



## **Manual**

**Musca 2S**  
**Aquarius 2S**

**FCC**



# 1. Introduction

This manual is intended for both the installer and the user.  
The operating instructions depend on the application; the person installing the system is ultimately responsible for those.  
Keep this manual, if you pass the product on to third parties, provide them with all the documents.

## Intended use

This product was designed for wireless radiographic control of machinery. Examples of applications include winches, pumps, gates, doors, lighting, electric controls and axle controls of trailers for special transport. If your application differs significantly, please contact Tyro Remotes to avoid incorrect use of this product.

### Field of application

This product is specifically developed for the following application areas: industry, punch/press/die-cutting equipment, robots, cranes, pumps, lifts, mobile vehicles (not on public roads) and mechanical engineering. To prevent wrong use of the product, always contact Tyro Remotes when significantly different applications or to prevent incorrect use of the product.

## Important information

Our general terms and conditions of sale that can be requested or downloaded via our website ([www.tyroremotes.co.uk](http://www.tyroremotes.co.uk)) apply at all times. After installing the remote to your system, you are responsible for having the system as a whole in combination with the remote control certified.

Before this product is put into use, it can be possible that there are additional risks, which you as an end user must cover, these are listed in the chapter: safety, this must be listed in a risk analysis and be covered.

## Operating conditions

The handheld transmitter cannot function at temperatures below 0°C and above 60°C. Charging the handheld is only allowed between 10°C en 45°C. For the transmitter to function properly and safely, it must be charged daily.

## Performance

The performance of our products depends on many factors. Issued specifications are indicative. For a detailed explanation, visit [www.tyroremotes.co.uk/tyropedia](http://www.tyroremotes.co.uk/tyropedia).

## Everything to your liking?

We do our utmost to deliver our products to your satisfaction. If this is not the case, please contact us. Keep to the following deadlines: Visible defects must be reported within 2 working days after receipt. If we have not heard from you within 2 weeks after receipt, we assume that you have approved the delivered goods. If you have other complaints, we request that you report this to us as soon as possible, but no later than 2 months after delivery.

## Declaration of Conformity

Hereby, Tyro Remotes declares that the radio equipment types Musca 2S and Aquarius 2S are in compliance with Directive 2014/53/EU. The full text of the EU Declaration of Conformity can be found at [www.tyroremotes.co.uk](http://www.tyroremotes.co.uk).

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures: Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- |   |   |
|---|---|
| 1 | This device may not cause harmful interference, and   |
| 2 | This device must accept any interference received, including interference that may cause undesired operation. |

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.



2. Description of a Musca 2S transmitter

**Warning: risk of injury or damage!**

To avoid dangerous situations, please observe the following rules:  
In case of changes, doubts about the rules or if something is unclear, please contact Tyro Remotes.

Line of sight	Use only if there is a line of sight.
Care	Never leave the hand-held transmitter unattended.
Overload	Always simulate operation on connection before connecting to the mains to avoid any damage.
ESD	Always follow the ESD instructions if you come into contact with internal parts to avoid any damage.
Instruction	The end user must always be instructed on the safe operation of the remote control in combination with the entire system by the person responsible for the system.
Operation	Using the hand-held transmitter with (thick) gloves is not recommended.
Life	If the remote is well maintained and used normally, the expected life is 10 years. After that we recommend replacing the remote.
Multiple transmitters	Please pay attention when using multiple transmitters with one receiver. In the standard configuration, the receiver does not distinguish between the signals of the different transmitters.
Out of range	The operator of an active system should always stay within the range of the receiver (varies depending on the situation) to avoid risky situations.
Damage	In case of visible damage, always send the article for repairs to avoid risky situations.



3. Description of a Musca 2S transmitter

**Transmitter frontside**

- Transmission indicator (green LED)**
  - LED flashes for each signal transmitted.
- Battery indicator (red LED)**
  - This LED flashes when the battery is almost empty.
  - If a function key is active while switching on the transmitter, this LED flashes as an indication.
- Function keys**
  - These keys control the functions of the system.
  - Can be executed as pulse or latching (key hold-down function).
  - Function keys that have no function can be set inactive at the factory and can be locked mechanically.
  - Function keys lit up automatically when it is dark.
- ON/START-button**
  - Press down for 2 seconds, to activate the transmitter and the receiver.
- OFF/STOP-button**
  - Immediately switches off the transmitter and the receiver.
- Buzzer**
  - Beeps briefly with each key operation.
  - Warns when the function key is pressed when the transmitter is switched on.

**Transmitter backside**

- Battery casing**
  - Loosen the screws on the back of the transmitter and carefully open the casing.
  - Replace the battery and close the casing.
- System identification**
  - The system can be identified using the sticker on the back of your transmitter. The type of system is stated on the sticker next to the word 'Type'. The serial number can also be found here.

Musca 2S 2F      Musca 2S 4F      Musca 2S backside

Transmitter specifications	
Battery	2x 1.5V AA Alkaline (non-rechargeable)
Operating time	Approx 2 years (normal use)
IP Protection rating	IP67
Used frequency band	868 MHz
Maximum power	10 dBm

4. Range Optimisation

The location of the receiver is of great influence on the maximum range, therefore, please take into account the following points in order to optimise the range of the system;

- Place several receivers at least 50 cm apart.
- Never directly place the receiver or antenna on metal objects but at least 50 cm away
- Mount the receiver or antenna approximately 3 to 4 metres above work height, higher or under work height reduces range significantly
- Place the receiver or antenna at least 50 cm away from engines or other devices that can generate a force field
- Never place the receiver with antenna in the cabin of a vehicle, a switchbox, or a similar (metal) casing
- If possible try to maintain a line of sight with the receiver during operation
- Applications like axle steering or winching where the work height is equal, the aerial has to be mounted vertical
- Applications like hoists where the working height greatly differs, the aerial has to be mounted horizontal

**Range**

The maximum range indicated is based on a measurement with the line of sight without interference. The indicated range cannot be guaranteed because it is always subjective to variable environmental factors. In particular deflection, reflection and shadows can decrease the maximum range. Objects present in between the transmitter and the receiver, in particular metals, reinforced concrete or absorbing objects like trees or snow, have an unpredictable influence on the maximum range. In general the optimal range can be achieved when there is a line of sight between the transmitter and the receiver. Please also see [www.tyroremotes.co.uk/tyropedia](http://www.tyroremotes.co.uk/tyropedia) for more information about range.

**Frequencies**

Check if there are no other wireless devices that operate on the same frequency as that will have a negative impact on the performance and the range of the system.



## 5. Assembly of a standard system

For optimum range, place the Aquarius 2S receiver as high up as possible and away from metal objects. We advise against placing it in the cabin of a vehicle, a switch box or similar casing. After connection and assembly, the system must be tested before switching on the mains.



**Please note: if you have a customised product, the cable connection and assembly may differ.**  
To avoid dangerous situations, please observe the following rules:

In case of changes, doubts about the rules or if something is unclear, please contact Tyro Remotes.



**Please note: the Aquarius 2S must always be connected to the power source behind a main fuse!**

The standard cable connection is as follows:

Key	Wire number
1	5
2	4
3	2
4	3
5	6
6	7
ON (I)	-
OFF (O)	-
Input 1	8
Input 2	9
Power supply 8 - 36 VDC	1
Ground	green / yellow

## 6. Programming (an additional or repaired) transmitter to the receiver



**Please note: all systems have already been programmed at the factory!**  
You can skip this part unless you wish to program an additional or repaired hand-held transmitter to the receiver!

If you wish to program an additional or new hand-held transmitter to the Aquarius 2S receiver, take the following steps:

Step	Description
1	Make sure that the Aquarius is correctly connected and has supply voltage.
2	Press the black programming button on the bottom of the receiver for 1 second, the status LED on the receiver will light up red.
3	Keep buttons 1 and 2 on the transmitter pressed while you switch on the transmitter with the ON button. The red LED on the transmitter will light up. You can now release the buttons.
4	After a few seconds, the red LED on the transmitter and the red LED on the receiver will switch off. The transmitter and the receiver are now paired to each other.

To delete all transmitters from the receiver's memory, press and hold the black programming button on the receiver for more than 8 seconds until the red status LED switches off. To delete all receivers from the transmitter's memory, press and hold buttons 1 and 2 on the transmitter while turning the transmitter on with the ON button. Wait until the red LED switches off before releasing the buttons. Please check [www.tyroremotes.co.uk/support/tutorials](http://www.tyroremotes.co.uk/support/tutorials).

## 6. Change of functionality

In the factory settings, the switching type of the buttons is set in the pulse mode. Before the functionality can be changed, a transmitter must first be programmed to the receiver. When a complete set is ordered, this has already been done at the factory.



**Please note: the changes are to be set for all buttons at the same time!**  
By changing the configuration, already saved transmitters will be deleted. Other transmitters must be saved again.

Step	First put the transmitter in set-up mode
1	Switch off the transmitter by pressing the OFF button for 1 second.
2	Put the transmitter in set-up mode by holding down buttons 1 and 2 and simultaneously pressing the OFF button for 5 seconds.
3	The green LED lights up, the transmitter is now in the set-up mode. You can now release the buttons.
4	If none of the buttons is pressed for 30 seconds, the transmitter will exit the set-up mode.



As soon as the set-up mode has been activated the following settings can be changed:

Table 1

Button function pulse/flipflop	
Step	Description
1	Press the button to be changed, until the green LED starts to blink.
2	The button will switch to the flipflop-function. The green LED will blink 2 times (button-blocking is still alive).
<b>Back to standard setting:</b>	
1	Press the button to be changed again.
2	The button will switch to the pulse function. The green LED will blink 1 time.

Button-blocking	
In table 2 we show which buttons cannot be used at the same time (are blocked) and which can be used at the same time (buttons that are not blocked) in the standard settings.	
Step	Remove button-blocking for buttons that are normally blocked:
1	Press both buttons until the green LED starts to blink.
2	The buttons-blocking will be turned off. The green LED will blink 2 times.
Activate button-blocking for buttons that are normally not blocked:	
1	Press both buttons until the green LED start to blink.
2	The button-blocking will be activated. The green LED will blink 2 times.
Back to standard setting:	
1	Press both buttons again.
2	The button-blocking will change to the standard settings; the green LED will blink 1 time.

Send the adapted configuration to the receiver:	
1	Set the receiver to 'programming' mode by pressing the programming button briefly (the red LED on the receiver will switch on).
2	Press the OFF-button of the transmitter (within 30 seconds), the yellow LED on the receiver will blink 4 times.
3	The configuration has been saved on the receiver and the transmitter has exited the set-up mode and is switched off (green LED on the transmitter is off).
4	Switch the power supply of the receiver off and then turn it on again to activate the new settings.
5	As a last step, switch the transmitter on and check the functionality.

Table 2

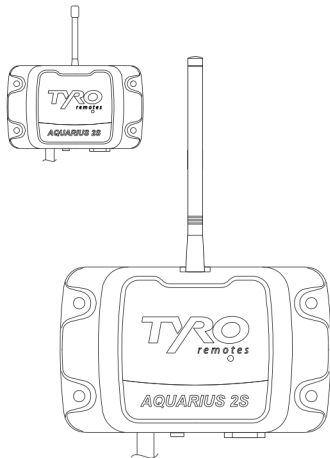
Buttons Musca	Standard configuration (blink 1x)	Configuration to be activated (blink 2x)
Button 1	Pulse	Latching
Button 2	Pulse	Latching
Button 3	Pulse	Latching
Button 4	Pulse	Latching
Button 5	Pulse	Latching
Button 6	Pulse	Latching
Button 1&2	Mutually blocked	No blocking
Button 3&4	Mutually blocked	No blocking
Button 5&6	Mutually blocked	No blocking
Button 1&3	No blocking	Mutually blocked
Button 2&4	No blocking	Mutually blocked
Button 3&5	No blocking	Mutually blocked
Button 4&6	No blocking	Mutually blocked
ON	Range limitation off	Range limitation on

### Revert to standard settings

In order to reset the receiver to its standard settings, you need to set only the transmitter to set-up mode and skip the changes in Table 1, or then send the unchanged setup to the receiver.



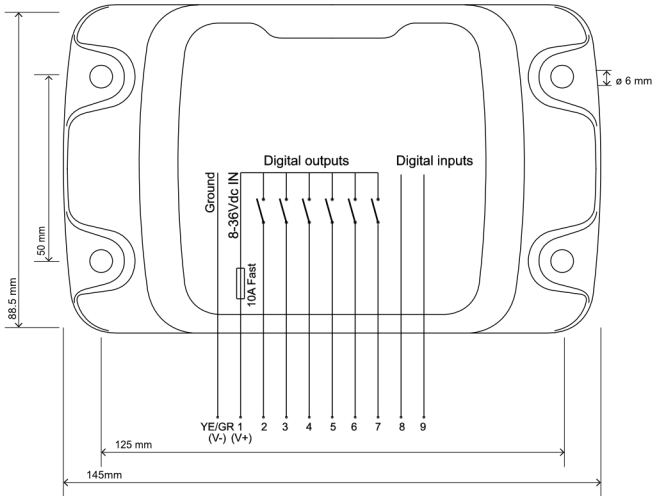
7. Description of Aquarius 2S receiver & system specifications



- 7. Flex-antenna or BNC-antenna**
- This product comes with a flexible antenna as standard.
    - FLEX total height 155 mm
  - The product can also be supplied with a BNC connector on which a BNC antenna and / or an extension cable can be mounted.
    - BNC total height 175 mm
- 8. Status LED**
- This is a double LED that can light up red or yellow.
  - Red constantly on: the receiver is in programming mode.
  - Yellow flashing quickly ( $\pm 10$ x per second), the receiver is receiving a signal from a non-programmed transmitter.
  - Yellow flashing slowly ( $\pm 2$ x per second), the receiver is receiving packets from a programmed hand-held transmitter.
- 9. Fuse holder**
- Twist-off cap
  - Behind the cap is another cap which can be turned a quarter turn to the left with a flat-head screwdriver.
  - The fuse holder can be removed and the 10A quick blow glass fuse (5x20 mm) can be placed.
- 10. Cable**
- This 10-core cable is used to connect the receiver.
- 11. Programming button**
- When this button is held down for 1 second, the receiver is set to programming mode.
  - If the button is held down for longer than 8 seconds, all programmed transmitters will be removed from the receiver's memory. In addition, the functions will be reset to the standard configuration (see Table 2).

Receiver specifications	
Power supply	8 - 36 VDC
Maximum load	4 A per output, total max 10 A
Switching voltage	8 - 36 VDC (equals power supply)
Digital input	2, optional 6
IP classification	IP68
Used frequency band	868 MHz

8. Receiver connection diagram



9. Resolving problems

If the system is not working properly, check the following points:

The receiver does not react when you give a command on the transmitter:	
The receiver does not have any power.	Check that the receiver is connected correctly and/or the fuse is intact.
You are out of range of the receiver.	Make sure you are within range of the receiver and that there are no large (metal) objects between you and the receiver or aerial of the receiver.
	If necessary, the antenna can be installed in another place with the aid of an antenna extension cable.
The transmitter is not programmed to the receiver.	Follow the steps in section 5 to program the transmitter to the receiver.

The transmitter is not working	
The transmitter does not switch on when you press the ON-button.	The battery may be empty, replace the battery.
You are out of the receiver's range.	If this is not the case, the transmitter is defective and the system must be sent back for repairs.
The LED on the transmitter flashes red and the buzzer beeps when you press the START button.	A function key has been pressed or is stuck. The number of flashes indicates which function key is not working properly. If the repeated pressing of this key does not help, you must send the transmitter for repair.

The range is too small	
The antenna is not properly installed on top of the receiver.	See guidelines provided in section 3.
The antenna has not been positioned correctly.	See guidelines provided in section 3.

**Service**  
If a Tyro Remotes' remote control has a problem or requires service, please send the entire system (transmitter and receiver) to Tyro Remotes for repairs. To ensure that this occurs smoothly, please print out the service form, fill it in and send it to us together with the system. The service form can be downloaded from our website [www.tyroremotes.co.uk](http://www.tyroremotes.co.uk). When the repairs are not covered by the warranty and are not free of costs, you will be informed in advance.

**Cleaning and maintenance**

- Do not use chemical cleaning agents or abrasives for cleaning, this can damage the service panel.
- We recommend you use a damp cloth with slightly soapy water.
- If the device is soiled, please contact Tyro Remotes to consult how to best clean it.
- Never submerge the appliance in water or other liquids, this can cause the appliance to become defective.
- Make sure that no water enters the appliance. Should this happen anyway, only use the appliance once it has been dried completely and tested.

**Conditions of sale and certification**  
All deliveries are made according to our conditions of sale. These are available upon request or can be downloaded directly from our website ([www.tyroremotes.co.uk](http://www.tyroremotes.co.uk)). The products are certified for many applications. These certificates are also available upon request. You are responsible to take into account the machine directive guidelines that are applicable to your machine in the corresponding application area. In case you provide your machine with a Tyro remote control as standard, the certification of the entire system - including the Tyro remote control - is your responsibility.

**Please note:**  
Tyro Remotes is not responsible for personal, material and consequential damages caused by improper or careless use, which are in conflict with the provisions, instructions and guidelines included in this manual.