

INSTALLATION MANUAL

REMOTUS JUPITER Era 100/150J

(RX161, MC110)
FSK16



Revision history

Version	Date	Reason
A0	2017-02-23	1 st released version
A1	2017-09-04	Overlay - place symbol

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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 out of 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.

2 Scope

The Remotus Jupiter system described in this manual consists of one receiver and one transmitter.

	Type	Model	Symbols
Receiver	RX161	J-RX161	
Joystick transmitter	MC110	Jupiter Era 100J Jupiter Era 150J	Nordic, DIN or CS

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 serious 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!**



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.

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:	RED Directive 2014/53/EU
Reaction time on STOP function:	150 ms (typ), maximum 550 ms
Safety category for the Stop function	ISO 13849-1:2008 Category 3 PL d
Safety category for unintended movement (UMFS)	ISO 13849-1:2008 Category 3 PL d
Receiver RX161:	
16 Relay outputs:	
<ul style="list-style-type: none"> • 6 safety relays (NO) for movements • 4 change-over relays (NO/NC) • 6 normally open relays (NO) 	
2 Separate main contactor change over safety relays	
1 output for horn (siren)	12V
1 Analogue input:	0 (4) -20 mA or 0(2)-10 V
2 Digital inputs:	24/48 V AC/DC (Opto-isolated) or 115/230 V AC (Opto-isolated)
1 Serial port:	RS422/RS485
Input voltage:	24/48/115/230 V AC, power consumption less than 14 VA or 24 V DC 0.5 A. Shall be connected to SELV circuits.
Dimensions:	277x217x115 mm
Weight:	Approximately 1.6 kg
Degree of protection (plastic enclosure):	IP67
Operating temperature:	-25 °C – +55 °C
Storage temperature:	-40 °C – +85 °C
Transmitter:	
MC110:	
Dimensions:	260 x 165 x 150 mm
Weight:	1.3 kg
Degree of protection:	IP67
Display:	Graphic LCD, 128x64 pixels
Battery specification:	3.7 V Li-Ion, 1.95 Ah
Battery life:	~ 17 hours
Operating Temperature for battery:	-20 °C – +55 °C
Storage Temperature for battery:	-20 °C – +35 °C
Charging Temperature for battery:	+10 °C – +45 °C
NOTE! For charging see charger documentation	

Table 1. Technical specifications

5.1 Design

The RX161 receiver consists of a MAIN board, antenna board 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.

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

5.2 Functional safety description

The Remotus Jupiter Era system uses a dual channel architecture in both the receiver and the transmitter to achieve high degree of safety. For additional safety the receiver RX161 is equipped with eight (8) safety relays whereof two safety relays are intended for safety stop. The other 6 safety relays are used for crane movement and provides protection against unintended movement due to welded relay contacts (UMFS Category 3 PL d ISO 13849-1:2008).

The dual channel architecture and extensive use of safety relays 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 13849-1:2008, both safety stop outputs from the receiver shall be connected to two independent stop inputs on the crane (two safety stop channels).

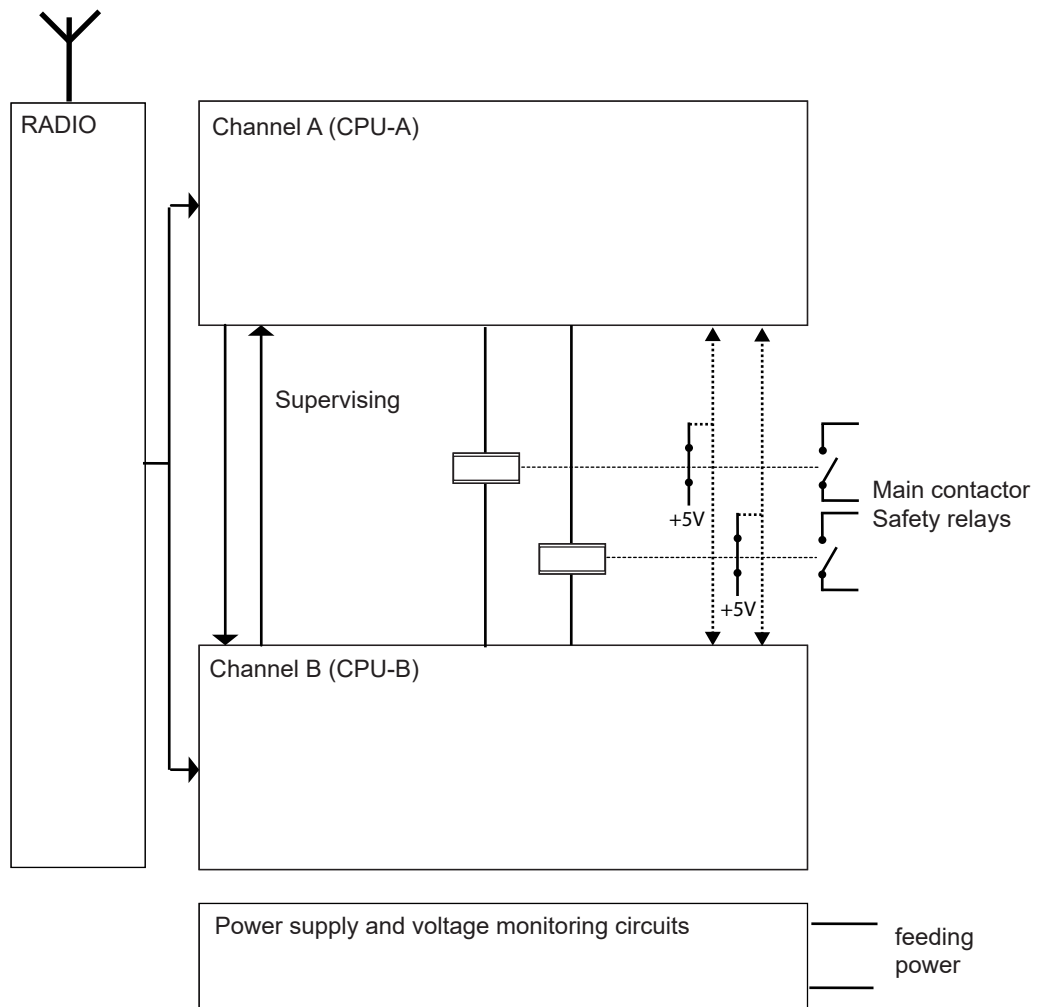


Figure 1. Receiver functional safety description

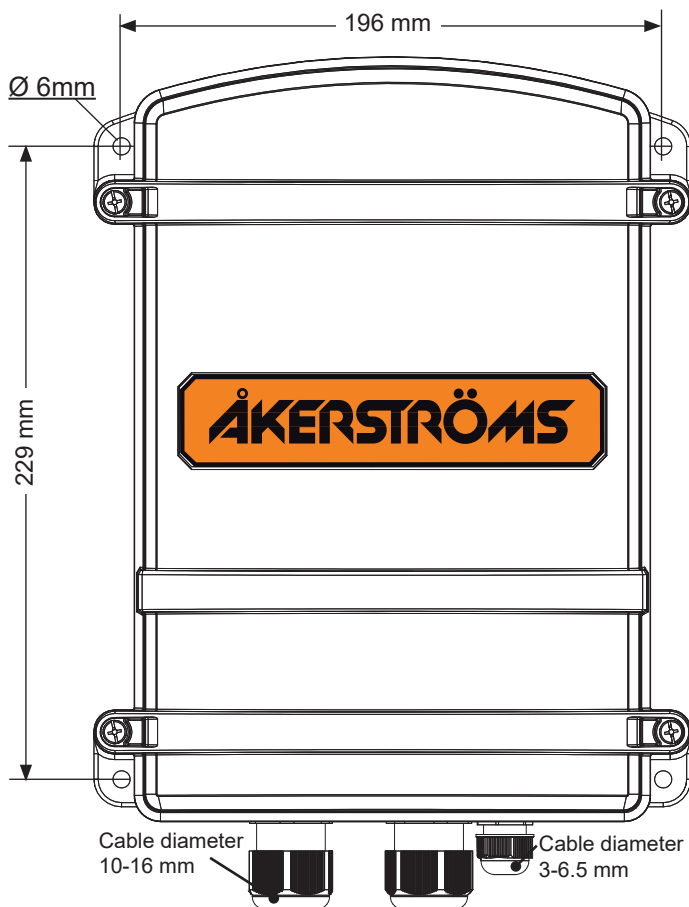
6 Installation

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.

6.1 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.



Mount the receiver upright with the cable glands facing down. The receiver shall be mounted on a flat surface with screws suitable for the surrounding environment. Note! If the plastic spacer is mounted the screws needs to be 20 mm longer.

Assembly Instruction - plastic spacer (optional)

Press the plastic spacers firmly to the bottom enclosure. Make sure to align the spacers frame opening with the condensation filter ventilation on the bottom enclosure lower, right side.

4 black plastic spacer art. no: 947504-000.

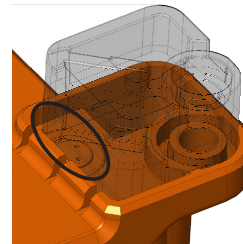
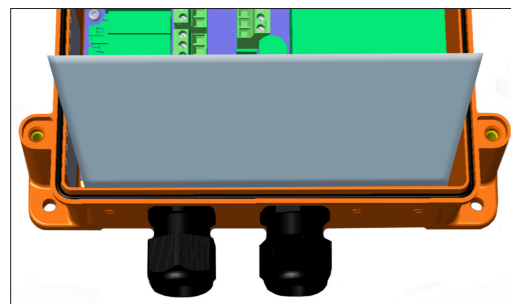


Figure 2. Mount RX161

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.



6.2 Connections and switches on the MAIN board

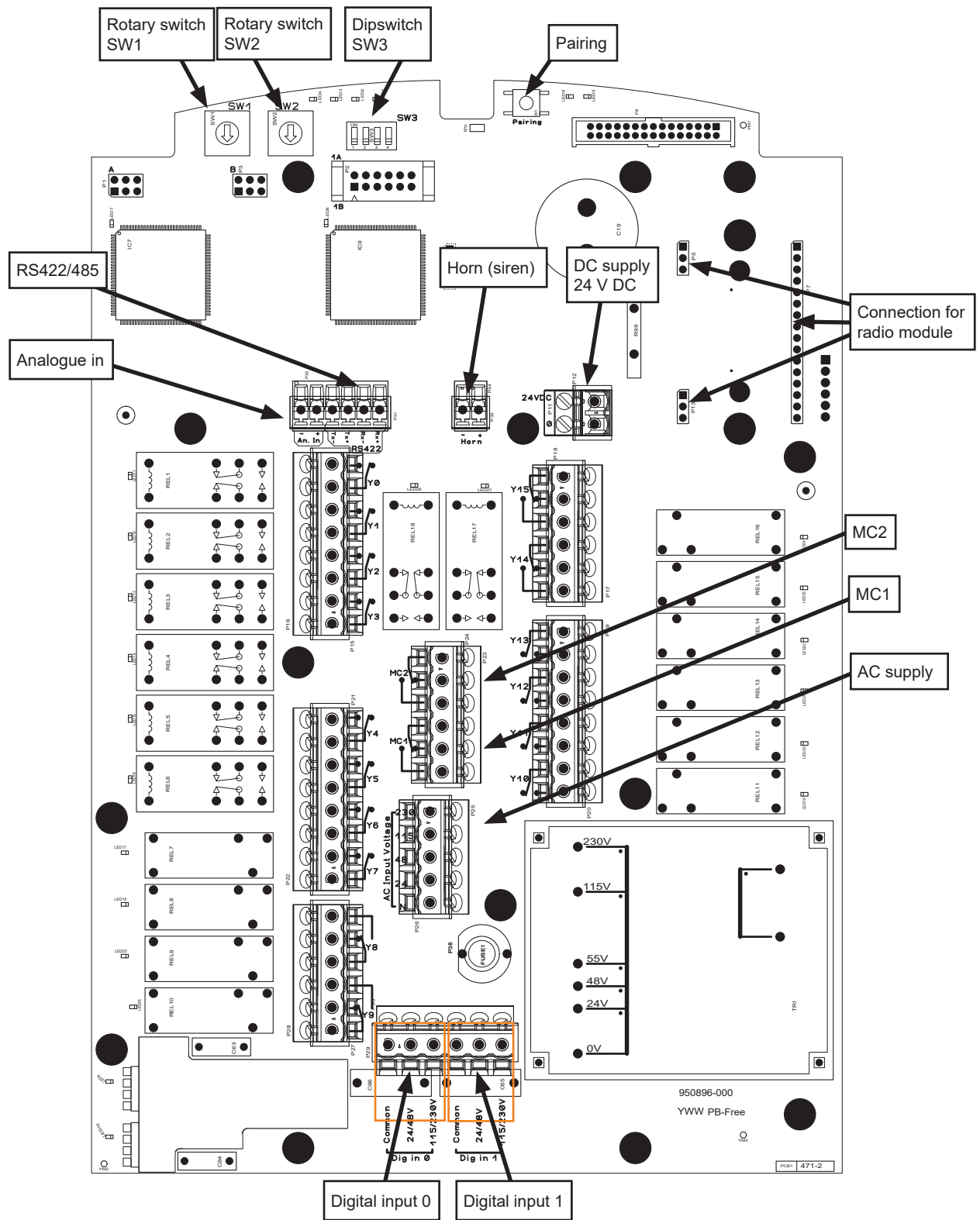


Figure 3. Connections and switches on the MAIN board

6.3 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 2 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 4). This is important if a cable become loose. The cable should not be able to end up in an unsuitable location inside the receiver.

Fasten with a torque of 0.4-0.5 Nm.

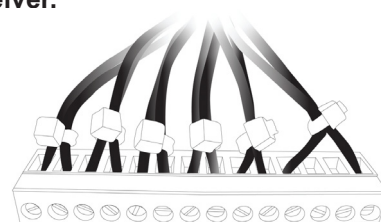
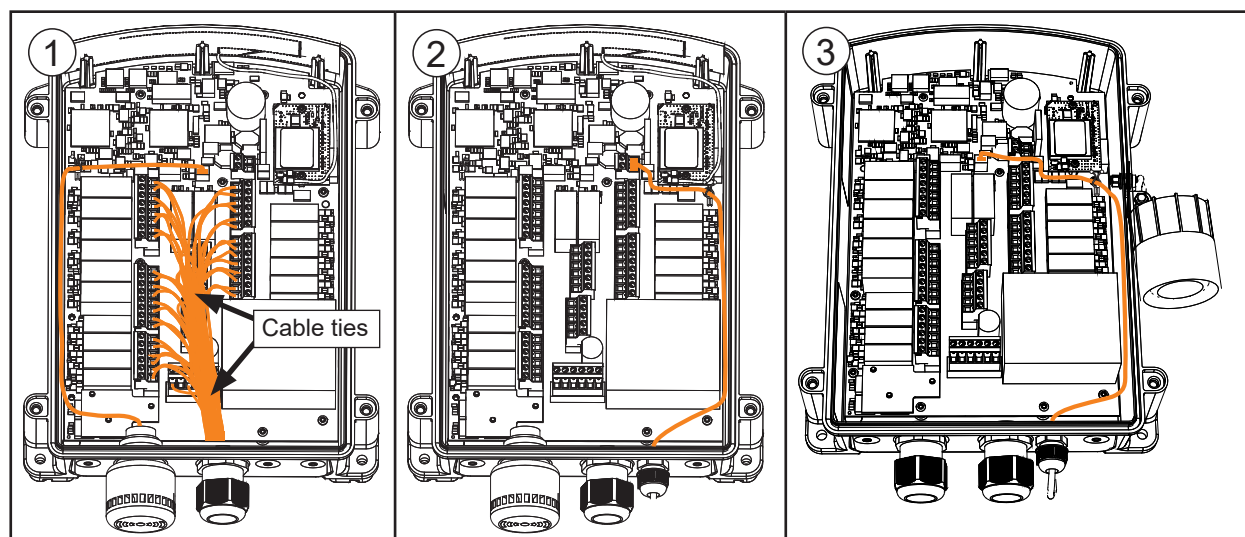


Figure 4. Installation of cables

Cabling



Note! The position of different cable glands can vary depending on combination of accessories.

① **Relay/digital in and hole mounted siren cabling.** Note! Relay cabling, use cable ties not only as in Figure 4 but also to hold them together in the middle. Hole mounted siren cabling to the left.

② **DC supply cabling.** Note! The connection from this supply shall be routed through its own cable gland.

③ **External siren**

RS 422/485 and Analogue in. M12 cable gland at suitable placement. Note! Cabling shall be routed to the left or right.

Pigtail for external antenna. BNC chassis connector in the rightmost hole. Note! Cabling shall be routed as shown in ② / ③

For relay terminal and connector number see Figure 3 on page 9.

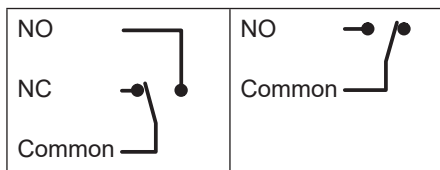


Figure 5. Relay symbol explanation

6.3.1 Functional diagram

The receiver functional diagram shows how to connect the equipment, in this manual the functional diagram is written as different program options, see chapter 12.

6.3.2 Principle connection of the Main contactors

The radio remote control system is, for the safety stop function, designed for category 3 P1 d according to ISO 13849-1:2008. 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.

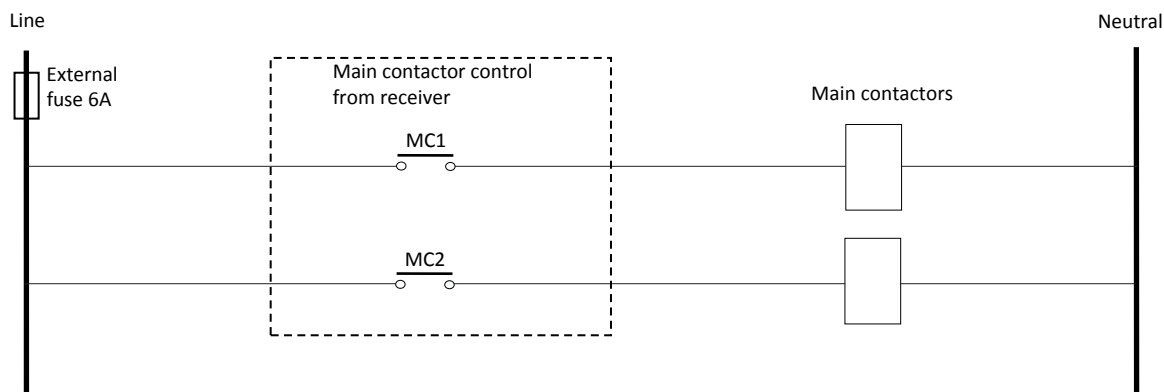


Figure 6. Connection with the two main contactors in parallel, **category 3**

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.

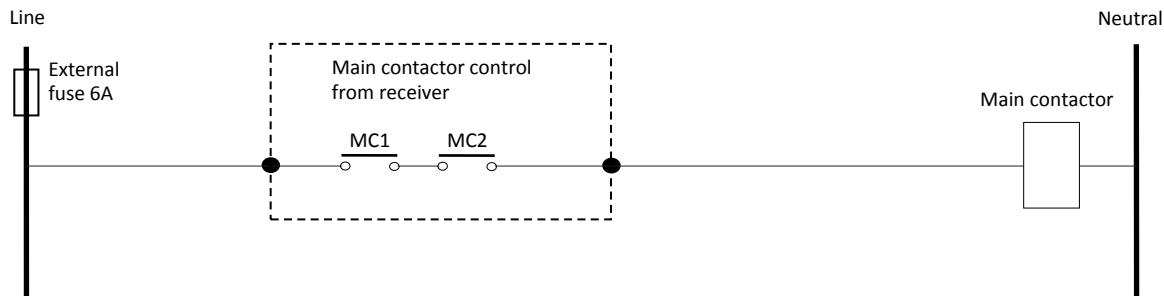
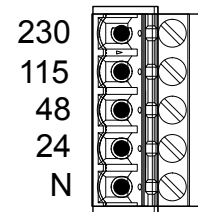


Figure 7. Connection with the two main contactors in series, **category 1**

6.3.3 AC supply



Carefully check the power supply voltage level.

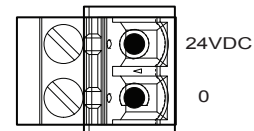


6.3.4 DC supply

The connection cable for the 24 V DC supply shall be routed through its own cable gland.



Do not mix with NON SELV signals.



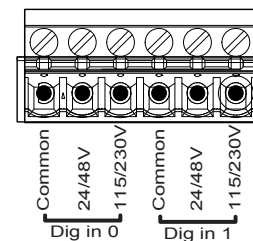
6.3.5 Digital inputs



Carefully check the signal voltage level.

Terminal marked 24/48V: 24/48V AC or DC

Terminal marked 115/230V: 115/230 VAC

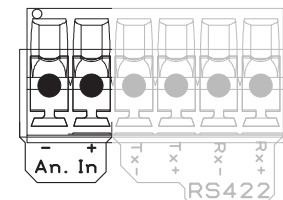


6.3.6 Analogue input

This signal may be used for weight information from a scale, shown on the transmitter's display. See section 10.2.2.



Do not mix with NON SELV signals.

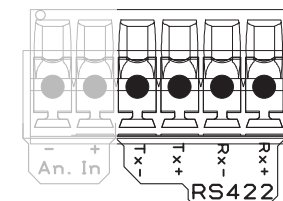


6.3.7 RS422/485

This signal may be used for weight information from a scale, shown on the transmitter's display. See section 10.2.2.



Do not mix with NON SELV signals.



6.3.8 Connection cable

The cable cross-sectional area shall be at least 0.75 mm² and with an outer insulation diameter of 10-16 mm.

6.4 Antenna placement

The antenna is by default placed internally in Jupiter RX161.

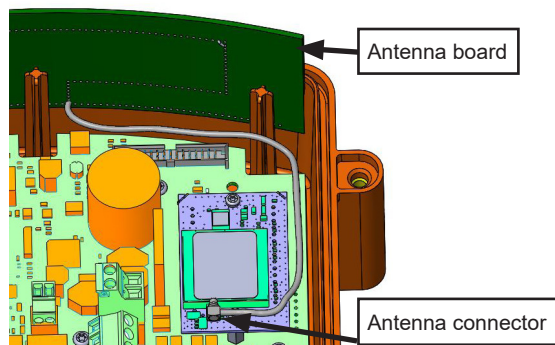


Figure 8. Internal antenna

6.4.1 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.

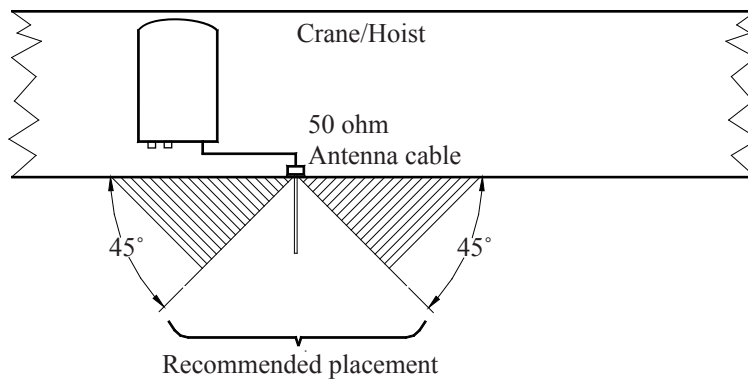


Figure 9. Recommended and wrong placement of the antenna

! 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.

7 Commissioning

7.1 *Frequency setting*

Fixed frequency channel set by the user. It's only in the transmitter the frequency need to be set, see section "8.2.1.3 Radio configuration (page 3)" on page 22.

Note that for 433MHz region "EU" or "Other" is set in both the transmitter and the receiver. For the receiver refer to Configuration Tool (manual 952576-000) and for the transmitter see section "8.2.1.3 Radio configuration (page 3)" on page 22. Default setting is "EU".

7.1.1 Indication of radio channel quality in Receiver RX161

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 10.1 on page 25).

- 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.

7.2 Pairing of transmitter and receiver

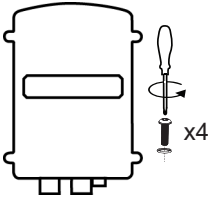
For location of pairing button and indications LED 5, 6 see Figure 3 and Figure 12.

! Set the region (“EU” or “Other”, in both the transmitter and the receiver) and frequency channel before pairing!
If multiple systems are used on the same site, careful frequency planning is recommended.

Note! For pairing tandem/multi-operator operation see section “7.3 Tandem and Multi-operator Operation” on page 16. For single system see below:

1

Open the lid on the receiver

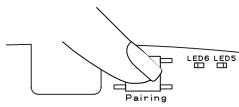


2

Power ON the receiver

3

Press the pairing button



Pairing mode

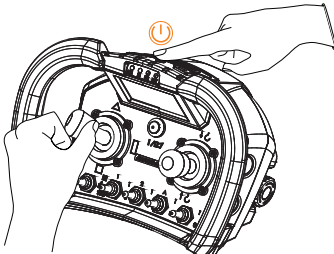
LED6 LED5

Flash rate Steady

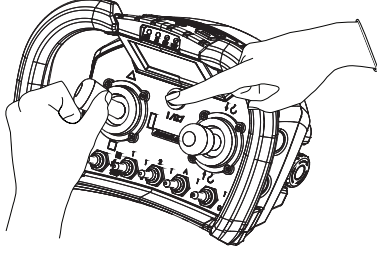
50/50 ms


4

Set the transmitter in pairing mode.



Hold out one of the transmitter joysticks and start the transmitter



Keep holding the joystick out and press | /  ≈10s

Pairing mode

BAT

Active 20s

Green/ Yellow

Flash rate

100/100 ms

5

Check the indications if receiver and transmitter has paired.

Paired

LED6 LED5

LED6 LED5

OFF Steady

Paired

BAT

Steady green

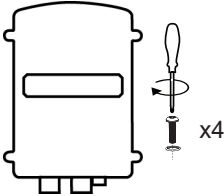
Pairing failed. Restart!

BAT

Steady red

6

Remount the receiver lid



7

Power OFF and power ON (Restart) the system to activate the new ID number.

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

7.2.1 Display during paring

Pairing:	Pairing ready:	Link timeout:
<div>Pairing Info ***Pairing!***</div>	<div>Pairing Info Pairing ready! Restart system</div>	<div>Pairing Info Pairing failed! Restart system</div>

Table 2. Transmitter display pairing indication

Installation Manual Remotus Jupiter Era 100/150J FSK16 Version: A1 Document-ID: 954121-000 EN Author: SH

ÅKERSTRÖMS

7.3 Tandem and Multi-operator Operation

- !
- !
- Only Era 150J.
- Set the region (“EU” or “Other”, in both the transmitter and the receiver) and frequency channel before pairing!
If multiple systems are used on the same site, carefull frequency planning is recommended.

Tandem Operation

Tandem 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

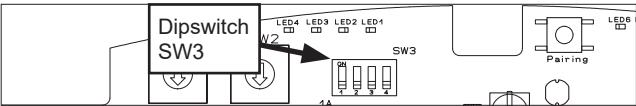


Figure 10. Dipswitch SW3, position in the receiver

Follow pairing instruction described in section 7.2, but notice the difference of SW3 when pairing the different transmitters and receivers. For settings of dipswitch SW3 see respective section.

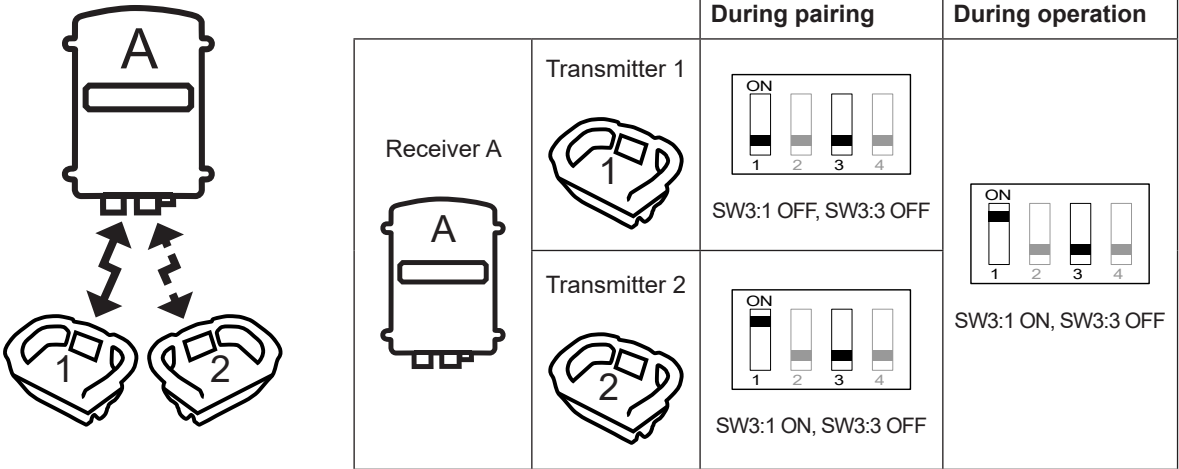
Note! After the pairing is made, if it’s for a example is a tandem operation, the transmitter needs to choose crane before function goes out.

7.3.1 Multi-operator operation

2 transmitters and 1 receiver

In order to run multi-operator operation the receiver must be paired with two ID’s. First paired transmitter = transmitter 1.

1. Pair transmitter 1 to the receiver. Disconnected and reconnect the power source to the receiver.
2. Pair transmitter 2 to the receiver. Disconnected the power source to the receiver, set the SW3 in “during operation” and reconnect the power source to the receiver

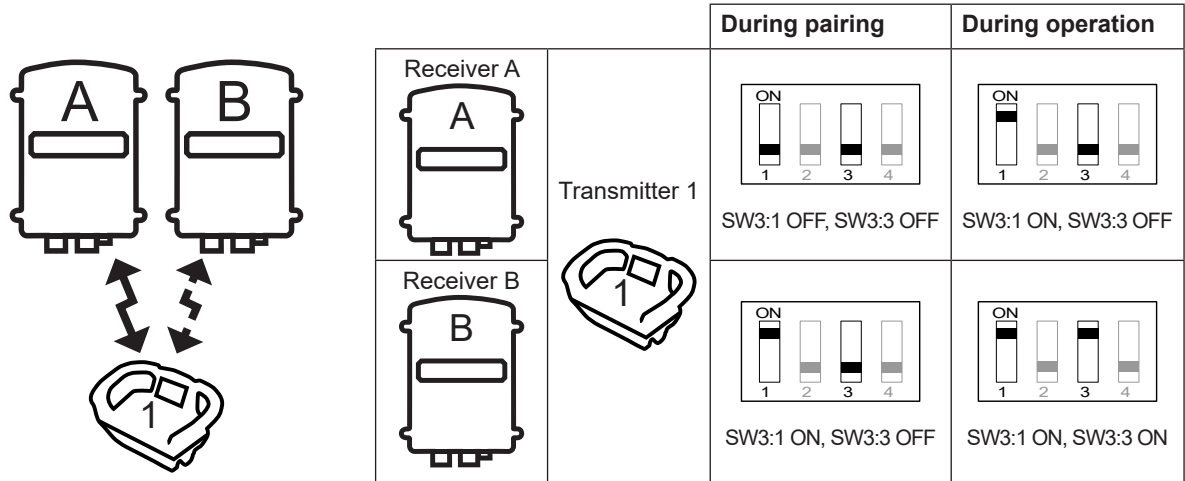


7.3.2 Tandem operation

1 transmitter and 2 receivers

In order to run tandem operation the receivers must be paired with the same ID.

- 1. Pair the transmitter to receiver 1 (A). Disconnected the power source to the receiver, set the SW3 in “during operation” and reconnect the power source to the receiver.
- 2. Pair the transmitter to receiver 2 (B). Disconnected the power source to the receiver, set the SW3 in “during operation” and reconnect the power source to the receiver.



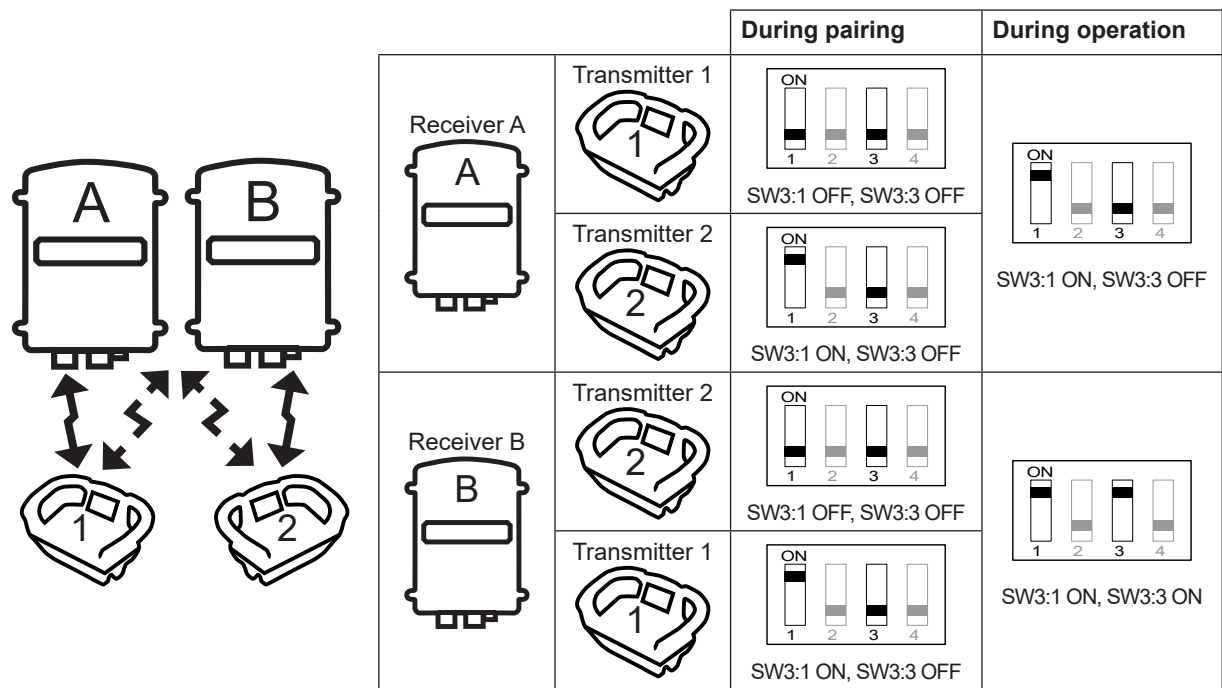
7.3.3 Tandem operator operation & Multi-operator operation

2 transmitters and 2 receivers

In order to run tandem/multi-operator operation the receivers must be paired with two ID's.

- 1. Pair transmitter 1 to receiver 1 (A). Disconnect and reconnect the power source to the receiver.
- 2. Pair transmitter 2 to receiver 1 (A). Disconnect the power source to the receiver, set the SW3 in “during operation” and reconnect the power source to the receiver.
- 3. Pair transmitter 2 to receiver 2 (B). Disconnect and reconnect the power source to the receiver.
- 4. Pair transmitter 1 to receiver 2 (B). Disconnect the power source to the receiver, set the SW3 in “during operation” and reconnect the power source to the receiver.

Transmitter 1 primary transmitter for receiver 1 (A). Transmitter 2 primary transmitter for receiver 2 (B).



7.3.4 Tandem operator operation & Multi-operator operation (Primary/Secondary)

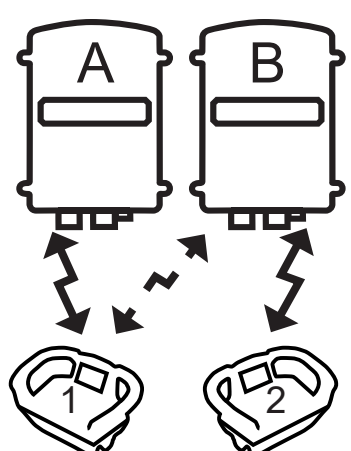
2 transmitters and 2 receivers (one of the transmitters can only operate one crane)

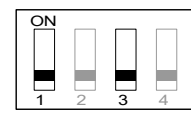
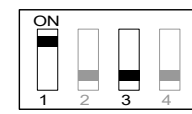
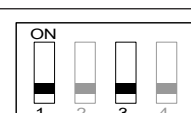
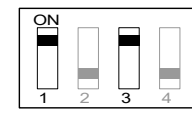
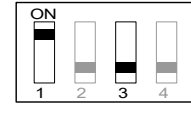
In order to run tandem/multi-operator operation the receivers must be paired with two ID's.

- 1. Pair transmitter 1 to receiver 1 (A). Disconnected the power source to the receiver, set the SW3 in “during operation” and reconnect the power source to the receiver.
- 2. Pair transmitter 2 to receiver 2 (B). Disconnected and reconnect the power source to the receiver.
- 3. Pair transmitter 1 to receiver 2 (B). Disconnected the power source to the receiver, set the SW3 in “during operation” and reconnect the power source to the receiver.

Transmitter 1, can operate both cranes, primary transmitter for receiver 1 (A) and secondary for receiver 2 (B).

Transmitter 2, can operate one crane, primary transmitter for receiver 2 (B).



		During pairing	During operation
Receiver A	Transmitter 1	 SW3:1 OFF, SW3:3 OFF	 SW3:1 ON, SW3:3 OFF
Receiver B	Transmitter 2	 SW3:1 OFF, SW3:3 OFF	 SW3:1 ON, SW3:3 ON
	Transmitter 1	 SW3:1 ON, SW3:3 OFF	

7.4 Micro (slow speed) Operation

The SW3 dipswitch for adjusting micro setting is marked in Figure 3. See Figure 11 for settings.

Non simultaneous - SW3:3 OFF

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

Simultaneous - SW3:3 ON

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

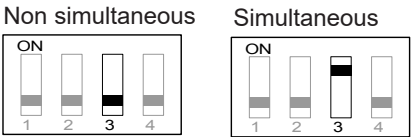


Figure 11. Micro operation setting, switch 3

! Note. Selection of simultaneous micro is not available for tandem/multi-operator operation.

7.5 CIM Card

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



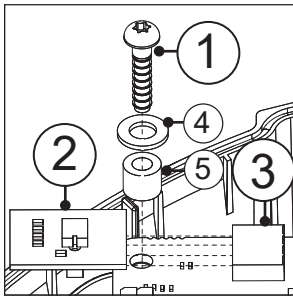
The CIM card exchange process has to be done in a clean, dry and ESD safe environment.



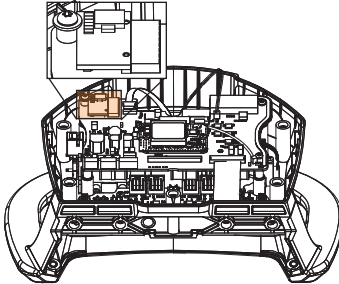
To avoid personal and/or property damages; exchange CIM card ONLY when the transmitter battery has been removed.

7.5.1 Mounting CIM Card

Disassembled

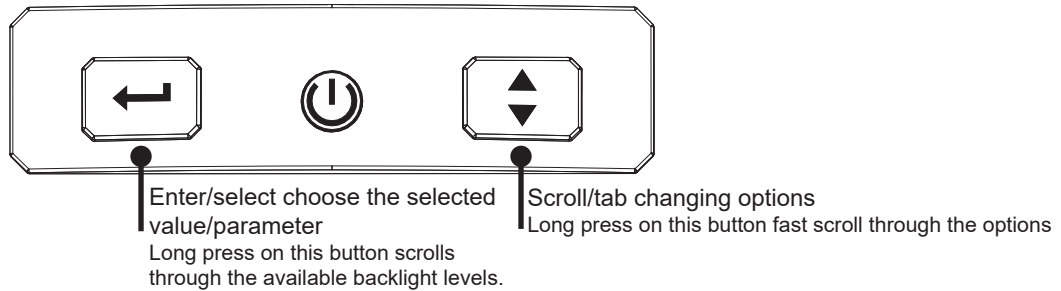


Assembled



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.
4. 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.

8 Configuration from transmitter display





8.1 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.

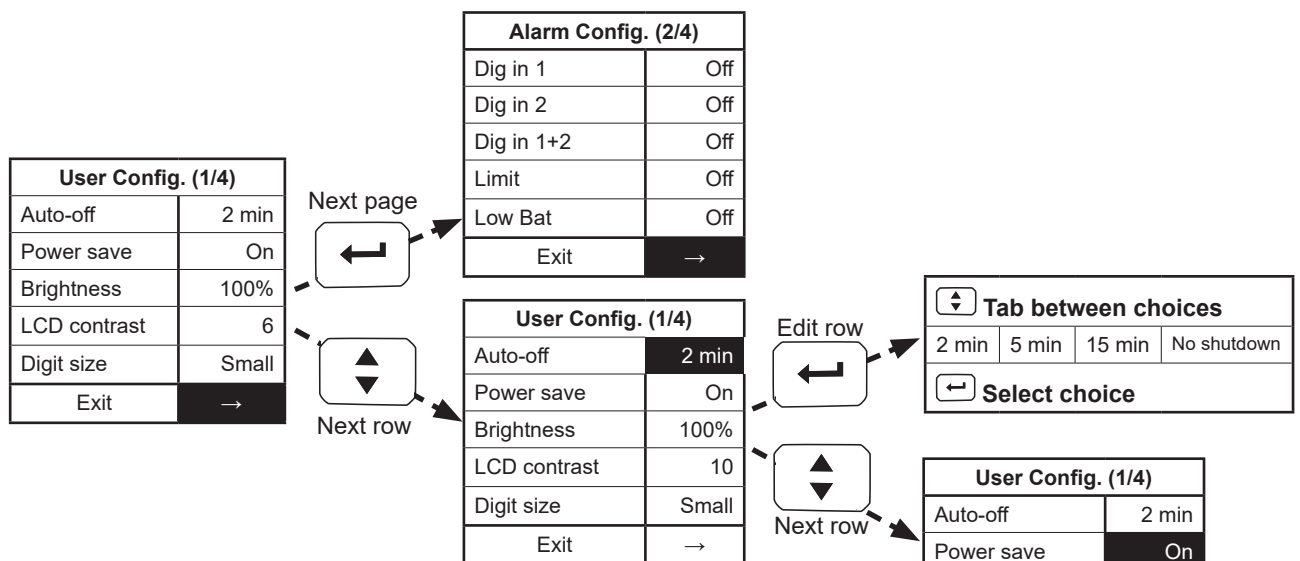
Enter the 4-digit PIN Code (default PIN Code is 0000).

Tab between the numbers 0-9 with  and select a number with .

If the incorrect PIN is entered the configuration menu closes and a new entering is necessary.

8.2 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 .



8.2.1 Menu pages

Menu pages overview:

User Config. (1/4)	Alarm Config. (2/4)	Radio Config. (3/4)	Misc Config. (4/4)
Auto-off 2 min	Dig. In 1 Off	Freq. Mode Fixed	Tilt (deg) 90°
Power save On	Dig. In 2 Off	Channel 0	PIN (admin) 0000
Brightness 100%	Dig. In 1+2 Off	TX Power 100%	PIN (user) 0000
LCD contrast 10	Limit Off	Pairing Enable	
Digit size Small	Low Bat Off	Region EU	Service mode ****
Exit →	Exit →	Exit →	Exit →

8.2.1.1 User configuration (page 1)

User Config. (1/4)	Choices	Description
Auto-off 2 min	5 min 15 min Off	Power save On - Automatically reduces brightness to 25% after 10 seconds off inactivity.
Power save Off	On	
Brightness 25 %	50 % 75 % 100% Off	
LCD contrast 6	0-20	
Digit size Small	Large	
Exit →		

8.2.1.2 Alarm & indications (page 2)

Alarm Config. (2/4)	Choices	Description
Dig.In 1 Off	Buzzer P Buzz. CP Vibr. P Vibr. CP	P = Pulse CP = Continuous Pulse Buzz. = Buzzer Vibr. = Vibration
Dig.In 2 Off	Buzzer P Buzz. CP Vibr. P Vibr. CP	
Dig.In 1+2 Off	Buzz. CP Vibr. CP Red LCD	
Limit Off	Buzz. CP Vibr. CP Red LCD	
Low Bat Buzzer P	Buzz. CP Off	
Exit →		

8.2.1.3 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 3 on page 23
TX Power 100%	25%	
Pairing Enable	Disabled	Pairing - Disable pairing function
Region EU	Other	
Exit →		

Channel no	434MHz EU	433-434 MHz Other
0	434,05	433,3
1	434,075	433,325
2	434,1	433,35
3	434,125	433,375
4	434,15	433,4
5	434,175	433,425
6	434,2	433,45
7	434,225	433,475
8	434,25	433,5
9	434,275	433,525
10	434,3	433,55
11	434,325	433,575
12	434,35	433,6
13	434,375	433,625
14	434,4	433,65
15	434,425	433,675
16	434,45	433,7
17	434,475	433,725
18	434,5	433,75
19	434,525	433,775
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
25	434,675	433,925
26	434,7	433,95
27	434,725	433,975
28	434,75	434
29	434,775	434,025
30		434,05
31		434,075
32		434,1
33		434,125
34		434,15
35		434,175
36		434,2
37		434,225
38		434,25
39		434,275
40		434,3
41		434,325
42		434,35
43		434,375
44		434,4
45		434,425
46		434,45
47		434,475
48		434,5
49		434,525
50		434,55
51		434,575
52		434,6
53		434,625
54		434,65
55		434,675
56		434,7
57		434,725
58		434,75
59		434,775

! Note. If the equipment is being operated in EU-region this setting has to 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.

Table 3. Fixed frequency list

8.2.1.4 Choices in menu page 4 (page 4)

Misc Config. (4/4)		Choices			Description
Tilt (deg)	Off	45°	90°	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	→				

8.3 Exit/Save

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

9 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 test is for reference only and can be extended by the system integrator in the specific installations and the corresponding risk analysis.

10 Indications

10.1 Receiver indications

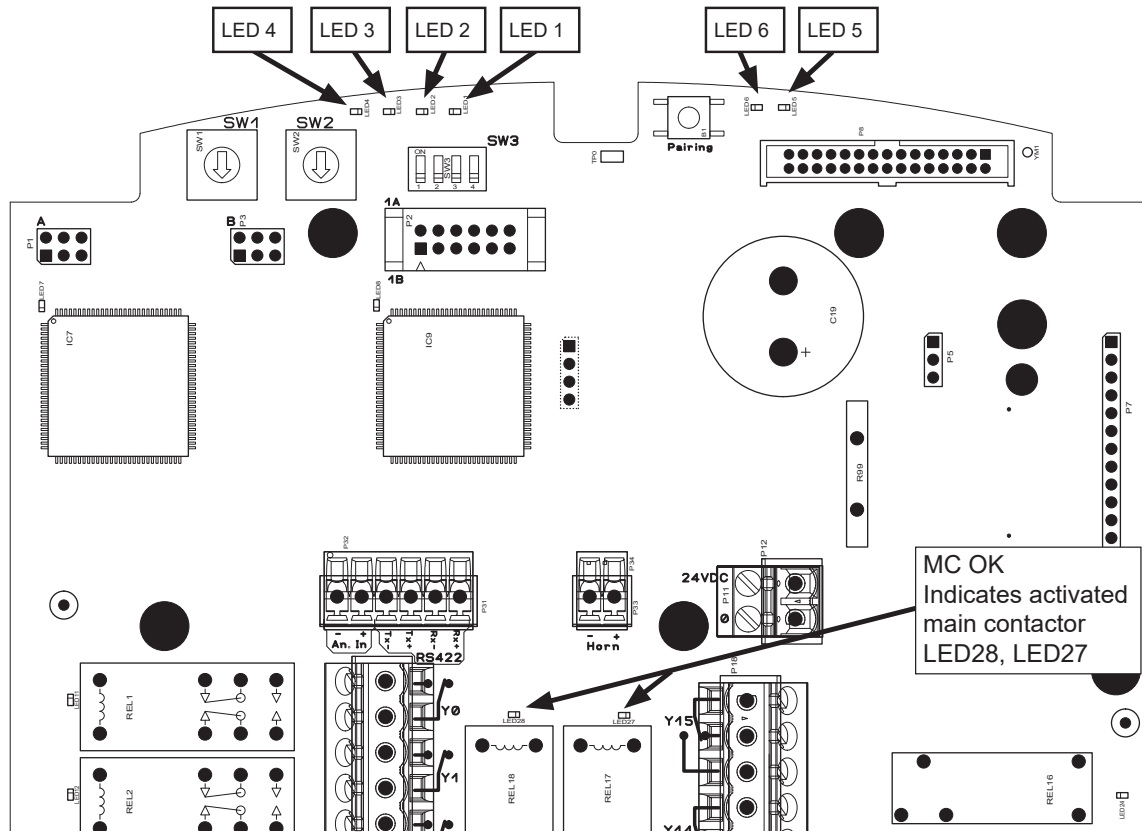


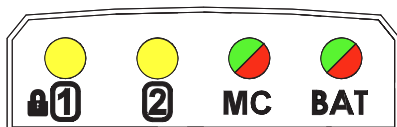
Figure 12. Indications on the MAIN board

Mode	Event	Indication on RX	Flash rate
LED 1-4			
TX command change	A change is detected in the transmitter switches or joysticks	LED 1 flashes	
Digital input data change		LED 2 flashes	
Message received		LED 3	
Squelch	Signal strength > -90 dBm	LED 4	
LED 5-6			ON/OFF
System OK	Not connected	LED 5 fast	50/50 ms
	Connected, MC=OFF	LED 5 slow	50/250 ms
	Connected, MC=ON	LED 5 extra slow	30/970 ms
	50% time out	LED 5 and LED 6 steady	
ERROR	Receiver internal error	LED 6 steady	
	Transmitter internal error	LED 6 fast	50/50 ms
Pairing	In pairing mode	LED 5 steady LED 6 fast	50/50 ms
	Paired	LED 5 steady	
LED 27-28			
MC activated		LED 27 & 28 steady	

Table 4. Mode, event and indications on the MAIN board

10.2 Transmitter indications

10.2.1 LED panel indications

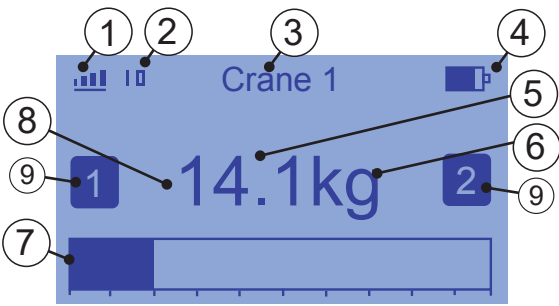


LED	Indications	Explanations
1	● Yellow continuous	Receiver digital in 1 active
	● ● ● Yellow flashing	Transmitter locked. PIN code login required
2	● Yellow continuous	Receiver digital in 2 active
MC	○ OFF	No link established
	● ● ● Green flashing	Link established Main Contactor OFF
	● Green continuous	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 transmitter during start up or operation detect a fault in any of the transmitters self-tests the status indicator will indicate continuously red light, after that the transmitter will shut down.	
	● ● ● Green flashing	Operating OK
	● ● ● Yellow flashing	Low Battery voltage. Operation can continue approximately 30 minutes depending on battery condition. A prompt change of battery is recommended.
	● Yellow continuous	Battery empty. Transmitter will shut-off.
	● Red continuous	Hardware fault
Pairing	Indications	Explanations
BAT	● ● ● ● 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 receiver has been pressed.

Table 5. Indications on the transmitter LED panel

10.2.2 Display indications






These symbols appear on the display by default. For configuration see RX16X configuration tool manual.



- 1. Radio signal / Main contactor indicator
- 2. Channel indicator, up to 3 digits
(if the 433MHz region setting is "Other" an "E" is displayed after the channel number)
- 3. Text field (crane id etc.)
- 4. Battery level
- 5. Weight, up to 5 digits
- 6. Weight unit (kg,t or lb)
- 7. Weight load graph (full-scale=max load)
- 8. Overload warning
- 9. Status indicator for digital input 1 and 2 on the receiver

10.2.2.1 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
				

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


This text is configured in the receiver (8 characters) using the RX16X configuration tool.

10.2.2.3 Battery level

Battery empty	25%	50%	75%	100% (fully charged)
				

10.2.2.4 Weight / Graph / Overload (option)

The weight is shown with the unit symbol kg, ton or lb. depending on the receiver configuration. The bar graph displays the weight load. Full scale= maximum load. At overload the overload symbol also appears to the left in the graph. The graph is only shown if a maximum weight limit is configured in the receiver.

This  overload symbol appears if the load on the crane reaches the weight limit (overload). Refer to the RX16X configuration tool.

10.2.2.5 STOP

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



11 Trouble shooting

11.1 First check

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 4 on page 25.

11.2 It is impossible to activate the Main Contactor

The transmitter has not been paired with the receiver. For LED position see Figure 12.

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 authorised 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.
- Check if the transmitter indicator MC is red (Main Contactor locked). See section 11.1.

11.3 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 and indicate 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.

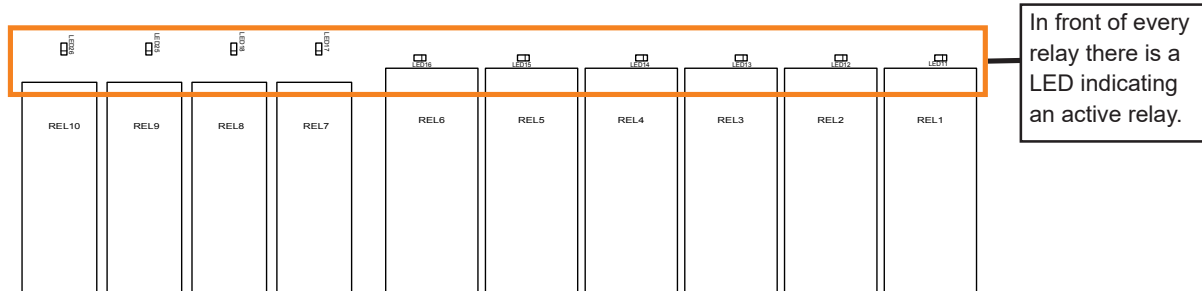


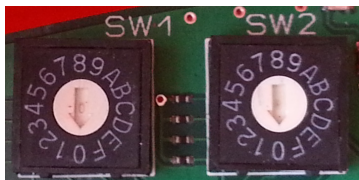
Figure 13. LED indicators indicating active outputs

11.4 Transmitter PIN locked

Both the user PIN and the admin PIN can be used to unlock the transmitter at start-up. If the PIN codes are lost they can be reset to 0000 by SW1:4 on when powering up the transmitter. Remember to turn SW1:4 off after the PIN has been reset.

12 Program Selection

There are two rotary switches for program selection in the receiver, see section 12.1, rotary switch SW1 and SW2. For position on the main board see Figure 3 on page 9.



Note! The switches must be set to the same position.

12.1 Program Selection list

Every program option is for 3 movements and 2 steps.


















For symbols on the transmitter see chapter “13 Layout joystick transmitters” on page 39.


















For relay see “Figure 5. Relay symbol explanation” on page 11.


















Safety relays (Y0-Y5) for movements is indicated by **bold text** in the function column.


















!	For Australia it is a 5 second delay for the “lamp”
!	For Australia: Program option D = 1 but with the difference that output Y11 is activated by Up/Down/North/South/East/West-” movement activated”
!	Difference in program selection at Tandem/Multi-operator operation:
Program option 0:	! Not available for tandem/multi-operator operation.
Program option 1-D:	Y14 indication driver A and Y15 indication driver B
Program option 1,2,4,6,A,B,D:	Y13 interconnection crane A & B
Program option 3,5,7,8,9,C:	Y9 interconnection crane A & B


















Program Option 0 - 12pc Single functions for JUPITER Era 100/150J			
Terminal	Connector	Cable part	Function
P21	Y4		Right joystick Backward
	Y5		Right joystick Forward
	Y6		Left joystick Left
	Y7		Left joystick Right
P27	Y8		Left joystick Forward
	Y9		Left joystick Backward
P20	Y10		SW 2 - ①
	Y11		SW 3 - ②
	Y12		SW 1
	Y13		SW 1 - (🐢)
P18	Y14		SW 4 [A]
	Y15		SW 5 [B]

















Program Option 1 - 3 outputs per movement				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down	Right joystick Forward
	Y5 		Hoist up	Right joystick Backward
	Y6 		Bridge high speed	
	Y7 		Trolley high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - ①
	Y9 		Trolley 2/Selection 2	SW 3 - ②
P20	Y10 		Hoist high speed	
	Y11 		X	SW 1 - X
	Y12 		-	
	Y13 		A	SW 4 - A
P18	Y14 		B	SW 5 - B
	Y15 		Horn	

















Program Option 2 - Different outputs for high speed up and down				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down	Right joystick Forward
	Y5 		Hoist up	Right joystick Backward
	Y6 		Bridge high speed	
	Y7 		Trolley high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - ①
	Y9 		Trolley 2/Selection 2	SW 3 - ②
P20	Y10 		Hoist down high speed	
	Y11 		Hoist up high speed	
	Y12 		X	SW 1 - X
	Y13 		Horn	
P18	Y14 		A	SW 4 - A
	Y15 		B	SW 5 - B

















Program Option 3 - All high speed outputs are separately (X/Y function)				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down	Right joystick Forward
	Y5 		Hoist up	Right joystick Backward
	Y6 		Bridge forward high speed	
	Y7 		Bridge backward high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - ①
	Y9 		Trolley 2/Selection 2	SW 3 - ②
P20	Y10 		Trolley left high speed	
	Y11 		Trolley right high speed	
	Y12 		Hoist down high speed	
	Y13 		Hoist up high speed	
P18	Y14 		X	SW 1 - ④
	Y15 		Horn	

















Program Option 4 - 3 outputs per movement + MC-ON function. (KONECRANES)				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down	Right joystick Forward
	Y5 		Hoist up	Right joystick Backward
	Y6 		Bridge high speed	
	Y7 		Trolley high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - ①
	Y9 		Trolley 2/Selection 2	SW 3 - ②
P20	Y10 		Hoist high speed	
	Y11 		MC ON	I
	Y12 		X	SW 1 - ④
	Y13 		Horn	
P18	Y14 		A	SW 4 - A
	Y15 		B	SW 5 - B


















Program Option 5 - Outputs for low speed and high speed for each movement (X/Y function)				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down	Right joystick Forward
	Y5 		Hoist up	Right joystick Backward
	Y6 		Bridge low speed	
	Y7 		Bridge high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - ①
	Y9 		Trolley 2/Selection 2	SW 3 - ②
P20	Y10 		Trolley low speed	
	Y11 		Trolley high speed	
	Y12 		Hoist low speed	
	Y13 		Hoist high speed	
P18	Y14 		X	SW 1 - ④
	Y15 		Horn	


















Program Option 6 - Different outputs for high speed up and down + MC ON function				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down	Right joystick Forward
	Y5 		Hoist up	Right joystick Backward
	Y6 		Bridge high speed	
	Y7 		Trolley high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - ①
	Y9 		Trolley 2/Selection 2	SW 3 - ②
P20	Y10 		Hoist down high speed	
	Y11 		MC ON	I
	Y12 		Hoist up high speed	
	Y13 		A	SW 4 - A
P18	Y14 		B	SW 5 - B
	Y15 		X	SW 1 - ④

















Program Option 7 - All high speed outputs are separately (A/B function)				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down	Right joystick Forward
	Y5 		Hoist up	Right joystick Backward
	Y6 		Bridge forward high speed	
	Y7 		Bridge backward high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - 1
	Y9 		Trolley 2/Selection 2	SW 3 - 2
P20	Y10 		Trolley left high speed	
	Y11 		Trolley right high speed	
	Y12 		Hoist down high speed	
	Y13 		Hoist up high speed	
P18	Y14 		A	SW 4 - A
	Y15 		B	SW 5 - B


















Program Option 8 - Outputs for low speed and high speed for each movement (A/B function)				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down	Right joystick Forward
	Y5 		Hoist up	Right joystick Backward
	Y6 		Bridge low speed	
	Y7 		Bridge high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - 1
	Y9 		Trolley 2/Selection 2	SW 3 - 2
P20	Y10 		Trolley low speed	
	Y11 		Trolley high speed	
	Y12 		Hoist low speed	
	Y13 		Hoist high speed	
P18	Y14 		A	SW 4 - A
	Y15 		B	SW 5 - B


















Program Option 9 - Low speed in first step disappears in the second step (X/Y function)			
Terminal	Connector	Cable part	Function
P15	Y0 		Bridge forward low speed
	Y1 		Bridge backward low speed
	Y2 		Trolley left low speed
	Y3 		Trolley right low speed
P21	Y4 		Hoist down low speed
	Y5 		Hoist up low speed
	Y6 		Bridge forward high speed
	Y7 		Bridge backward high speed
P27	Y8 		Trolley 1/Selection 1
	Y9 		Trolley 2/Selection 2
P20	Y10 		Trolley left high speed
	Y11 		Trolley right high speed
	Y12 		Hoist down high speed
	Y13 		Hoist up high speed
P18	Y14 		X
	Y15 		Horn


















Program Option A - Different outputs for high speed up and down. Transition from high speed to low speed – delayed 1s. (DEMAG, Dematek)				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down	Right joystick Forward
	Y5 		Hoist up	Right joystick Backward
	Y6 		Bridge high speed	
	Y7 		Trolley high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - 1
	Y9 		Trolley 2/Selection 2	SW 3 - 2
P20	Y10 		Hoist down high speed	
	Y11 		Hoist up high speed	
	Y12 		X	SW 1 - X
	Y13 		Horn	
P18	Y14 		A	SW 4 - A
	Y15 		B	SW 5 - B

Program Option B - 3 outputs per movement. Blocked 1s with zero position transition. (ABUS)				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down	Right joystick Forward
	Y5 		Hoist up	Right joystick Backward
	Y6 		Bridge high speed	
	Y7 		Trolley high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - 1
	Y9 		Trolley 2/Selection 2	SW 3 - 2
P20	Y10 		Hoist high speed	
	Y11 		X	SW 1 - X
	Y12 		-	
	Y13 		(A)	(SW 4 - A)
P18	Y14 		(B)	(SW 5 - B)
	Y15 		Horn	

Program Option C - Low speed in first step disappears in the second step (A/B function)				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward low speed	
	Y1 		Bridge backward low speed	
	Y2 		Trolley left low speed	
	Y3 		Trolley right low speed	
P21	Y4 		Hoist down low speed	
	Y5 		Hoist up low speed	
	Y6 		Bridge forward high speed	
	Y7 		Bridge backward high speed	
P27	Y8 		Trolley 1/Selection 1	
	Y9 		Trolley 2/Selection 2	
P20	Y10 		Trolley left high speed	
	Y11 		Trolley right high speed	
	Y12 		Hoist down high speed	
	Y13 		Hoist up high speed	
P18	Y14 		A	
	Y15 		B	

Program Option D - Hoist low speed				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down low speed	
	Y5 		Hoist up low speed	
	Y6 		Bridge high speed	
	Y7 		Trolley high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - ①
	Y9 		Trolley 2/Selection 2	SW 3 - ②
P20	Y10 		Hoist down high speed	
	Y11 		Hoist up high speed	
	Y12 		X	SW 1 - ④
	Y13 		Horn	
P18	Y14 		A	SW 4 - A
	Y15 		B	SW 5 - B

Program Option E - 3 outputs per movement with common movement indication output on Y12				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down	Right joystick Forward
	Y5 		Hoist up	Right joystick Backward
	Y6 		Bridge high speed	
	Y7 		Trolley high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - ①
	Y9 		Trolley 2/Selection 2	SW 3 - ②
P20	Y10 		Hoist high speed	
	Y11 		X	SW 1 - ④
	Y12 		Common movement indication	
	Y13 		A	SW 4 - A
P18	Y14 		B	SW 5 - B
	Y15 		Horn	

Program Option F - 3 outputs per movement + MC-ON function. Common movement indication output on Y12				
Terminal	Connector	Cable part	Function	
P15	Y0 		Bridge forward	Left joystick Forward
	Y1 		Bridge backward	Left joystick Backward
	Y2 		Trolley left	Left joystick Left
	Y3 		Trolley right	Left joystick Right
P21	Y4 		Hoist down	Right joystick Forward
	Y5 		Hoist up	Right joystick Backward
	Y6 		Bridge high speed	
	Y7 		Trolley high speed	
P27	Y8 		Trolley 1/Selection 1	SW 2 - 1
	Y9 		Trolley 2/Selection 2	SW 3 - 2
P20	Y10 		Hoist high speed	
	Y11 		MC ON	I
	Y12 		Common movement indication	
	Y13 		Horn	
P18	Y14 		A	SW 4 - A
	Y15 		B	SW 5 - B

13 Layout joystick transmitters

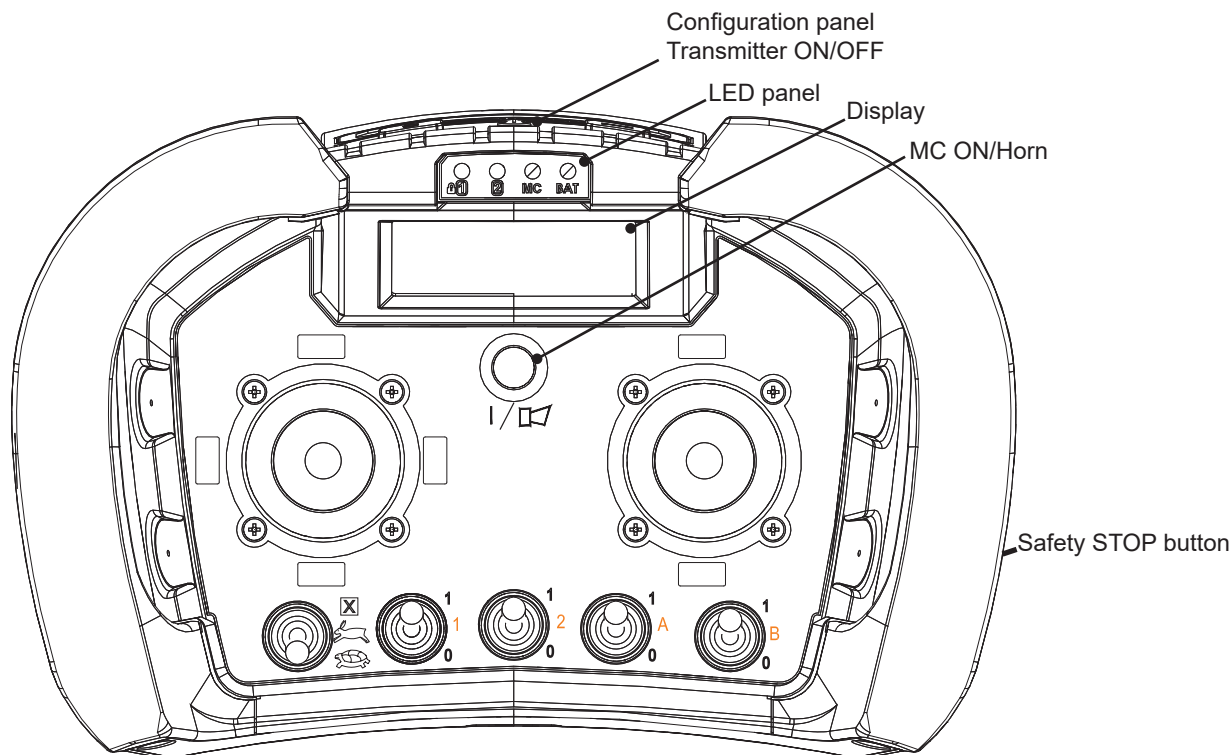


Figure 14. Transmitter overview (example in the figure; Jupiter Era 150J)

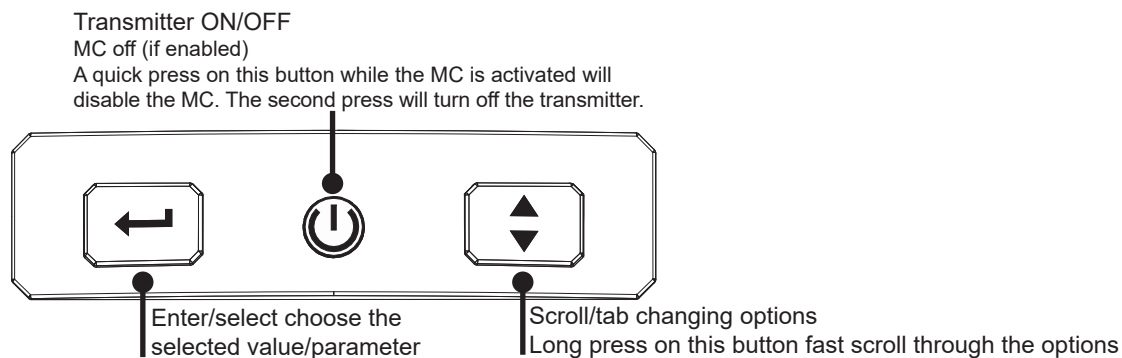


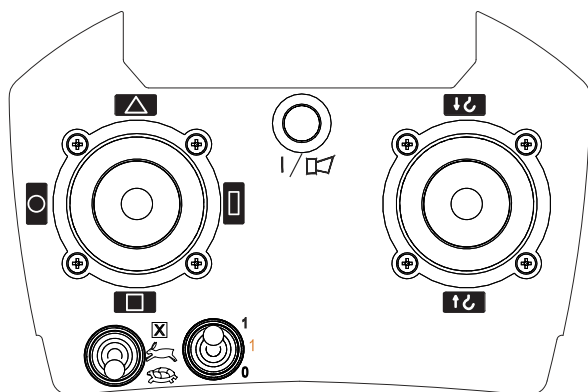
Figure 15. Configuration panel overview

13.1 Place symbol label

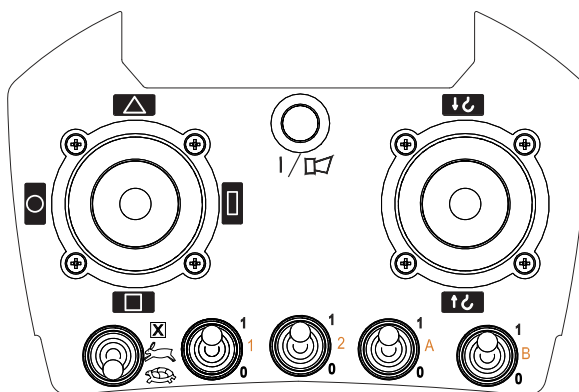
Alongside the joysticks there is room for a symbol label. A sheet of symbol labels are included with the delivery.

1. Before placing the label, clean the surface with alcohol (do not use isopropyl alcohol).
2. Place the label; make sure that the symbol label is placed at the right position, see section 13.1.1, 13.1.2 and 13.1.3.

13.1.1 Nordic symbols

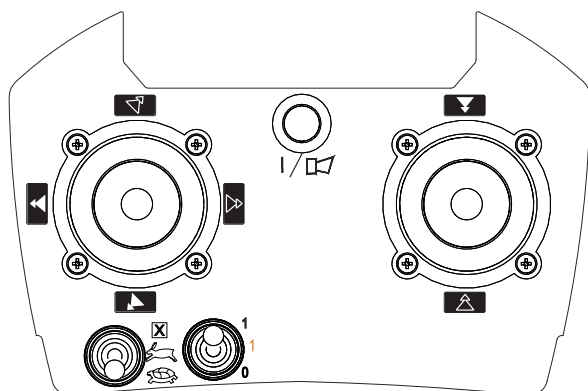


Jupiter Era 100

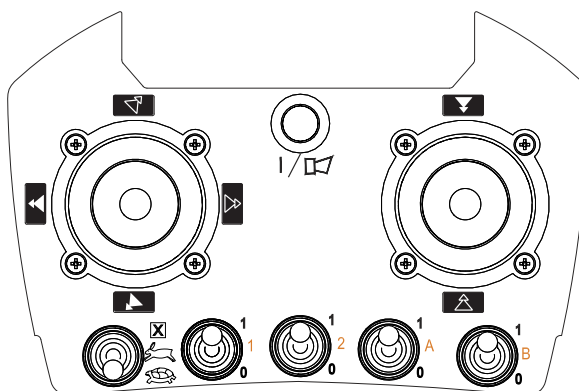


Jupiter Era 150

13.1.2 DIN symbols

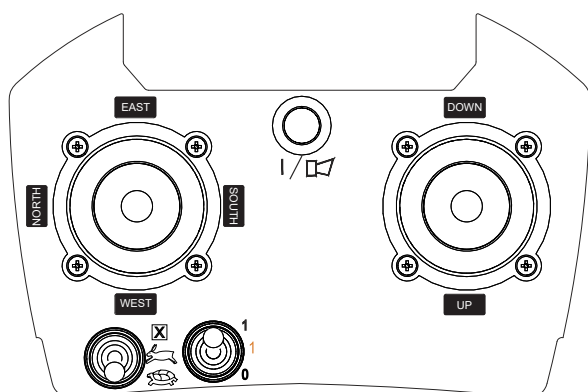


Jupiter Era 100

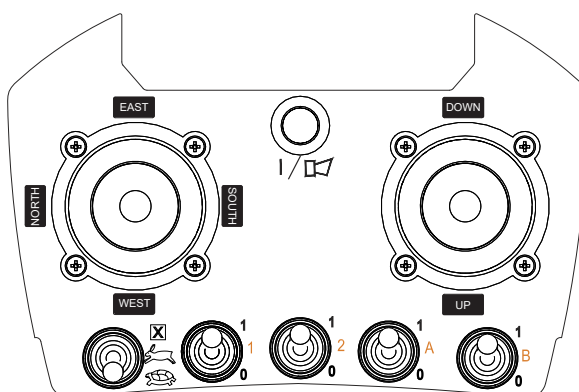


Jupiter Era 150

13.1.3 CS symbols










Jupiter Era 100









Jupiter Era 150







13.2 Symbol explanation

Micro	Slow speed operation	
Normal	Normal speed	
Extra	Optional feature	
Extra	Optional feature	
Siren		
Selection 1		
Selection 2		
Selection A		A
Selection B		B

NORDIC SYMBOLS:

Hoist	Up		Down	
Trolley	Left		Right	
Bridge	Forward		Reverse	

DIN SYMBOLS:

Hoist	Up		Down	
Trolley	Left		Right	
Bridge	Forward		Reverse	

CS SYMBOLS:

Hoist	Up	UP	Down	DOWN
Trolley	Left	NORTH	Right	SOUTH
Bridge	Forward	EAST	Reverse	WEST

Appendix 1 - European Radio Regulation

Excerpt from ERC RECOMMENDATION 70-03:

Frequency Band		Power / Magnetic Field	Spectrum access and mitigation 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 modulation 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 bandwidth ≤ 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 (note 4bis)	≤ 5 mW e.r.p.	No requirement	No spacing (for 1 or more channels)	Narrow / wide-band modulation. No channel spacing, however the whole stated frequency band may be used
		≤ 25 mW e.r.p.	up to 1% duty cycle or LBT+AFA (note 1)		

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 ≤ 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. bandwidth ≤ 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 2 - Settings, notes

SYSTEM

Customer: _____

Object: _____

Serial number: _____

System ID: _____

Frequency: _____

Freq.mode: Fixed ☐ Channel: _____

TRANSMITTER; GENERIC

Shutdown time (auto-off): 2 min ☐ 5 min ☐ 15 min ☐ OFF ☐

PIN-code (user): Enable ☐ Disable ☐

Heavy weight PIN-code: Enable ☐ Disable ☐

TX power (radio comm power): _____

Specific settings for joystick transmitter Era 100/150J:

User Configuration

Power save: ON ☐ OFF ☐ LCD contrast: _____ Digit size: Small ☐ Large ☐

Alarm Configuration

Dig.In 1:	OFF	<input type="checkbox"/>	Buzzer P	<input type="checkbox"/>	Buzzer CP	<input type="checkbox"/>	Vibration P	<input type="checkbox"/>	Vibration CP	<input type="checkbox"/>
Dig.In 2:	OFF	<input type="checkbox"/>	Buzzer P	<input type="checkbox"/>	Buzzer CP	<input type="checkbox"/>	Vibration P	<input type="checkbox"/>	Vibration CP	<input type="checkbox"/>
Dig.In 1+2:	OFF	<input type="checkbox"/>	Vibration CP	<input type="checkbox"/>	Buzzer CP	<input type="checkbox"/>	Red LCD	<input type="checkbox"/>		
Limit:	OFF	<input type="checkbox"/>	Vibration CP	<input type="checkbox"/>	Buzzer CP	<input type="checkbox"/>	Red LCD	<input type="checkbox"/>		
Low Bat:	OFF	<input type="checkbox"/>	Buzzer P	<input type="checkbox"/>	Buzzer CP	<input type="checkbox"/>				

Misc Configuration

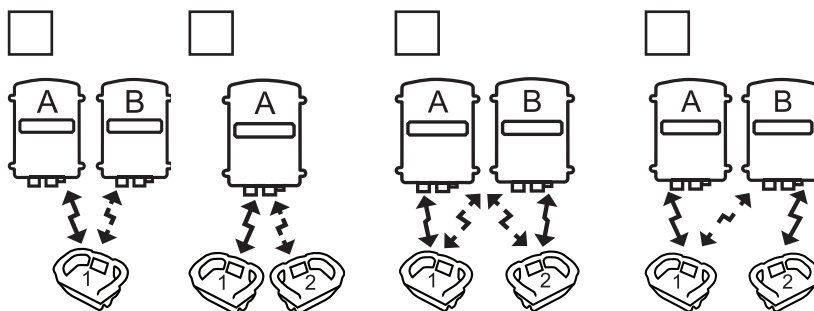
Tilt (deg): OFF ☐ 45° ☐ 90° ☐ 135° ☐
 PIN (admin): Enable ☐ Disable ☐

Specific settings for Receiver RX161:

Program Option: 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐

Micro (slow speed) Operation: Non simultaneous ☐ Simultaneous ☐

Tandem and Multi-operator Operation



Crane A: _____

Crane B: _____

Transmitter 1: _____

Transmitter 2: _____



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