MC-2120 controller Operating and Maintenance Manual

industrial control

CHAPTER 1: CUSTOMER INFORMATION

THANK YOU FOR PURCHASING AN INDUSTRIAL CONTROL PRODUCT

Read all instructions and warnings carefully before mounting, installing and configuring the products.

These instructions have been published by INDUSTRIAL CONTROL and are not subject to any guarantee. The instructions may be withdrawn or revised by INDUSTRIAL CONTROL at any time and without further notice.
Corrections and additions will be added to the latest version of the instructions. Always download the installation instructions from our website, www.incontrol-co.com, for the latest available version. Keep the safety instructions for future reference.

IMPORTANT! These instructions are intended for end users.
They can be printed and handed to end users. The installation instructions containing information about the installation and configuration of the radio Controller unit on the machine is not intended to be passed on to the end user. Only such information that is needed to operate the machine correctly by radio controller may be passed on to the end user. INDUSTRIAL CONTROL MC controller are often built into wider applications. Always refer to the applicable local regulations for installation and safety requirements relating to cranes, hoists or other material handling and/or lifting equipment's using INDUSTYRIAL CONTROL products, e.g.: n applicable local and industrial standards and requirements, n applicable occupational health and safety regulations, n applicable safety rules and procedures for the factory where the equipment is being used, n user and safety manuals or instructions of the manufacturer of the equipment where INDUSTRIAL CONTROL MC controller systems are installed.
INDUSTRIAL CONTROL instructions do not include or address the specific instructions and safety warnings of the end product manufacturer.
INDUSTRIAL CONTROL products are covered by a guarantee/warranty against material, construction or manufacturing faults, see § "GUARANTEE, SERVICE, REPAIRS AND MAINTENANCE" on page 11
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ABOUT SYSTEMS
The RC & MC product range is composed of transmitters and receivers intended for use together as a system in complex control applications as an industrial firefighting monitor remote control.

ABOUT THIS DOCUMENT

Every care has been taken in the preparation of this manual. Please inform INDUSTRIAL CONTROL of any inaccuracies or omissions. These End user instructions cover general safety issues, main technical specifications, standard installation, operating instructions, general troubleshooting information and regulatory information. Images shown in this document are for illustrative purposes only.

Term and symbol definitions

The capitalized terms and symbol used herein shall have the following meaning:

- WARNING! indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- CAUTION! indicates a hazardous situation which, if not avoided, will result in minor or moderate injury.
- IMPORTANT! is used for information that requires special consideration.
- NOTE! is used to address practices not related to physical injury.

This symbol is used to call attention to safety messages that would be assigned the signal words "WARNING" or "CAUTION".

WARNINGS & RESTRICTIONS

Carefully read through the following safety instructions before proceeding with the installation, configuration, operation or maintenance of the product. Failure to follow these warnings could result in serious injury and property damage.

RC & MC products must not be operated without having read and understood the End User instructions, specific technical documentation (when provided), and having received the appropriate training. The purchaser of this MC product has been instructed how to use the system safely.

Operation

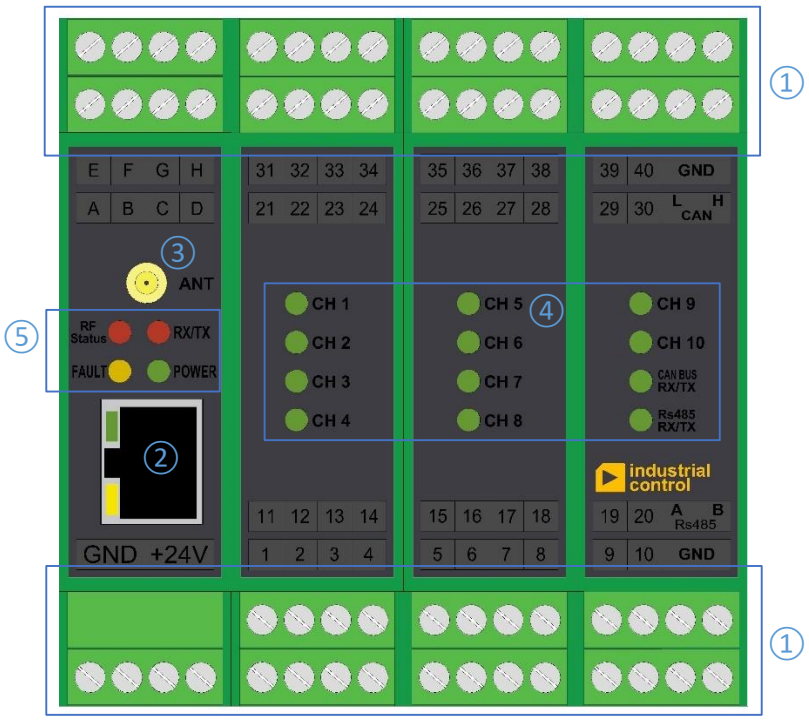
- This radio system should not be used in areas where there is a risk of explosion unless you put it in an explosion-proof housing. (For Antenna it is recommended explosion proof type with related barrier)
- Only qualified personnel should be permitted to access the controller and operate the equipment.
- Always follow operating and maintenance instructions as well as all applicable safety procedures and requirements.
- Do not open the controller housing unless you are qualified.
- You must satisfy the age requirements in your country for operating the equipment.
- It is strictly prohibited to operate the equipment under the influence of drugs, alcohol and/or medications.
- Always test the stop button before operating it. Press the stop button on console then twist and pull it out. This test should be done on each shift, without a load.
- Never use a MC if the stop button is mechanically damaged. Contact your supervisor/representative for service immediately.

Maintenance

- Keep the safety instructions for future reference. Always download the End user instructions from our website for the latest available version.
- Always contact your representative for service and maintenance work on the product.
- If error messages are shown, it is very important to find out what caused them. Contact your representative for help.
- The functionality of the stop button should be tested at least after every 200 hours' use. Test the stop button by pressing it and pulling it out.
- If the stop button is mechanically damaged, do not use the transmitter. Contact your representative for service immediately.
- Before maintenance intervention on any remote-controlled equipment:
  A- always remove all electrical power from the equipment.
  B- always follow lockout procedures.

CHAPTER 2: PRODUCT DESCRIPTION

CONTROLLER FRONT VIEW



1: Input / Output Terminal	4: I/O Card Indicator Status
2: Ethernet connector	5: RF Module / CPU Indicator Status
3: SMA Antenna connector	

TERMINAL DESCRIPTION

	Port Description	I/O	Signal type	Terminal No.
1	Left Command	Out	+24Vdc Up to 500mA output to Relay, Contactor, or Solenoid Valve control command	1
2	Right Command	Out		2
3	Up Command	Out		3
4	Down Command	Out		4
5	Motor Fog Command	Out		5
6	Motor Jet Command	Out		6
7	Water MOV Open Command	Out		7
8	Water MOV Close Command	Out		8
9	Foam MOV Open Command	Out		9
10	Foam MOV Close Command	Out		10

	Port Description	I/O	Signal type	Terminal No.
11	Left Status	In	+24Vdc Optocoupler protected input	11
12	Right Status	In		12
13	Up Status	In		13
14	Down Status	In		14
15	Motor Fog Status	In		15
16	Motor Jet Status	In		16
17	Water MOV Open Status	In		17
18	Water MOV Close Status	In		18
19	Foam MOV Open Status	In		19
20	Foam MOV Close Status	In		20
21	Left Joystick Command Station	In	+24Vdc Optocoupler protected input	21
22	Right Joystick Command Station	In		22
23	Up Joystick Command Station	In		23
24	Down Joystick Command Station	In		24
25	Motor Fog Joystick Command Station	In		25
26	Motor Jet Joystick Command Station	In		26
27	Water MOV Open Joystick Command Station	In		27
28	Water MOV Close Joystick Command Station	In		28
29	Foam MOV Open Joystick Command Station	In		29
30	Foam MOV Close Joystick Command Station	In		30
31	Emergency Stop Command Station	In		A
32	Enable / Disable Command Station	In		B
33	Oscillating	In		C
34	Com. Fault	In		D
35	Left Indicator Command Station	Out	Up to 500mA open collector output	31
36	Right Indicator Command Station	Out		32
37	Up Indicator Command Station	Out		33
38	Down Indicator Command Station	Out		34
39	Motor Fog Indicator Command Station	Out		35
40	Motor Jet Indicator Command Station	Out		36
41	Water MOV Open Indicator Command Station	Out		37
42	Water MOV Close Indicator Command Station	Out		38
43	Foam MOV Open Indicator Command Station	Out		39
44	Foam MOV Close Indicator Command Station	Out		40
45	sensor off	Out		E
46	Enable / Disable Indicator Command Station	Out		F
47	Oscillating indicator command station	Out		G
48	Fault Indicator Command Station	Out		H
49	Input supply Positive Voltage	-24Vdc	GND	
50	Input supply Negative Voltage		GND	
51	Input supply Positive Voltage	24Vdc	+24V	
52	Input supply Negative Voltage		+24V	
53	RS485	A		
54		B		
55	CAN BUS	L		
56		H		

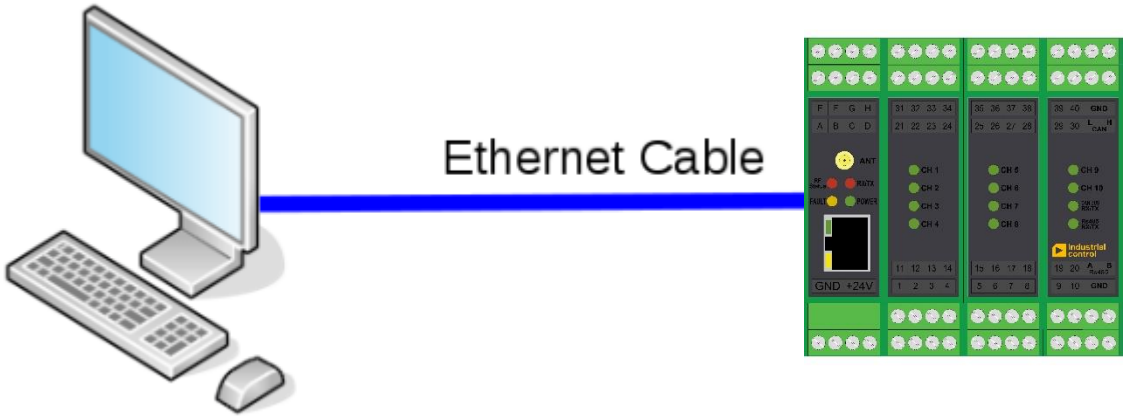
CHAPTER 3: CONFIGURATION

This section will show you how to configure your new MC controller using the web-based configuration utility.

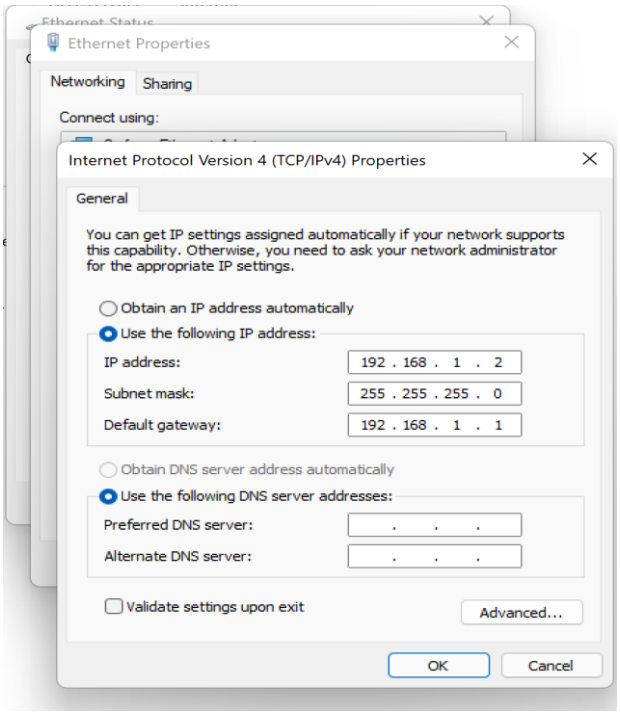
Web-based Configuration Utility

If you wish to change the default settings or optimize the performance of the MC-2120, you may use the web-based configuration utility.

After power on, connect Ethernet cable from PC to MC-2120

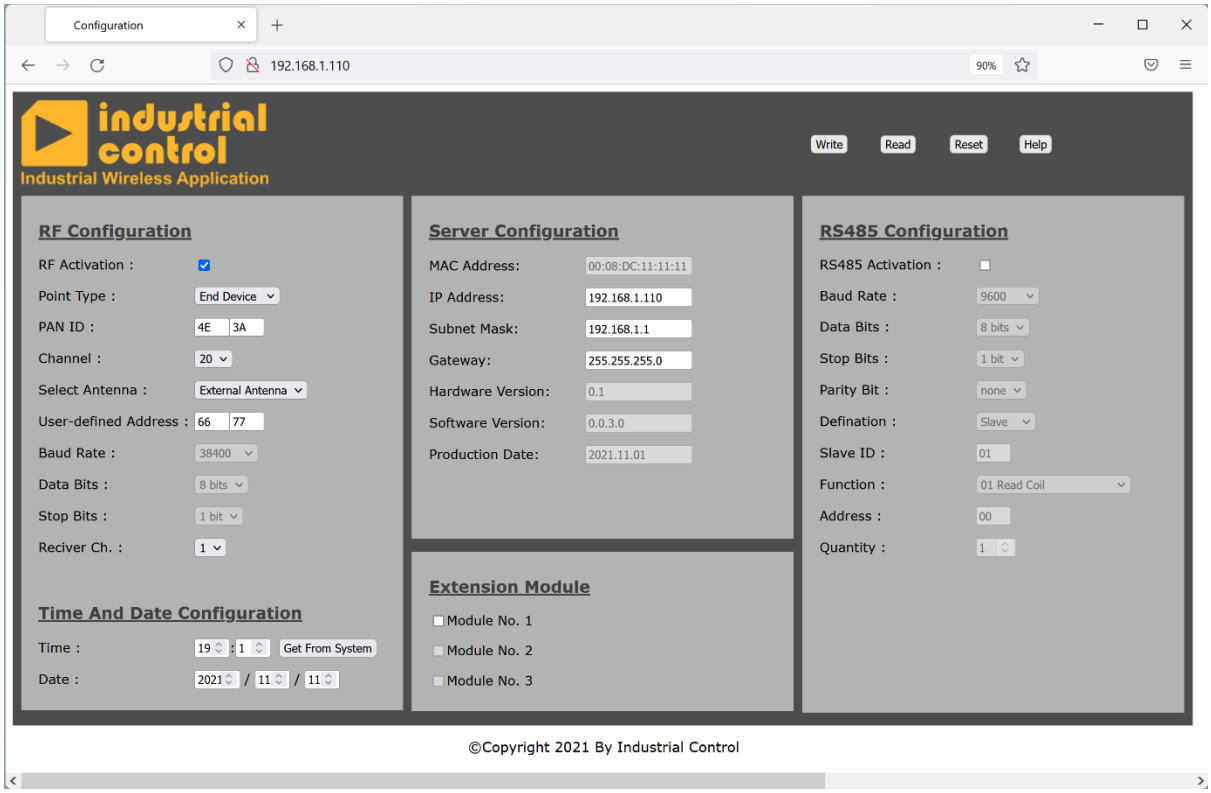


Go to control panel -> network and sharing center -> Ethernet properties and setup TCP/IPv4 as manual.



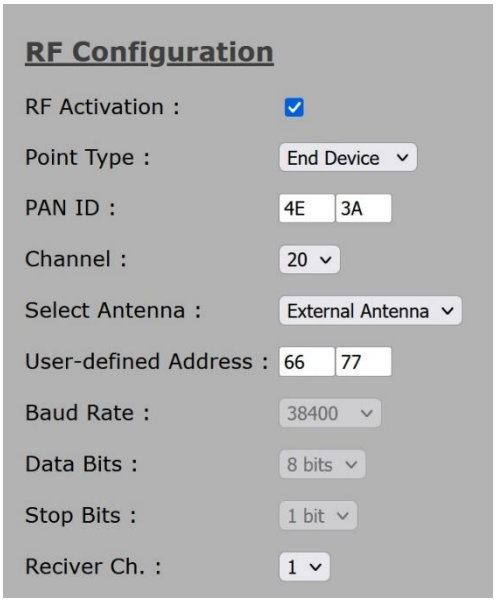
To access the configuration utility, open a web browser such as Internet Explorer or Firefox and enter http://192.168.1.110 in the address field.

Note: our recommendation is Firefox browser.

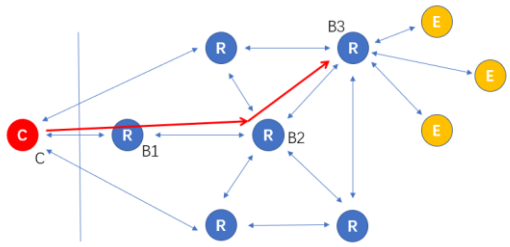


RF Configuration

RF Activation: Check the box to enable the wireless function. If you do not want to use wireless, uncheck the box to disable all the wireless functions.



Point type: The MC2120 network is a MESH network. A network consists of a Coordinator (master) and N routers (routers, slave modules). All nodes have the same channel and PAN ID.



Note: always the RC remote control is set to coordinator as factory set.

PAN ID: MC-2120 networks are called personal area networks (PANs). Each network is defined with a unique PAN identifier (PAN ID), which is common among all devices of the same network. MC-2120 devices are either preconfigured with a PAN ID to join, or they can discover nearby networks and select a PAN ID to join.
MC-2120 supports 00 01-FF 00 PAN ID. Both PAN IDs are used to uniquely identify a network. Devices on the same network must share the same PAN IDs. If multiple MC-2120 networks are operating within range of each other, each should have unique PAN IDs.

Channel: Users can change the channel (2405 MHz~2480 MHz), the corresponding channel 11 ~ 26 optional.

Note: If the gateway is used as a data node for the positioning system, it needs to be set to: PAN ID = 0xDEBF, channel = 15

Select Antenna: Users can switch between on bored antenna or external.

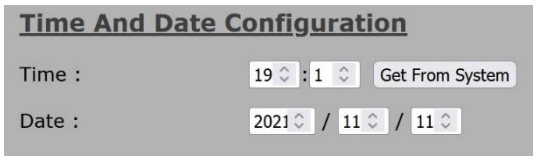
User defined address: self-address ranges from 0001 ~ to FF00

Receiver Ch.: this setting is related to Channel RC remote control selection. can be set 1 to 4

Note: each RC remote control can be full control 4 No. MC-2120 controller.

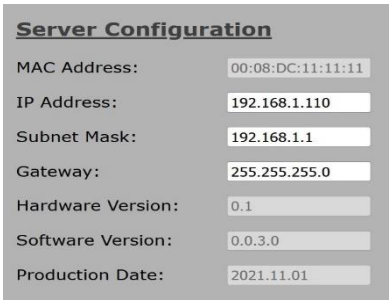
Clock Configuration

To set RC remote control time & date use this setting.



Server Configuration/Hardware & software version

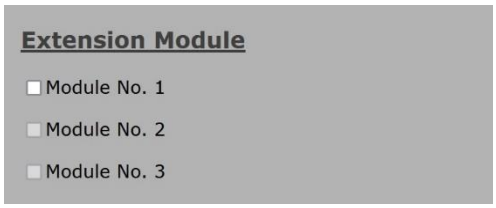
Users can change the IP address with this setting.

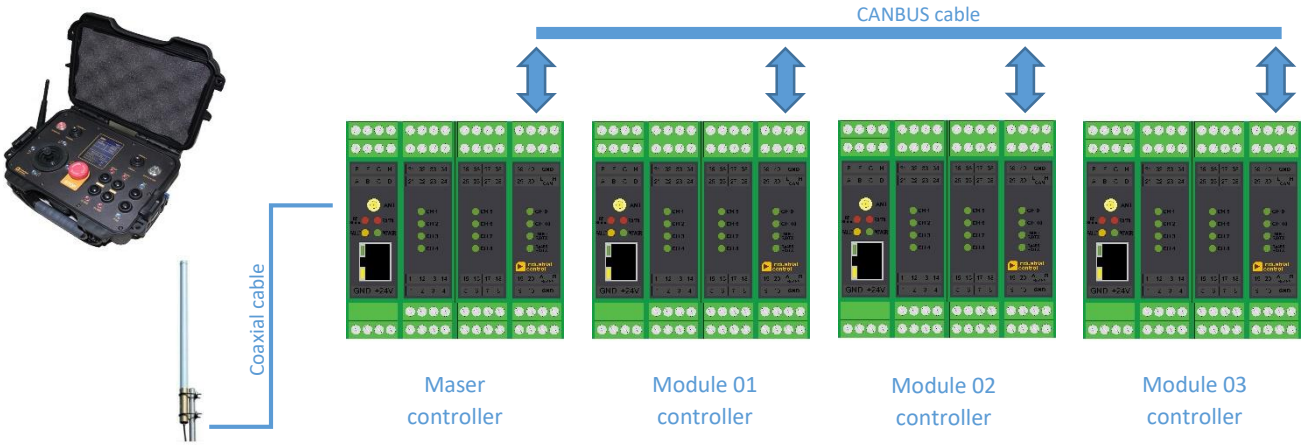


Extension Module

Check the box to enable the module No.1 to 3. If you do not want to use extension module, uncheck the box to disable all the functions.

This mode to use network 4 No. MC2120 via CANBUS with one antenna.



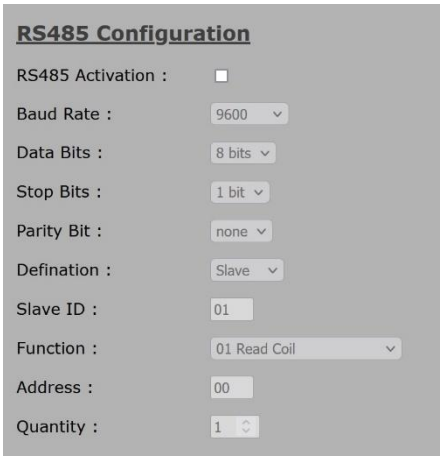


RS485 Configuration

Check the box to enable the RS485. If you do not want to use extension module, uncheck the box to disable all the functions.

This mode to use connect MC2120 to RC remote control or HMI via RS485 Modbus. In this mode disable RF function.

Note: In this function the MC-2120 set to slave & RC remote is master by factory set



CHAPTER 4: OPERATION

To control a receiver, the transmitter must be registered and logged in to the receiver. If another transmitter is already logged in to the receiver, it must be logged out before a different transmitter can be logged in. If no transmitter is logged in to a receiver, any registered transmitter will automatically log in when sending radio signals to the receiver. The transmitter will remain logged in until it is manually logged out.

NOTES!

- More than one transmitter can be registered in the receiver, but only one transmitter can be logged in at a time. (by factory setting is applicable for transmitter)
- Up to 4 No. MC receiver can be register in one RC transmitter

START THE TRANSMITTER (RC portable remote control)

IMPORTANT! To be able to control a receiver with the transmitter, the transmitter must be registered in the receiver.

If no receiver is registered, the display will show [Offline] after the stop button has been pulled out.

NOTE! By default, all the receivers & transmitter register by factory.

1- Make sure that the stop button is pressed.
2- Press the [POWER ON] button. transmitter starts the lamp test. after lamp test the selection receivers (monitors) appear on the display [figure No.01].
3- Select a receiver (monitor). Move CH +/- toggle switch to step between the registered receivers. Move UP Angle+/- toggle switch to select the requested receiver. One of a receiver has been selected.
4- Pull out stop button. the status on the display shows [RUN]. if the transmitter be registered in the receiver, LED indicator status will light if active on main controller.
5- Move CH +/- toggle switch up /down to step between the registered receivers. If no receiver is registered, the display will show [STATUS: offline].
6- In this case the LED indicator on Fix console [POWER ON] button stays on/off each 1 sec.

If not successfully completed, the display will show [offline & disconnect].

If no button press or joystick move is established within 30 seconds, the transmitter goes to standby.

If stop button push in operation condition, the LED indicator on RC transmitter goes off & STOP logo appear on display [figure No.04].

START THE FIX console (MC receiver located on Fix console)

IMPORTANT! To be able to control a receiver with the transmitter, the transmitter must be registered in the receiver.

NOTE! By default, all the receivers & transmitter register by factory.

1- Make sure that the stop button is pressed.
2- Press the [POWER ON] button. Fix console starts the lamp test. In this case the LED indicator on Fix console [POWER ON] button stays on.
3- Pull out stop button. The monitor is ready for operation

In this case the Fix console never goes to standby.

If stop button push in operation condition, the LED indicator on RC transmitter goes off & STOP appear on display [figure No.04].

Disable & Enable RC transmitter when the fix console is activated

When the fix console is running the LED indicator on Fix console [POWER ON] button stays on. In this case if you pressed [POWER ON] button on transmitter and select relevant monitor on display appear “FIX CONSOLE ACTEVATED” [figure No.07].

To enable RC transmitter, press the [POWER ON] button one time on fix console. In this case the LED indicator on Fix console [POWER ON] button stays on/off each 1 sec.

SWITCH THE TRANSMITTER OFF

NOTE! When the transmitter is switched off, it remains logged in to the receiver(s). To logout, see § "Logout" on page 09

Press the stop button. The display shows [Stopping]. The transmitter switches off. All relays/contactor deactivate inside fix console.

To switch off the fix console with RC transmitter, push [CH +] & [Angle +] together. the fix console goes off and the RC transmitter goes to standby mode. press [POWER ON] button to switch off the remote control.

LOGOUT

A transmitter already logged in to the receiver has to be logged out before any other transmitter can be logged in.

NOTE! If a transmitter has been lost or seriously damaged, use the replace procedure whenever possible. It is possible to log out a transmitter directly from the receiver. However, this is not recommended. Contact your representative for assistance.

NOTE! Logout can only be performed when the transmitter is on and a radio link with one or more receivers has been established. The receiver must be powered up for the logout procedure to be successful.

SWITCH CHANNEL

For radio systems operating on frequency band 2.4GHz, it is possible to switch channels.

To switch frequency bank on radio systems operating on frequency band 2.4Ghz MHz, contact your representative for assistance.

AUTOMATIC SHUTDOWN

Automatic shutdown helps prolong battery capacity by automatically switching the transmitter off after a preset period of inactivity.
the preset period on RC transmitter is 30 Min.

OSCILLATING MODE

Certain fire hazards require the cooling of large hazard areas using water application. Similarly, it may be required to apply foam over a large area in some situation, instead of specific point application. This can be achieved by using oscillating monitors, as the monitor oscillates in the horizontal plane, providing coverage to a large area instead of a specific location. Oscillating Foam/ Water remote Monitors use electro mechanical means to oscillate the monitor in a preset or selectable angle. The power for movement can be an external power source. These are also recommended where unmanned operation is necessary in view of severe fire hazards.
it can be turned on remotely by Press the [Oscillating] button on RC remote control or Fix console. On the fix console the monitor Oscillate 100% of calibration angle but on the RC remote control percent of angle can be selected by push up / down [Angle +/-] toggle switch.

NOTE!
When the Oscillating mode is activated, no function can be controlled.
For Deactivate oscillating mode push [Oscillating] button.

CHAPTER 5: GUARANTEE, SERVICE, REPAIRS AND MAINTENANCE

INDUSTRIAL CONTROL products are covered by a guarantee/warranty against material, construction, and manufacturing faults. During the guarantee/warranty period, INDUSTRIAL CONTROL may replace the product or faulty parts. Work under guarantee/warranty must be carried out by INDUSTRIAL CONTROL or by an authorized service center specified by INDUSTRIAL CONTROL.

The following are not covered by the guarantee/warranty:

1- Faults resulting from normal wear and tear.

2- Parts of a consumable nature.

3- Products that have been subject to unauthorized modifications.

4- Faults resulting from incorrect installation and use.

5- Damp and water damage.

Maintenance:

1- Repairs and maintenance must be carried out by qualified personnel.

2- Only use spare parts from INDUSTRIAL CONTROL.

3- Contact your representative for service or any other assistance.

4- Keep the product in a clean, dry place.

5- Keep contacts and antennas clean.

6- Wipe off dust using a slightly damp, clean cloth.

CHAPTER 6: TECHNECAL DATA

MC-2120 size / protection	L:100mm W:90mm H: 120mm IP20
Frequency Band / receiver sensitivity	2.4GHz / -98dBm
Area classification	Safe area
Operating Temperature	-40 to 60°C
Power supply / consumption	Normal 24Vdc (18 ~28Vdc) / Max 600mA
Reaction Time	< 0.1 Sec
operation & indicator	Left / Right – Up / Down joystick Water actuator valve open/close Foam actuator valve open / close Oscillating mode pushbutton On/off switch FOG/JET
Distance	Visual distance 500 meter in open area with 5dB antenna

FREQUENCY BAND 2.4GHz

For radio systems operating on frequency band 2.4 GHz, the frequency band is divided into 11 channels (channel 11-26). Once the channel has been selected on the transmitter, the receiver will automatically detect and switch to the same channel.

CHAPTER 7: ANTENNA RULE

1. Antenna gain

A high antenna gain does not automatically mean a better connection. The high gain generates a small angle of radiation, which requires a more precise alignment.

2. Antenna selection

Think about selecting the correct antenna characteristics, particularly on the receiver side. While doing so, pay attention to the correct polarization.

3. Assembly height

An antenna, particularly outside, should be positioned as high as possible. This allows you to improve the range. This keeps the Fresnel zone clear – the higher, the better.

4. Antenna cable as short as possible

The antenna cable should be as short as possible to keep signal loss on the cable as low as possible. Bring the radio module closer to the antenna, e.g. in a small box.

5. Correct protection of antenna connections

Always protect connections on the outside cables, junctions and antennas with protective tape.

6. Antennas are not lightning arresters

Antennas on buildings are not used as lightning arresters. Select the position of the antenna carefully, use surge protection and do not route the antenna cable parallel to the lightning arrester.

7. Correct mounting

In the case of insufficient stability, the quality of your antenna alignment can be reduced. When mounting the antenna, also think about wind and other outside influences.

8. The right distance

Install the antenna in an open area, as far away as possible from any obstacles such as buildings, trees, other antennas, or metal objects.

9. Connection to antenna from below

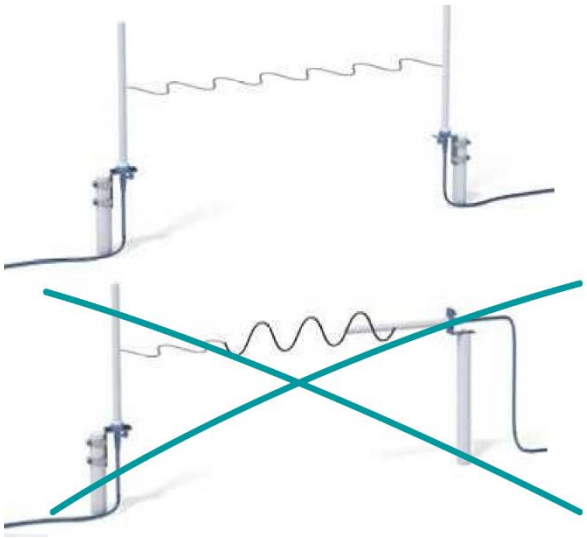
Outdoor antenna cables should always be connected to the antenna from below. Also use a conduit, if necessary.

10. Weather influences

Fog and rain have nearly no influence on the wireless path. In the case of ice and snow, on the other hand, you must make sure that the antennas are not covered with ice.

Explanations

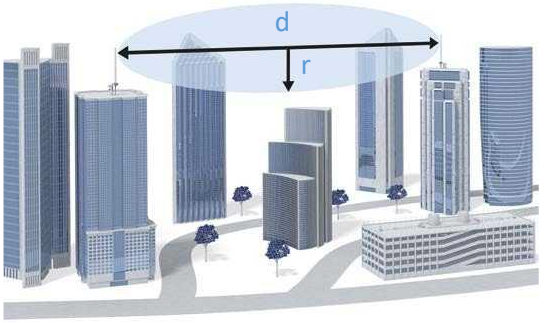
- Antenna selection:
Areas of application for omnidirectional antennas
• Numerous devices in different directions (Repeater or mesh networks)
• Versatile applications
• Applications without visual communication (in the case of a reflective environment, the signal can be received via alternate lines)
Areas of application for directional antennas
• Bridging large distances
• Point-to-point connections
• Stationary or linear applications
• Decoupling due to directivity and different polarization planes in the case of multiple point-to-point paths



Note: *Make sure the antennas have a uniform polarization plane.*

- The assembly height (Fresnel zone)
The wireless path may also work if obstacles are within the Fresnel zone (house, tree, etc.). The decisive factor is the number of obstacles and the area they occupy in this zone. In practice, lower frequencies (e.g. 868 MHz) are better at penetrating obstacles.

Note: Use antennas with circular polarization in a strongly reflective environment. This type of antenna prevents polarization loss, allowing you to achieve higher gain in this environment. To improve the signal strength, you can also combine circularly and vertically polarized antennas.

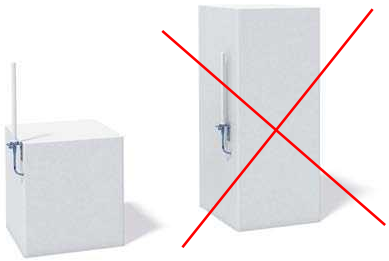


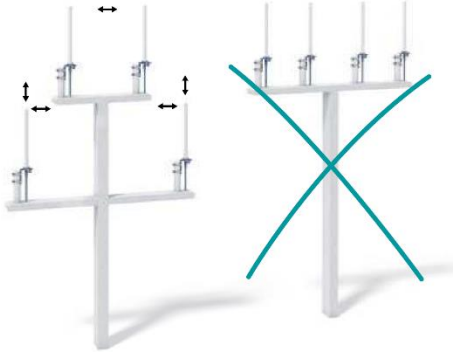
Wireless path distance (d)	Antenna height(r)		
	868/900Mhz	2.4GHz	5GHz
200 m	4.0 m	2.5 m	1.5 m
500 m	6.5 m	4.0 m	2.5 m
1000 m	9.0 m	5.5 m	4.0 m
2000 m	13.0 m	8.0 m	5.5 m

-The right distance

An omnidirectional antenna must always be installed at a sufficient distance from obstacles (poles, building walls or metal walls).

If multiple radio modules are used, you have to make sure, the antennas are spread out at sufficient distances from one another.

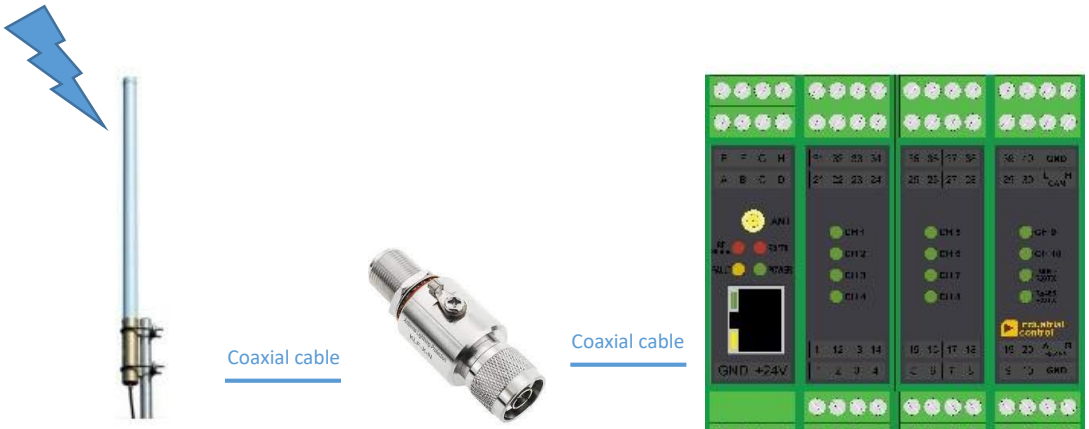




Frequency	Minimum distance (Vertical and horizontal)
868/900 MHz	1.5 ~ 2.5 m
2.4GHz	0.5 ~ 1.0 m
5 GHz	0.5 ~ 0.8 m

-Surge protection

Antennas on buildings are not used as lightning arresters. Select the position of the antenna carefully, use surge protection if antenna install outdoor.



Outdoor Antenna

Surge protectio