.

Enter User configuration menu:					
When the transmitter is started press and hold down the enter button (+), approx. 2 seconds.					
Enter Advanced configuration menu:					
When the transmitter is started press and hold down the enter button 🗂 and the scroll/tab button 🕏, approx. 2 seconds.					
Enter the 4-digit PIN Code (default PIN Code is 0000). Tab between the numbers 0-9 with $\textcircled{\bullet}$ and select a number with $\textcircled{\bullet}$.					
If the incorrect PIN is entered the configuration menu closes and a new entering is necessary.					

8.2.2 Menu navigation (advanced configuration)

When entering the configuration menu, the first page is displayed, and the next page arrow is highlighted. For next page press enter 🗭 and for editing on that page press tab 🗘 now the top row is highlighted keep pressing tab 🎝 to the row that you want to edit then press enter 🗭. To toggle between the choices in a row press tab 🎝 and for selection press enter 🗭. After the last row the exit button is highlighted press enter 🕶 if you want to exit the configuration menu or press tab 🎝 once more to the next page arrow and press enter 📻.



8.2.3 Menu pages

8.2.3.1 User configuration (page 1)

User Confi	Choices				Description	
Auto-off	2 min	5 min	15 min	Off		Power save On - Automatically reduces
Power save	Off	On		·		brightness to 25% after 10 seconds off
Brightness	25 %	50 %	75 %	100%	Off	inactivity.
LCD contrast	6	0-20				
Digit size	Small	Large				
Exit	\rightarrow					

8.2.3.2 Alarm & indications (page 2)

Alarm Conf	ig. (2/4)	Choices				Description
Dig.In 1	Off	Buzzer P	Buzz. CP	Vibr. P	Vibr. CP	Buzz. = Buzzer
Dig.In 2	Off	Buzzer P	Buzz. CP	Vibr. P	Vibr. CP	Vibr. = Vibration
Dig.ln 1+2	Off	Buzz. CP	Vibr. CP	Red LCD		P = Pulse
Limit	Off	Buzz. CP	Vibr. CP	Red LCD		CP = Continuous Puise
Low Bat	Buzzer P	Buzz. CP	Off			
Exit	\rightarrow					

8.2.3.3 Radio configuration (page 3)

Note before setting the frequency channel set the region "EU" or "Other" first. If there is a change between "EU" or "Other" in the settings, the frequency channel has to be set again!

Radio Config. (3/4)		Choices		Description
Freq. mode	Fixed			
Channel	0	0-29 (EU), 0-59	(Other)	Channel; see "Table 2. Fixed frequency list" on page 19
TX Power	100%	25%		
Pairing	Enable	Disabled		Pairing - Disable pairing function
Region	EU	Other		
Exit	\rightarrow			

8.2.3.4 Choices in menu page 4 (page 4)

Misc Config	g. (4/4)	Choices		es	Description
Tilt (deg)	Off	45° 90° 135°		135°	Tilt angle to disable movements
PIN (admin)	0000				PIN code necessary to enter the advanced configuration menu.
PIN (user)	0000				PIN code necessary to start the transmitter (default 0000-no PIN code).
Service mode	****				Only for Åkerströms Björbo AB
Exit	\rightarrow				

8.2.4 Exit / Save

When the exit button is highlighted press enter 🕶 to exit the configuration menu. There is also an automatically exit from the configuration menu after 10 seconds of inactivity.

9 Commissioning

9.1 Frequency setting

Fixed frequency channel set by the user. It's only in the transmitter the frequency needs to be set, for Era 4/6/8B/10BD see section 8.1.3 on page 17 and for Era 100 see section "8.2.3.3 Radio configuration (page 3)" on page 24.

Note that 433MHz region "EU" or "Other" is set in both the transmitter and the receiver. Default setting is "EU".

- For the receiver refer to Configuration Tool (manual 952576-000).
- For transmitter Era 4/6/8B, 10BD see section 8.1.4 on page 18. For transmitter Era 100 see section "8.2.3.3 Radio configuration (page 3)" on page 24.

9.1.1 Indication of radio channel quality in Receiver

By watching the indications "Squelch" (LED 4) and "Message received" (LED 3) it is possible to diagnose the quality of the radio channel (see section 11.1 on page 30).

- Every time a message is received the indication "Squelch" lit. The messages are sent at a constant rate. The indication "Squelch" shall lit at this rate. If this isn't the case the selected channel might be occupied by some other radio equipment.
- If the message is accepted by the receiver, indication "Message received" will lit.

If the indication "Message received" does not lit at the same rate as the indication "Squelch" the messages on one or more frequencies are disturbed or distorted.

9.2 Program Selection

There are two rotary switches for program selection in the receiver, rotary switch SW1 and SW2. For position on the main board see Figure 4 on page 10. For information about the different program option, relay contacts and how to select program see appendix RX161: 959125-100, RX110: 959125-101.

9.3 Multi-crane and Multi-operator Operation

Only for Era 100 (model 150, Era 100 Configurable/Customized if applicable), Era 8B set to 9 or 10 Buttons (see section 8.1.7) and 10BD.

Multi-crane Operation

Multi-crane operation means that two cranes can be operated from the same transmitter, which makes it easier, for example to lift two objects simultaneously or a big object using two cranes.

A data link is needed between the two cranes. This link shall fulfil at least EN ISO 13849-1:2008 Performance Level c and category 2.

Multi-operator Operation

Multi-operator operation means that two transmitters can operate the same object. This can be beneficial, for example, when the view is blocked. The control of the object can be passed between two transmitters. Active crane selection and deselection guarantees that only one transmitter is in control of the object at a time.

Pairing Multi-crane and Multi-operator Operation

See appendix 959125-200.

9.4 Pairing of transmitter and receiver

- Set the region ("EU" or "Other") and frequency channel before pairing! If multiple systems are used on the same site, careful frequency planning is recommended.
- Note! For pairing multi-crane/multi-operator operation see appendix 959125-200.

9.4.1 Pairing indications

Mode	Event	LED indication Receiver	Flash rate	Pairing button	<u>LED 6 LED 5</u>
Pairing	In pairing mode	LED 6 fast	50/50 ms		
		LED 5 steady			
	Paired	LED 5 steady			

Table 3.	Receiver	pairing	indication
----------	----------	---------	------------

Mode	Event	Status indicator transmitter	Flash rate
In pairing mode	Not paired	Green/yellow	50/50 ms
	Paired	Steady green	

Table 4.Transmitter pairing indication

Pairing:	Pairing ready:	Link timeout:	
Pairing Info	Pairing Info	Pairing Info	
Pairing!	Pairing ready!	Pairing failed!	
	Restart system	Restart system	

Table 5. Transmitter display pairing indication

9.4.2 Pairing single system

- 1. Open the lid on the receiver. Power ON the receiver.
- 2. Press the pairing button in the receiver.
- Set the transmitter in pairing mode.
 Era4/6/8B, 10BD: Hold down bottom buttons when starting the transmitter. Continue to press the buttons for ≈ 5 seconds.
 Era100: Hold out one of the transmitter joysticks and start the transmitter. Keep holding the joystick out and press | /□□ ≈ 10s.
- See pairing indications. When paired, receiver LED 5 shows steady green. If this has not been indicated within 15 seconds, restart the transmitter.
- 5. Restart the system.
- 6. Remount the receiver lid (2Nm).

The receiver has now learned the transmitter ID number and will only accept commands from that transmitter.

Enter pair mode Era 100



Enter pair mode

9.5 Micro (slow speed) Operation

This setting can only be done in the configuration tool for RX161/110, see 952576-000.

Non simultaneous (default)

The buttons/joysticks for movement are interlocked during this time so that only one movement can be operated at a time.

Simultaneous

1

The buttons/joysticks for movements are looped so that two or more movements can be operated simultaneously.

Note! Micro operation is not possible with Era 8B "9 Buttons".

Note! For Era 8B "10 Buttons" B8 1st step (micro) needs to be pressed down 0.3 seconds for activation of micro function.



Enter pair mode

9.6 CIM Card

The CIM card is used for storing configuration information. You can take out the CIM-module from one system and place it in a spare transmitter with the same system program and it will work exactly* the same.

This exchange must be done in a clean, dry and ESD safe environment.

- To avoid personal and/or damages on property; exchange CIM card ONLY when the transmitter battery has been removed.
- *Note that some settings do not follow with the CIM card and need to be set in the "spare" transmitter. These settings are; PIN-codes, both PIN-code and heavy weight PIN-code.

9.6.1 Removing/Mounting CIM Card Era 4/6/8B



- 1. To disassemble the transmitter, remove the battery, unscrew the six screws holding the back cover of the transmitter, pull up the back of the transmitter carefully and pull out the connector for the battery and remove the back enclosure entirely.
- 2. The CIM card ① is located at the top of the transmitter above the display board ②. Gently remove the CIM card straight up.
- 3. Install the CIM card primarily in the original transmitter, alternative spare transmitter. Be sure to insert the CIM card properly in its connector.
- 4. Reinstall the enclosure. The screws should be tightened with 0.35Nm ± 0.05 .
- 5. Insert battery. Now, the transmitter is ready for operation.

9.6.2 Removing/Mounting CIM Card 10BD



- 1. Remove the battery. Unscrew the CIM card cover \bigcirc , 4 screws.
- 2. Gently remove the CIM card ③ straight up.
- 3. Pull out the 3-pole CIM card power supply 2.
- 4. Install the CIM card primarily in the original transmitter, alternative spare transmitter. Be sure to insert the CIM card in its connector, the upper row of holes, see labeling Key-Id ④.
- 5. Mount the power supply connector (note that the connection cables must be placed beside the CIM card).
- 6. Reinstall CIM card cover. The screws should be tightened with 1 Nm.
- 7. Insert battery. Now, the transmitter is ready for operation.

Disassembled





- 1. Remove the battery.
- 2. Unscrew the bottom of the transmitter; pull up the bottom of the transmitter carefully. Disassemble the mounting screw ① for the CIM card ②.
- 3. Assemble the CIM card primarily in the original transmitter, alternative spare transmitter, on the CIM card contact ③.
- Tighten the mounting screw 1 including nylon washer 4 and nylon distance 5 with 1 Nm.
- 5. Remount the bottom enclosure, check position of rubber seal. Tighten the screws 1 Nm.
- 6. Insert battery. Now, the transmitter is ready for operation.

10 Function tests

Before the following test is performed, make sure to prevent unintended movements of the controlled object from becoming a safety hazard.

Check that the transmitter can control the receiver by testing all functions and note if the output relays and the corresponding inputs on the controlled object are activated.

Follow the local safety regulations for the equipment and start the equipment as described in the Operator Manual.

Check the following:

- Are all movements correct?
- Do the other functions operate correctly?
- Does the stop function on the transmitter work properly?
- Also test the stop function by removing the battery in the transmitter.
- Is it possible to control the equipment from the normal controllers? If it is possible to operate the equipment from more than one controller at a time the system is incorrectly installed.
- There should be a changeover switch between radio/pendant controls to prevent control from two places at the same time.
- Test that all the safety and stop limits switches work.

This list of tests is for reference only and can be extended by the system integrator in the specific installations and the corresponding risk analysis.

11 Indications

11.1 Receiver indications

	Explanation of LED symbol						
OFF	Steady	Flash	Flashing fast Flash rate, 50/50 ms	Flashing slow Flash rate, 50/250 ms	Flashing e Flash rate, 3	xtra slow 30/970 ms	
LED Lo	cation	Indica	ation on RX	Event		Mode	
			LE	D4-LED1			
	ED2			Changes in the tra switches or joystic	ansmitter ks	TX com change	nmand
						Input d	ata change
						Messaç	ge received
		Signal strength > -90 dBm Squelch		h			
LEDG-LED5							
		LED6	LED5	Not connected			
		LED6	💷 🛄 LED5	Connected, MC=OFF			
		Connected, MC=ON		System OK			
		LED6	🔲 🛄 LED5	50% time out		-	
		LED6	LED5	Receiver internal error		FDDOF	
		LED6	🛄 🛄 LED5	Transmitter internal error			
		LED6	💷 💻 LED5	In pairing mode		Dairing	
		LED6	🗔 🗖 LED5	Paired		Fairing	
		1	LEC	028-LED27			
			LED28 LED27	Indicates activated contactor	d main	MC ON	
	/		LED28 LED27			MC OF	F

Table 6. LED indications on the MAIN board

11.2 Transmitter indications

11.2.1 Status indicator, Era 4/6/8B, 10BD

If the transmitter during start up (if not PIN locked) or operation detects a fault in any of the transmitters self-tests, the status indicator (see section 14) will indicate a continuous red light, after which the transmitter is shut down.

BAT.	INDICATIONS	EXPLANATIONS
\circ \circ \circ	Green flashing	OK, normal operation
$\circ \circ \circ$	Yellow quick flashing	Battery voltage low <3.5 V
\bigcirc	Yellow continuous, during operating	Battery empty. Transmitter will shut-off within 10s
\bigcirc	Yellow continuous, at start-up	Configuration mode
•	Red continuous, at start-up	PIN locked
•	Red continuous, during operation	Hardware fault

11.2.2 LED panel indications, Era 100



LED	Indications		Explanations
A (1)	O	Yellow continuous	Receiver digital in 1 active
	$\bigcirc \bigcirc \bigcirc$	Yellow flashing	Transmitter locked. PIN code login required
2	0	Yellow continuous	Receiver digital in 2 active
МС	0	OFF	No link established
		Green flashing	Link established Main Contactor OFF
		Green continuous	Link established Main Contactor is ON
	•	Yellow continuous	Movements disabled due to tilting of the transmitter (if enabled). Main Contactor is ON
	•	Red continuous	Main Contactor locked
			MC can not be activated due to one of the following reasons: -Safety STOP button depressed -Tilt alarm -Joystick not centered -Configuration menu/mode active
BAT	If the transm	itter during start up or d	peration detect a fault in any of the transmitters
	self-tests the transmitter v	e status indicator will i vill shut down.	ndicate continuously red light, after that the
		Green flashing	Operating OK
	000	Yellow flashing	Low Battery voltage. Operation can continue approximately 30 minutes depending on battery condition. A prompt change of battery is recommended.
	0	Yellow continuous	Battery empty. Transmitter will shut-off.
		Red continuous	Hardware fault
Pairing	Indications		Explanations
BAT	$\bigcirc \bigcirc $	Yellow/green quick flashing	Pairing mode activated. Pairing mode is active for 20 seconds.
	•	Green continuous	-Pairing completed. Restart the transmitter and receiver.
		Red continuous	Pairing failed.
			Pairing must be completed within 20 seconds after activating the pairing mode on the transmitter.
			Make sure the pairing button on the

11.2.3 Display indications

These default symbols can appear on the display depending on the configuration. For configuration refer to RX161/RX110 configuration tool.



- 1. Radio signal / MC / Low/High power
- 2. Channel indicator, up to 3 digits (if the 433MHz region setting is "Other" an "E" is displayed after the channel number)
- 3. Selection (SHIFT Era 8B 9/10 Buttons)
- 4. Text field (crane id etc.)
- 5. Battery level
- 6. Dig. In 1 & 2 (shows if active)
- 7. Overload warning
- 8. Weight load graph (full-scale=max load)
- 9. Weight, up to 5 digits
- 10. Weight unit (kg,t or lb)

11.2.3.1 Radio signal quality

Depending on the application this symbol can be enabled or disabled. At low power mode the first bar is narrower. Underlined radio signal indicator means main contactor activated in the receiver, example **____**

No radio link established	Weak signal	Good signal	Strong signal	Very strong signal
\times	-	-	- 22	- = = 8

11.2.3.2 Text field (crane id etc.) (option)

This text is configured in the receiver (8 characters) using the RX161/RX110 configuration tool.

11.2.3.3 Battery level

Battery empty	25%	50%	75%	100% (fully charged)
D	li și		3831	

11.2.3.4 Weight / Graph / Overload (option)

The weight is shown with the unit symbol kg, t or lb. depending on the receiver configuration. The bar graph displays the weight load. Full scale= maximum load. The graph is only shown if a maximum weight limit is configured in the receiver.

This 2 symbol appears if the load on the crane reaches the weight limit (overload). Refer to the RX161/RX110 configuration tool.

11.2.3.5 Selection (only SHIFT Era 8B 9/10 BUTTONS)

Shows which SHIFT selections that currently are active.

11.2.3.6 STOP (only Era 100)

When the safety stop button is pressed the display backlight turns red and a STOP-sign is shown on the display, as illustrated below.



12 Trouble shooting

12.1 First check

On push button transmitter:

Ensure that a charged battery is inserted in the transmitter.

The status indicator indicates following:

- Slow green flashing means that the transmitter is fully operational
- · Fast yellow flashing means that the battery needs charging
- Steady yellow light means that the transmitter is in configuration mode
- Steady red light at start up means that the transmitter is PIN locked
- Steady red light during operating means that an error in the transmitter has been discovered and it will shut itself down

On joystick transmitter:

Ensure that a charged battery is inserted in the transmitter.

The status indicator indicates following:

- Slow green flashing means that the transmitter is fully operational
- · Fast yellow flashing means that the battery needs charging
- Steady yellow light and shut down means that the battery is completely discharged and that the transmitter will shut itself down within 20 seconds
- Steady red light at start up means that a push button or joystick is activated or faulty or that another hardware error has been detected
- Steady red light during normal operation means that an error in the transmitter has been detected and it will shut itself down
- The MC indicator indicates following:
 - Steady red light. Main Contactor can not be activated due to one of the following reasons:
 - Safety STOP button depressed
 - Tilt alarm
 - Joystick not centered
 - Configuration menu/mode active

In receiver:

• Check the indications of mode "Error", "MC activated" and "System OK", see Table 6 on page 30.

Version: Al

12.2 It is impossible to activate the main contactor

The transmitter has not been paired with the receiver. For LED position see "Table 6. LED indications on the MAIN board" on page 30.

Indication Squelch (LED 4) is flashing or lit but the transmitter is off.

• This means that some or all frequencies are used. Try an alternative frequency setting.

Indication Message received (LED 3) does not flash and the transmitter is on.

- Check the antenna on the receiver.
- All the settings are correct on both the transmitter and the receiver; the system must be checked by authorized personnel.

Indication Message received (LED 3) lit and indication LED 5 lit but the main contactor remains deactivated.

- Check the instructions in the operator's manual dealing with activation of the main contactor. Normally the horn/siren push button must be pressed to activate the main contactor. At start up the push buttons or joystick must be in not activated position.
- A fault in the receiver prevents the main contactor to be activated.
- Era 100: Check if the transmitter indicator MC is red (Main Contactor locked). See section 11.2.2 on page 32.

12.3 Some output functions do not work

If the LEDs indicate the output function the fault is likely to be found in the relay itself or in the cables/ contacts or in the controlled units' electronics.

If no LEDs are indicating the output function the fault is likely to be found in the transmitter.



Note LED1 is flashing if a command is changed from the transmitter.

Figure 13. LED indicators indicating active outputs

12.4 Transmitter PIN locked

Both the user PIN and the admin PIN can be used to unlock the transmitter at start-up.

13 Recycling

WEEE DIRECTIVE



This symbol means that inoperative electrical and electronic products must not be mixed with household waste. The European Union has implemented a collection and recycling system for which producers are responsible. For proper treatment, recovery, and recycling, please take this product to a designated collection point.

14 Overview transmitter



37 (44)

14.1 Place symbol label

Alongside the buttons/joystick/switches there is room for a symbol label. A sheet of symbol labels is included with the delivery.

- 1. Before placing the label, clean the surface with alcohol.
- 2. Place the label; make sure that the symbol label is placed at the right button! See Table 7, Table 8 on page 38 or Table 9 on page 38.



Table 7. Symbol placement for Era 4B and 6B

Х

Х

X





Table 9.Symbol placement for 10BD

14.1.1 Nordic symbols, example



14.1.2 DIN symbols, example



Jupiter Era 100

Jupiter Era 150





Jupiter Era 150

14.1.4 Configurable, example



Jupiter Era 100 Configurable

Jupiter Era 100 Configurable 2xRotary Switches

J1/J2	2 or 4 steps with 1 or 2 movements
S6/S7	Pushbutton
S1-S5	Toggle switches, rotary switches and/or push buttons. Note! Only possible with maximum of 2 rotary switches (position S2 and S4). If there is a rotary switch in position S2 then position S3 is no longer an option. If there is a rotary switch in position S4 then position S5 is no longer an option.

Jupiter Era 100 Customized overlay is also an option, see specific documentation.

14.2 Symbol explanation

			Era 4/6/8B	10BD
Siren		\Box	B7 1 st step	B9 1 st step
МС	Activation of Main Contactor in the receiver	MC	B7 1 st step	B9 1 st step
Extra	Optional feature	X	B7 2 nd step	B9 2 nd step
Micro	Slow speed operation	Ð	B8 1 st step	B10 1 st step
Extra	Optional feature	Y	B8 2 nd step	B10 2 nd step
SHIFT	Only Era 8B 9/10 buttons		"B8" 2 nd step	-
Selection 1	(Trolley 1)	1	SHIFT + B5	B7
Selection 2	(Trolley 2)	2	SHIFT + B6	B8
Selection A	Only Era 8B 9 buttons (Crane A)	А	SHIFT + B3	-
Selection B	Only Era 8B 9 buttons (Crane B)	В	SHIFT + B4	-

NORDIC SYMBOLS:

Hoist	Up	↑८/ᢕ̂(B1)	Down	↓८, [∏] (B2)
Trolley	Left	О (ВЗ)	Right	(B4)
Bridge	Forward	(В5)	Reverse	(B6)
Rotate	CW		CCW	

CS SYMBOLS:

Hoist	Up	UP (B1)	Down	DOWN (B2)
Trolley	Left	NORTH (B3)	Right	SOUTH (B4)
Bridge	Forward	EAST (B5)	Reverse	WEST (B6)
Rotate	CW		CCW	

DIN SYMBOLS:

Hoist	Down	T (B1)	Up	 (B2)
Trolley	Left	∢ (B3)	Right	(B4) (B4)
Bridge	Reverse	A (B5)	Forward	√7 (B6)
Rotate	CW		CCW	

Appendix 1 - European Radio Regulation

Exerpts from ERC RECOMMENDATION 70-03:

Fre	Frequency Band Power / Magnetic Field		Spectrum ac- cess and mitiga- tion requirement	Channel spacing	Notes
f	433.050-434.790 MHz (note 4)	10 mW e.r.p.	< 10 % duty cycle (note 1)	No spacing	
f1	433.050-434.790 MHz (note 4bis)	1 mW e.r.p. -13 dBm/10 kHz	No requirement	No spacing	Power density limited to -13 dBm/10 kHz for wideband modu- lation with a bandwidth greater than 250 kHz
f2	434.040-434.790 MHz (note 4bis)	10 mW e.r.p.	No requirement	Up to 25 kHz	
g	863-870 MHz (note 3, 4 and 6)	≤ 25 mW e.r.p.	≤ 0.1% duty cycle or LBT (note 1 and 5)	≤ 100 kHz for 47 or more channels (note 2)	FHSS modulation
		≤ 25 mW e.r.p. (note 6) Power density : - 4.5 dBm/100 kHz (note 7)	≤ 0.1% duty cycle or LBT+AFA (note 1, 5 and 6)	No spacing	DSSS and other wideband modulation other than FHSS
		≤ 25 mW e.r.p.	≤ 0.1% duty cycle or LBT+AFA (note 1 and 5)	≤ 100 kHz, for 1 or more channels modulation bandwith ≤ 300 kHz (note 2)	Narrow /wide-band modulation
g1	868.000-868.600 MHz (note 4)	≤ 25 mW e.r.p.	≤ 1% duty cycle or LBT+AFA (note 1)	No spacing, for 1 or more channels (note 2)	Narrow / wide-band modulation. No channel spacing, however the whole stated frequency band may be used
g2	868.700-869.200 MHz (note 4)	≤ 25 mW e.r.p.	≤ 0.1% duty cycle or LBT+AFA (note 1)	No spacing, for 1 or more channels (note 2)	Narrow / wide-band modulation. No channel spacing, however the whole stated frequency band may be used
g3	869.400-869.650 MHz	≤ 500 mW e.r.p.	≤ 10% duty cycle or LBT+AFA (note 1)	25 kHz (for 1 or more channels)	Narrow / wide-band modulation The whole stated frequency band may be used as 1 channel for high speed data transmission
g4	869.700-870.000 MHz	≤ 5 mW e.r.p.	No requirement	No spacing	Narrow / wide-band modulation.
	(note 4DIS)	≤ 25 mW e.r.p.	up to 1% duty cycle or LBT+AFA (note 1)	(tor 1 or more channels)	the whole stated frequency band may be used

- Note 1:When either a duty cycle, Listen Before Talk (LBT) or equivalent technique applies then it shall not be user dependent/adjustable and shall be guaranteed by appropriate technical means.
For LBT devices without Adaptive Frequency Agility (AFA), or equivalent techniques, the duty cycle limit applies.
For any type of frequency agile device the duty cycle limit applies to the total transmission unless LBT or equivalent
technique is used.
- Note 2: The preferred channel spacing is 100 kHz allowing for a subdivision into 50 kHz or 25 kHz.
- **Note 4:** Note 4: Audio and video applications are allowed provided that a digital modulation method is used with a max. bandwidth of 300 kHz.

Analogue and digital voice applications are allowed with a max. bandwidth \leq 25 kHz.

- In sub-band 863-865 MHz voice and audio conditions of Annexes 10 and 13 of ERC/REC 70 03 apply respectively. **Note 4bis:** Audio and video applications are excluded. Analogue or digital voice applications are allowed with a max. band-
- width ≤ 25 kHz and with spectrum access technique such as LBT or equivalent. The transmitter shall include a power output sensor controlling the transmitter to a maximum transmit period of 1 minute for each transmission
- Note 5: Duty cycle may be increased to 1% if the band is limited to 865-868 MHz.
- Note 6: For other wide-band modulation than FHSS and DSSS with a bandwidth of 200 kHz to 3 MHz, duty cycle can be increased to 1% if the band is limited to 865-868 MHz and power to ≤10 mW e.r.p.

Appendix - Settings, notes

System
Customer:
Object:
Serial number:
System ID:
Frequency: Fixed Channel:
433 MHz: "EU" (Other"
TRANSMITTER; GENERIC
Shutdown time (auto-off): 2 min 5 min 15 min OFF
PIN-code (user): Enable Disable
Heavy weight PIN-code: Enable Disable
radio comm power: 100%
Specific settings button transmitter
Button configuration: B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12
Momentary
Remote type (Era xB): 8 Buttons 9 Buttons 10 Buttons 8 Buttons DIN 9 Buttons DIN 10 Buttons DIN
Remote type (10BD): Nordic/CS
Specific settings for joystick transmitter:
User Configuration Power save: ON OFF LCD contrast: Digit size: Small Large
Alarm Configuration Misc Configuration
Dig.In 1: OFF Buzzer P Buzzer CP Vibration P Vibration CP Tilt (deg): OFF 45° 90° 135°
Dig.In 2: OFF Buzzer P Buzzer CP Vibration P Vibration CP PIN (admin): Enable Disable
Dig.In 1+2: OFF Vibration CP Buzzer CP Red LCD
Limit: OFF Vibration CP Buzzer CP Red LCD
Low Bat: OFF Buzzer P Buzzer CP
Specific settings for Receiver RX161/RX110:
Program Option: 0 1 2 3 4 5 6 7 8 9 A B C D E F 10 12 13
Micro (slow speed) Operation: Non simultaneous Simultaneous
Multi-crane and Multi-operator Operation
A B A A B A Crane A:
Transmitter 1:



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