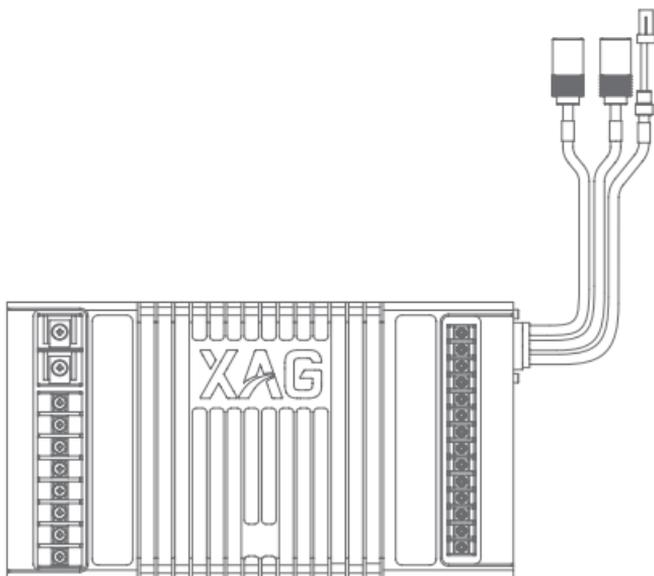# Unmanned Ground Vehicle IO Module

# User Manual

Version 1.0 EN

## To User

Dear User, thank you for choosing XAG.

For safety purposes and a better user experience, it is highly recommended that you read this manual carefully and strictly follow the instructions herein.

## Contact Us

If you have any questions about this document, please contact our Technical Support via email: info@xa.com

## Introduction

XAG Unmanned Ground Vehicle IO Module (hereinafter referred to as "IO Module") extends free task development system and features strong augmented functions and diversified operation modes. An unmanned ground vehicle with the IO Module and smart agricultural devices like XIoT ™ Agricultural IoT system is able to provide services including precise crop protection, field scouting and material delivery to cater for various demands. With better effect and higher efficiency, a triple-win situation - integration of ecological, economic and social benefits can be realized and the rich contents of smart agriculture can be presented.

## List of Items

Please check that all the following items are present when unpacking the box. Should there be any item missed, please contact your dealer.
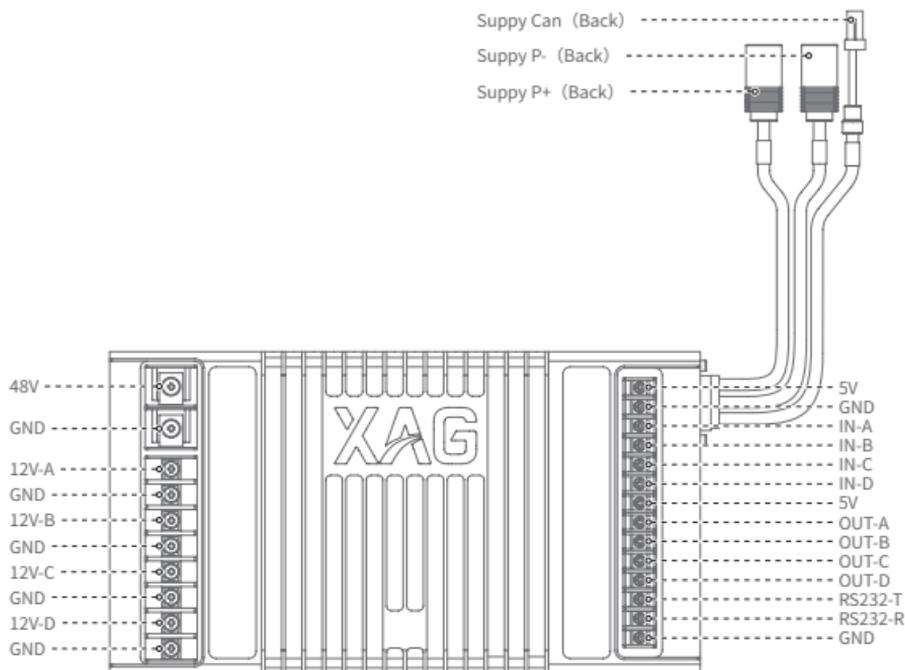
IO Module
× 1

Screw
× 4

**XAG**
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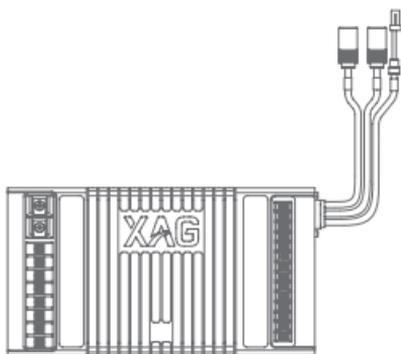
## Structure

- GND—Battery Anode.
- 48V Interface refers to output voltage: 48V, output power: 2000W.
- Output voltage of 12V-A, 12V-B, 12V-C and 12V-D is 12V. Output power of A+B and C+D is 250W (If only A/B and C/D are connected, output power of each port is 250W. For concurrent connection of AB or CD, total output power is 250W). Power of single connected device should not exceed 250W. Otherwise, overcurrent protection will be triggered.
- Output voltage is 5V for 2 routes output. Output power is 5W for each route.
- For 4 routes PWM input, voltage range is 0~15V. L: 0~0.8V, H: 2~15V. Frequency can be up to 20KHz.

- For 4 routes PWM output,(open-drain output), voltage range is 0~24V. Frequency can be up to 20KHz.
- 1 route RS232 standard interface.

## Installation

Fix the IO Module at the rear of the unmanned ground vehicle with 4 set screws and connect its power cable and signal cable.
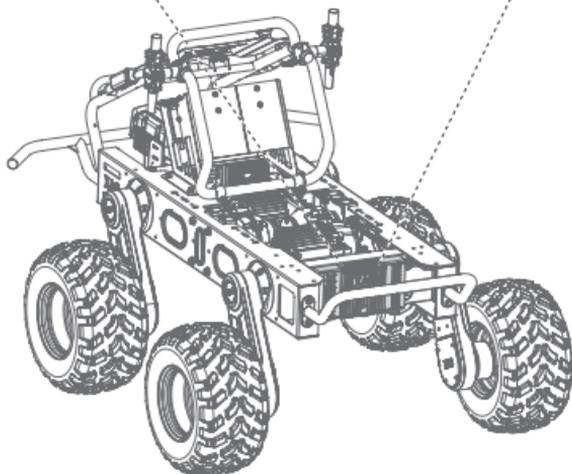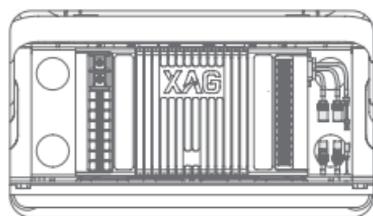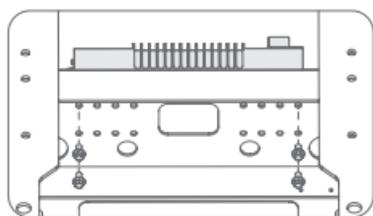
## Precautions

- As there are corresponding GNDs for each 48V and 12V route, it is highly recommended not to mix them in order to avoid interference.
- As threshold current of short circuit protection of 48V, 2000W output is relatively high, please be cautious for short circuits.
- Output current should not exceed 2A for 2 routes 5V. Otherwise, overcurrent protection will be triggered.
- For PWM input, a driving ability of over 1mA for each route is required for a peripheral to ensure a stable waveform.
- PWM output is in the form of Darlington open-drain output, with the lowest voltage of 0.64V (not 0V). Voltage range: 0-24V. Before connecting to this output port, peripheral should connect with a proper current limiting resistor in series. Sink current ranging from 10mA to 300mA for each route is recommended. As a peak sink current of over 500mA may lead to damages to components, please select a proper current limiting resistor.
- As the shell is aluminium-made, be sure that wire does NOT touch the shell while wiring.

## Specifications

For 1 route 48V output, output power is 2000W.

For 4 routes 12V output, output power is 125W for each route.

For 4 routes 5V output, output power is 5W for each route.

For 4 routes PWM input, capture frequency can be up to 20KHz for each route.

For 4 routes PWM output, capture frequency can be up to 20KHz for each route.

1 route RS232 communication.

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