

RoboMaster M3508

DC Brushless Gear Motor Mix Control

Tutorial Guide

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Control the Mecanum Wheel Chassis with an Aircraft Transmitter via Mix Control

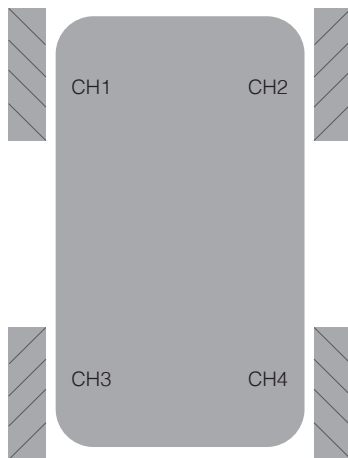
This tutorial guide is for readers who are experienced in aeromodelling or aircraft transmitters (aircraft transmitters contain receiver and hereinafter referred as transmitter), and are familiar with the RoboMaster M3508 DC Brushless Gear Motor (hereinafter referred as motor) and C620 Brushless DC Motor Speed controller (hereinafter referred as speed controller). Therefore, this guide will not explain the basic operation of motor and speed controller.

We'll use the FrSky Taranis X9D Plus transmitter as an example to illustrate how to control the omni-directional movement of Mecanum wheel chassis based on M3508 motors and C620 speed controllers, using a transmitter's Mix Control function.


The four positions marked CH1, CH2, CH3 and CH4 indicate the location of the four motors and speed controllers. Be sure to connect the PWM ports on the speed controller to the channel interfaces CH1, CH2, CH3, and CH4 with cables, and double-check that they are correctly connected.



 The PWM ports of the C620 speed controllers do not have BEC. Therefore, extra external power is needed for the receivers.

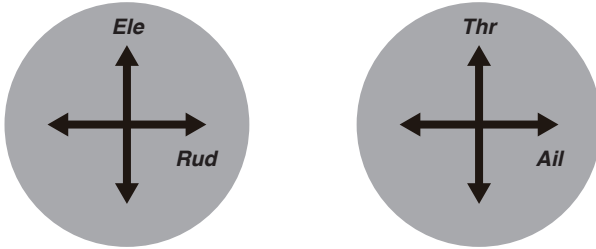
This guide will not describe the connections between motors and speed controllers (refer to the corresponding User Guides for these instructions). When the motors and speed controllers are properly connected, the connection of the chassis is complete.



The motors and speed controllers on the chassis

 When facing toward the M3508 motor's shaft, the shaft rotating counterclockwise is positive. Make sure the Mecanum wheels are attached in strict accordance with the illustration above (Pay attention to the diagonal lines). The M3508 motors drive the Mecanum wheels directly by default.

The picture below illustrates the movement of transmitter sticks (right hand throttle), and are named ***Thr***, ***Ail***, ***Ele***, ***Rud*** respectively. These italic and bold "***Thr***", "***Ail***", "***Ele***" and "***Rud***" stand for the real sticks on the transmitter, and are symbolized as  on the LCD settings page. They differ from the Thr, Ail, Ele, Rud, which stand for input names and are symbolized as  on the LCD setting page.



Transmitter sticks (right hand throttle)

 Pushing the sticks forward or right is positive, while backwards or left is negative.

This configuration is in accordance with Mecanum wheel movement logic and traditional methods of operating the transmitter for the RoboMaster competition. The chart below illustrates the relation between the movements of the sticks and the rotational direction of the motors.

<p><i>Thr</i> Forwards CH1 rotates clockwise CH2 rotates counterclockwise CH3 rotates clockwise CH4 rotates counterclockwise</p>	<p>Backwards counterclockwise clockwise counterclockwise clockwise</p>
<p><i>Rud</i> Rotates to the Left CH1 rotates clockwise CH2 rotates clockwise CH3 rotates clockwise CH4 rotates clockwise</p>	<p>Rotates to the Right counterclockwise counterclockwise counterclockwise counterclockwise</p>
<p><i>Ail</i> Pull to the Left CH1 rotates clockwise CH2 rotates clockwise CH3 rotates counterclockwise CH4 rotates counterclockwise</p>	<p>Pull to the Right counterclockwise counterclockwise clockwise clockwise</p>

Logic Relation of the rotational directions of the Motors

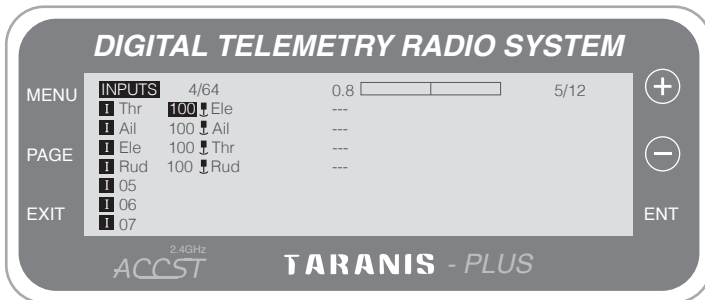
The above illustrates the relationship between the transmitter sticks and the motors' rotational directions.

To set Mix Control mode, please follow the directions below.

On the fifth page of the transmitter menu, you can set the relation between “sticks” (marked with **↓**) and “inputs” (marked with **I**). “Sticks” refer to the real sticks on the transmitter. By pushing the sticks, angel-data generated will be stored. The corresponding names of the real sticks are fixed. The stick movements and corresponding names are shown in the Transmitter’s sticks (see above).

Different of fixed real sticks names, “inputs” are changeable. For example, the first line on the below illustration, theoretically speaking, the **Thr** is related to Thr, but in reality, **Ele** is related to Thr. By doing so, the sticks' corresponding input can be changed instantly, facilitating quick-switch when Mix Control is in use (e.g. switching from left-hand throttle to right-hand throttle). This function is similar to defining global variables in code.

This example illustrates Thr mapping to **Ele**. Users can make changes based on need.



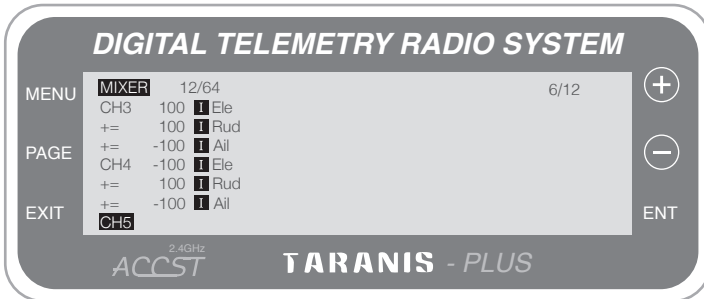
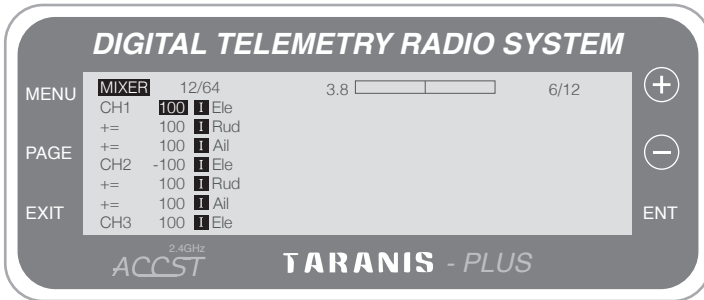
Relation between “Sticks” and “Inputs” on page 5

On the transmitter’s onscreen menu, go to page 6, which is critical for Mix Control logic setting. According to previous logic relations, we can get the following formula. “-” refers to reverse setting, indicating that pushing forward or right is negative while backward or left is positive. Please note that all the “Ele, Rud, Ail” in the formula are neither bold nor italic, so they belong to “inputs”.

- CH1 = Ele + Rud + Ail
- CH2 = - Ele + Rud + Ail
- CH3 = Ele + Rud - Ail
- CH4 = - Ele + Rud - Ail

If corresponding to “Sticks”, they will become:

CH1 = **Thr + Rud + Ail**
CH2 = **- Thr + Rud + Ail**
CH3 = **Thr + Rud - Ail**
CH4 = **- Thr + Rud - Ail**



Mix Control Configuration on Page 6 of the onscreen menu



Pay attention to reverse settings when configuring Mix Control.

Mix Control settings are now complete.

Refer to the RoboMaster C620 Brushless DC Motor Speed Controller User Guide to configure the speed controller to the mode enabling clockwise and counterclockwise rotation and calibrate both the transmitter and the speed controllers. Then you can power on the chassis and perform tasks.



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