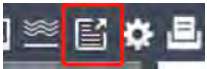


User Manual for CHCNAV APACHE USV

Click on "Data Processing - Data Export", or click on the "Export" button in the shortcut

bar ) open the saved HTT file,

Check "File Merge" to merge and export multiple HTT data into one file;

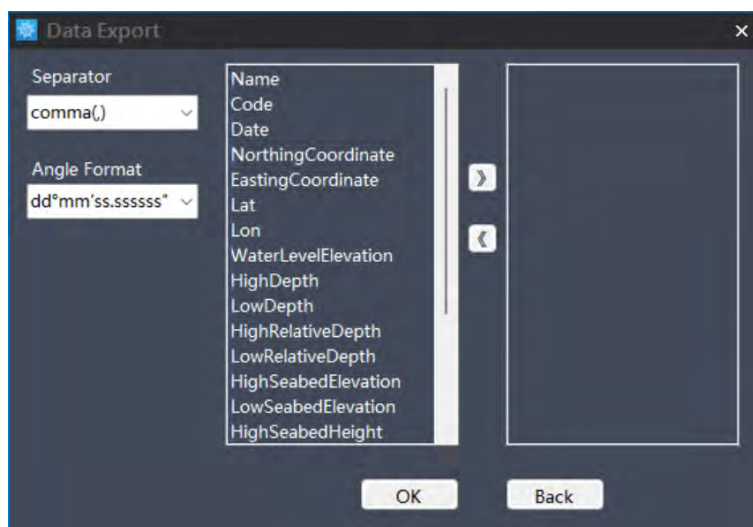
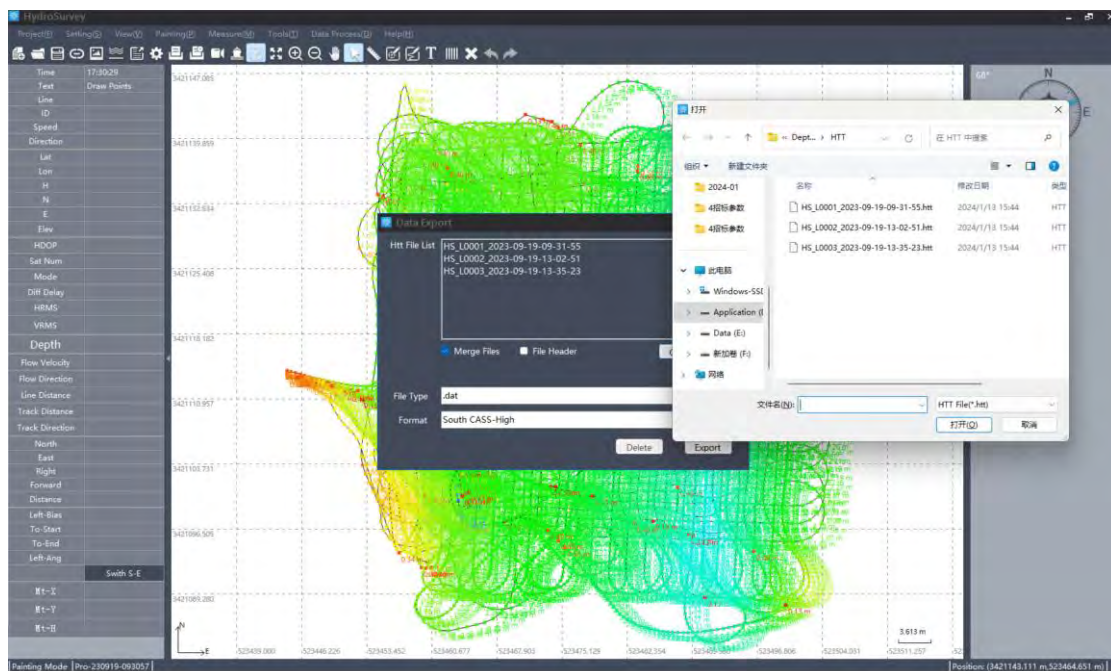
Check "Export Header" to export the result file of the data, supporting header export;

You can choose the file type to export, including dat, txt, CSV, and dxf types;

Format selection: Select a format from the drop-down list, and select the custom option to create a new format yourself;

Click "Export" to export the selected format data;

Click "Delete" to delete the selected format (only supports custom added data formats);



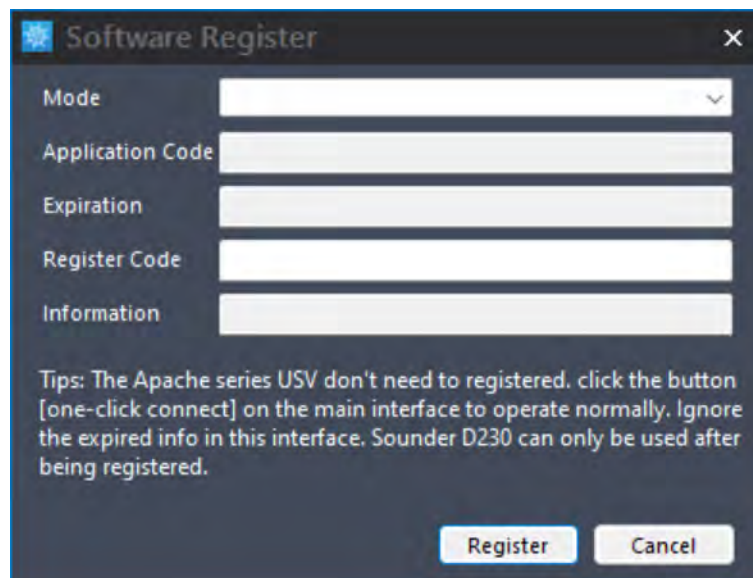
7.11.1 UAV cross-section export

Click "Data Processing - Drone Section Export", open the HTT file, fill in the relevant parameter information, and click "Table Export" to generate an xls file; Click "one click upload" to automatically upload to the drone flow measurement platform server, and generate flow measurement routes at the same time.

7.12 Support

7.12.1 Software registration

The CHCNAV series USV do not require registration. If using depth sounders and other positioning and navigation equipment, a software dog or machine code registration activation is required.

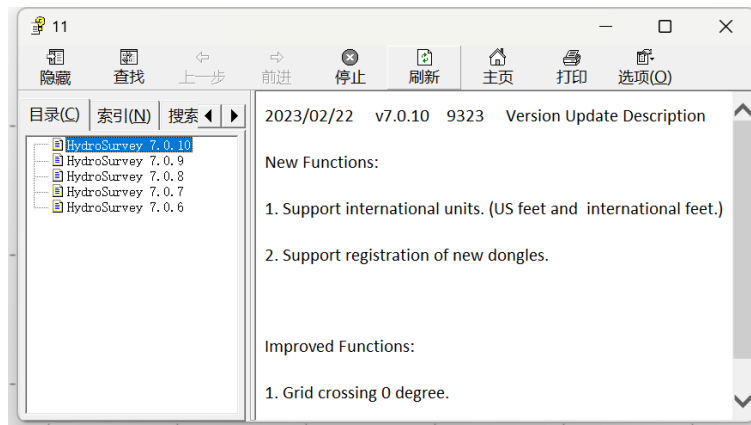


7.12.2 Online upgrade

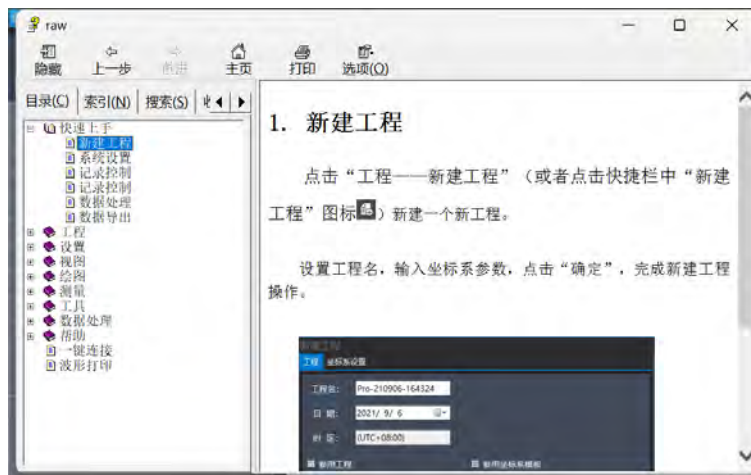
Click on online upgrade to automatically detect the latest version of the software.

Release note

User Manual for CHCNAV APACHE USV



7.12.3 User's manual



7.12.4 Understanding Huawei

Click to learn about CHCNAV APACHE series USV, follow the [Huawei Tour World] official account by scanning the WeChat code, and check the operation manual/video/FAQ/technical bulletin online.

User Manual for CHCNAV APACHE USV



7.12.5 Language selection

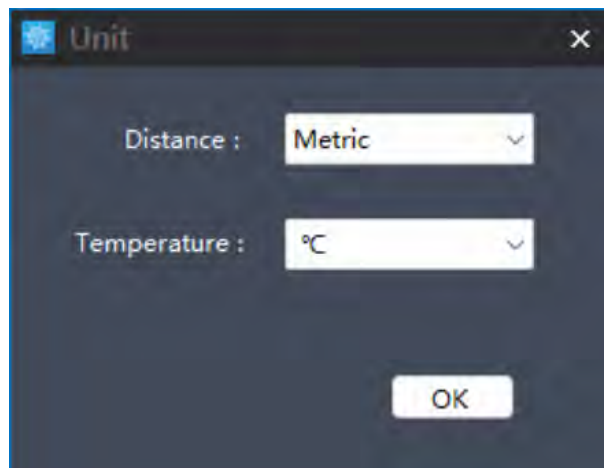
Supports switching between Chinese, English, and Russian languages, effective after restarting the software.

Unit selection

Supports switching between distance and temperature unit displays,

Distance: meters/US feet/International feet.

Temperature: Celsius/Fahrenheit.



7.12.6 About Software

View the current version of HydroSurvey software. When the depth sounder is turned on, the corresponding firmware version of the depth sounder can be displayed.



7.13 Other functions

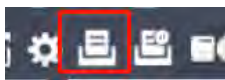
7.13.1 Waveform printing

This function requires connecting the printer (real-time printing and playback printing), installing the driver, and setting printer configuration parameters in order to print normally. When setting up PDF saving, it can be directly saved to a PDF file without the need for a connection.

Printer model: Brother PJ-763MFi

Printer driver: can be obtained by contacting technical personnel;

"Waveform Printing": Click on the "Waveform Printing" button in the shortcut bar



Printing methods: real-time printing, playback printing, PDF saving;

Engineering information: print head information;

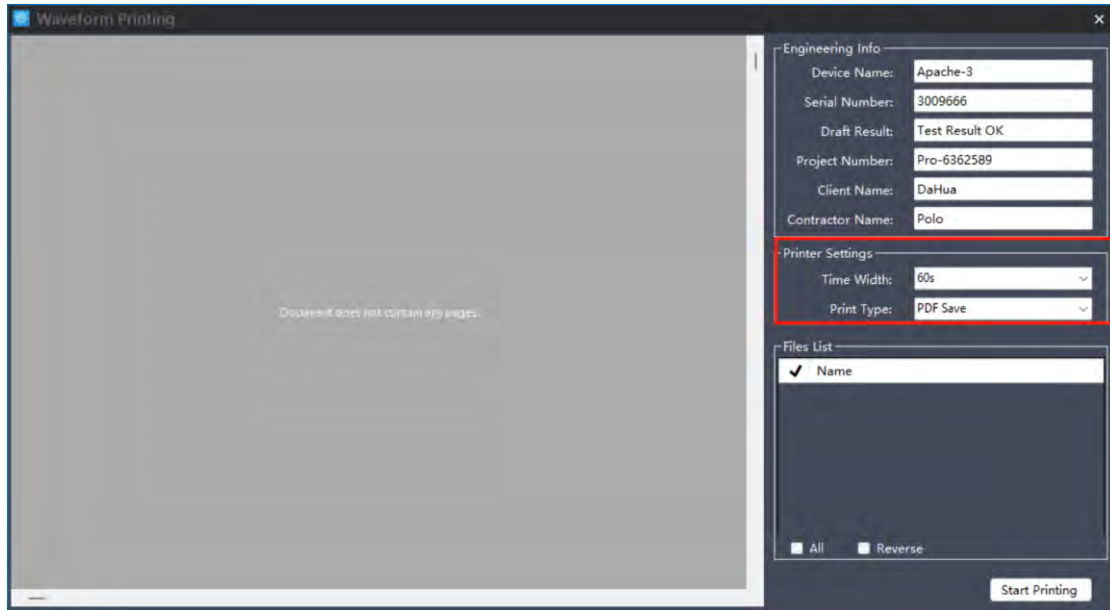
Horizontal width: printing horizontal time intervals;

7.13.1.1 Real Time Printing

User Manual for CHCNAV APACHE USV

After setting the parameters, click the "Start Printing" button and "Start" recording to achieve real-time waveform printing while measuring and recording data;

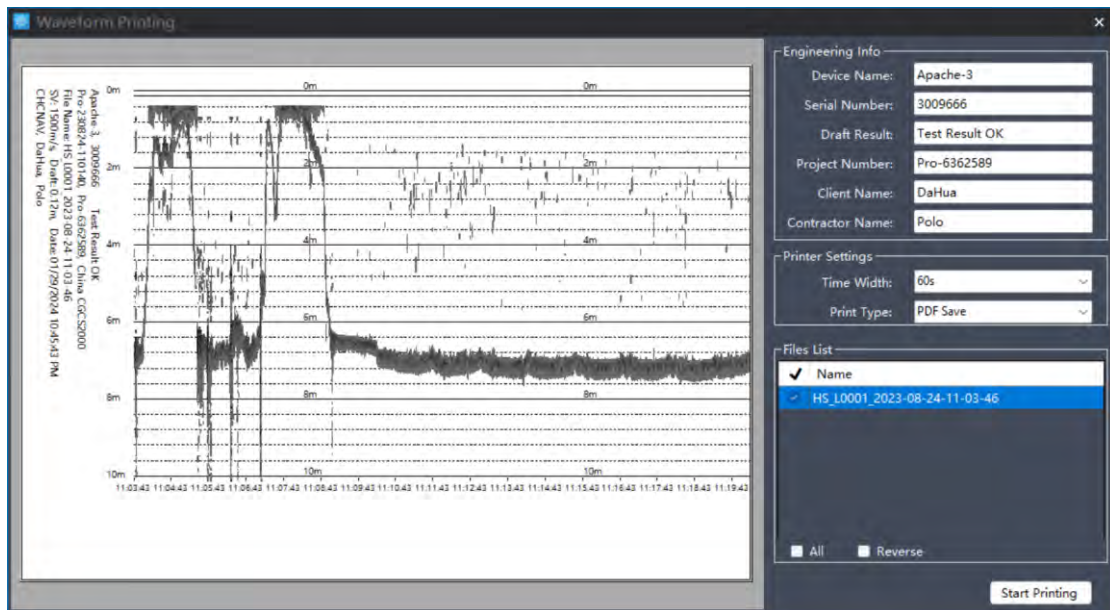
Real time printing, waveform renderings cannot be previewed;



7.13.1.2 Playback Printing

In the waveform file list, select the corresponding file and click the "Start Printing" button. Double click on the file to preview the waveform effect in the left view;

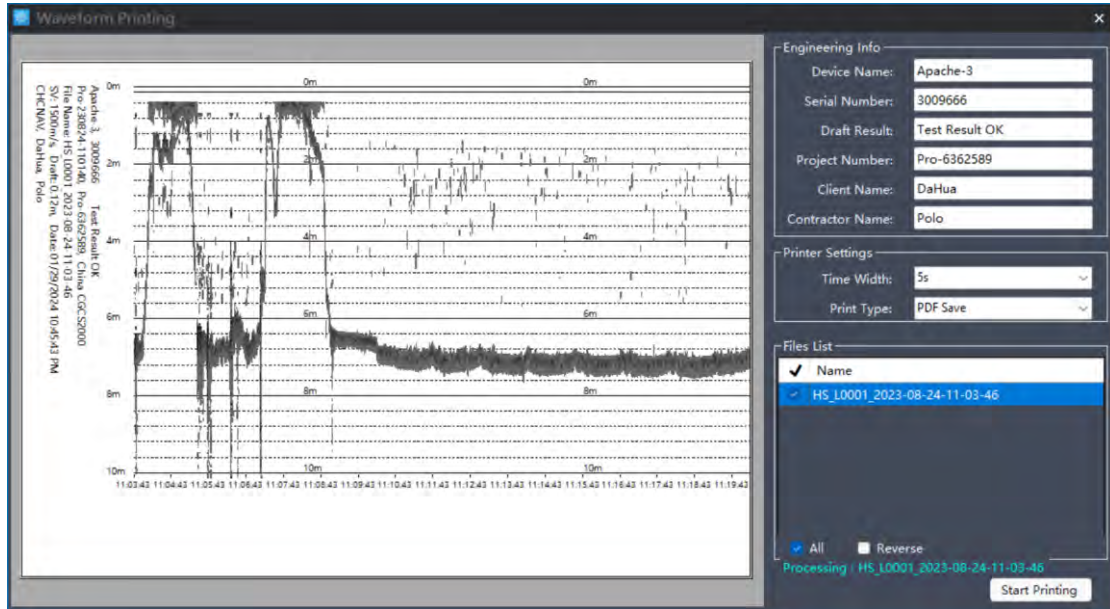
Attention: When the file is large, wait for a moment as uploading the data to the printer takes time;



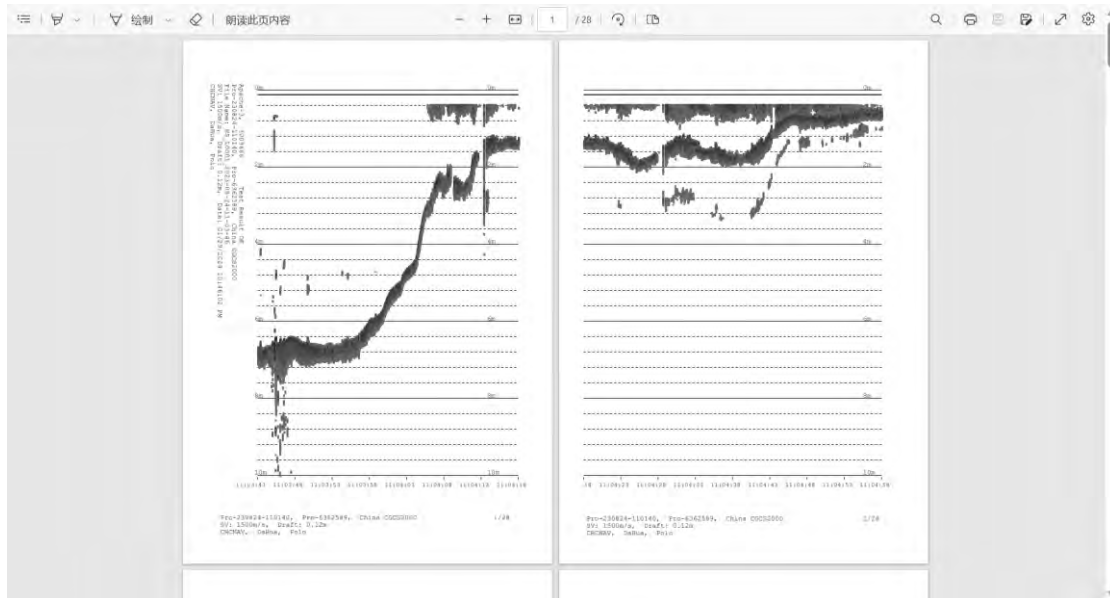
User Manual for CHCNAV APACHE USV

7.13.1.3 PDF Save


In the waveform file list, select the corresponding file and click "Start Printing". Below the file list, you can view the current progress of file processing.



The file is automatically stored in the Result directory under the current project, and the PDF file content is displayed:



7.13.1.4 End Printing

Click on the shortcut bar and click on the "End Printing" button , end current real-time printing, invalid for playback printing function.

8. Navigation operations

Please install and operate the equipment under the guidance of APACHE series USV professional technicians after completing the training and teaching of Huace USVs. When operating USVs, please plan the path reasonably based on the on-site working environment and adopt appropriate methods for accurate and efficient measurement.

9. Navigation environment requirements

In extremely bad weather, to ensure the safety of work equipment and personnel, please do not conduct measurements.

Please avoid operating near high-voltage power lines, communication base stations, and signal towers, as the remote control may be affected by interference in this environment. Please use with caution in complex aquatic environments such as turbulent water flow and navigation channels.

10. Pre homework check

USVs and remote control batteries are fully charged.

The USV antenna, hatch cover, etc. are all tightened in place

The motor rotates normally without any abnormal noise and the wind direction is correct.

The USV (4G/data transmission) has stable communication, and the depth sounder and positioning equipment are working properly.

If automatic navigation is required, check if the route is within the water area and if the Home point is reasonable.

11. APPENDIX

11.1 Product Parameters



华微3号无人测量船
让水域探测走向无人化

技术参数

船体	船体尺寸	1000mm*650 mm *300 mm	控制	控制模式	手动&半自动&免规划全自动
	材质	高分子聚酯碳纤维、凯夫拉布		主控防水防尘	IP67
	船体自重	7kg		数据存储	本地储存(可多通道储存)和远程储存
	最大载重	25kg		控制功能	任务规划、可实现自主导航、船体参数控制、总航行里程统计、剩余里程提醒、多角度视频、支持物理&虚拟摇杆、电池温度显示
	抗风浪等级	3级风, 2级浪		地图加载	支持在线地图、MapBox、ArcGIS卫星影像加载
	船型	三体船		数据采集功能	支持坐标转换、轨迹、水深、波形实时显示, 支持软件与无人艇本地通道存储
	防水防尘	IP67		数据后处理功能	支持单波束数据后处理, 支持波形叠加显示, 支持姿态改正
	吃水	10cm		PPK解算	支持定位+水深数据PPK后差分解算
	指示灯	双色灯, 可指示定位信号状态和差分源		自检	开机系统自检, 异常提醒; 巡航速度异常语音提醒、流量监控与提醒
	视频	360°全向视频		升级	支持软硬件在线推送升级
安全	浅滩自动倒车、毫米波自动避障和视频监控	返航逻辑	低电量自动返航、失联自动返航(最近路径返航)		
返航	低电量自动返航、失联自动返航(最近路径返航)	成果导出方式	U盘、Type-C线、分享码远程数据共享		
防护措施	船身配备防撞条, 安全可靠	定位系统	卫星系统	BDS B1/B2/B3L, GPS L1C/A/L2P(Y)/L2C/L5, Galileo E1/E5a/E5b, GLONASS L1/L2, QZSS L1/L2/L5	
动力类型	电动		通道	1408通道	
电机类型	无刷电机		冷启动	< 30s	
转向类型	无舵机转向		初始化时间	< 5s (典型值)	
马达功率	单马达最大700W		单点定位精度	平面1.5m; 垂直2.5m	
马达转速	最大7000转每分钟		DGNSS定位精度	平面40cm+1ppm; 垂直80cm+1ppm	
马达安装方式	桶状设计, 易拆换		RTK定位精度	平面-8mm+1ppm; 垂直±15mm+1ppm	
防水罩方式	半嵌入式通道式设计, 防水罩罩, 无外挂防刮蹭		CORS差分源	支持网络CORS, 赠送3年内账号	
电池规格	32.4V 23.1Ah*4可充电锂电池, 18650电芯		电台差分	支持华测协议/TT450协议/透明传输协议/南方协议、Satel 3AS协议	
续航时间	标配2组电池6h@2m/s, 11h@1.5m/s 选配可达12h@2m/s, 22h@1.5m/s		定向精度	0.1° (1m基线)	
续航里程	经济续航里程40km (以1:1000 10m航线间隔计算约0.4km²)	测导精度	6"/h; 20S精度衰减1m, 支持桥下持续自主导航及测量		
最大船速	7m/s	IMU更新率	200Hz		
显示屏	10.1寸工业触摸屏+阳光可视屏	测深系统	数据类型	华测格式、NMEA SDDPT/SDDBT和原始波形	
分辨率	1920*1200		主机重量	1.1kg	
安卓系统	Android 9.1		测深范围	0.15-300m	
内存	运行 4GB, 存储容量 64GB		测深精度	±1cm+0.1‰(h为水深)	
通讯频率	800MHz/1.4GHz/2.4GHz		分辨率	1cm	
通讯距离	数传电台常规2km, 最大3km, 4G无限制		最大采样率	30Hz	
电池容量	20000mAh		频率	200kHz	
工作续航	5小时		波束开角	6.5°±1°	
充电功率	36W快充, 充电时长4小时		供电电压	10-30V DC或220V AC适配器	
接口	USB口, Nano SIM卡槽, LAN网口, 音频接口, HDMI接口, TF卡最大支持128GB, Type-C		最大发射功率	300W	
按键	主摇杆*2, 次摇杆*2, 按钮*2, 按键*8	功耗	10W		
船体控制	物理按键控制手/自动, 悬停控制, 一体化软件控制船体, 规划航线、水下地形数据采集	接口	RS232		
控制	操作系统	Linux	本文件所列出的各项参数数值均为理论值或华测导航测试人员在特定受控测试环境下测得值(请见各具体说明), 实际使用中可能因产品个体差异、固件版本、使用条件、使用方式和使用环境等不同使得结果或有不同程度的差异, 请以实际使用的情况为准。 为提供尽可能准确的产品信息, 参数数值、华测导航可能实时对本文件的文字表述、参数数值等内容进行调整和修正, 以求与实际产品性能、规格等信息相匹配。由于产品批次和生产供应因素等实时变化, 如如有必要进行前述修改和调整的, 恕不专门通知, 请以官网实时信息为准。		
	基站通讯	电台&网络&CORS			
	数据通讯	标配4G(支持LTE-FDD, LTE-TDD, UMTS, GSM全球网络制式)&电台			
	视频通讯	4G&电台			
	SIM卡槽	eSIM(赠送10G*36月网络流量)和Nano卡槽			
接口	2*RS485网口, 3*RS232串口, 1*RS485串口, 1*PPS, 2*指示灯, 1*继电器, 1*WiFi	版本: Z3.11			
内存	主控内存存储32GB				
船型识别	支持船型自动识别, 并将各传感器安装偏差值自动写入记录文件中				



User Manual for CHCNAV APACHE USV



华微3号Pro 无人测量船

让水域探测走向无人化

技术参数

船体		软件系统	
船体尺寸	1050 mm *550 mm *390 mm	控制功能	任务规划、可实现自主导航、船体参数控制、总航行里程统计、剩余里程提醒、多角度视频、支持物理&虚拟摇杆、电池温度显示
材质	高分子聚丙烯纤维、凯夫拉布	地图加载	支持在线地图、MapBox、ArcGIS卫星影像加载
船体自重	6kg	数据采集功能	支持坐标转换、轨迹、水深、波形实时显示、支持软件与无人船本地存储
最大载重	30kg	数据后处理功能	支持单波束数据后处理、支持波形图叠加显示、支持姿态改正
抗风浪等级	3级风、2级浪	PPK解算	支持定位+水深数据PPK后差分解算
船型	三体船	自检	开机系统自检、异常提醒、巡航速度异常语音提醒、流量监控与提醒
GNSS	船体内置GNSS双天线，无需外接RTK	升级	支持软件在线推送升级
防水防尘	IP67	返航逻辑	低电量自动返航、失联自动返航（择近路径返航）
吃水	9cm	成果导出方式	U盘、Type-C线、分享码远程数据共享
指示灯	双色灯 可指示定位信号状态和差分源	卫星系统	BDS B1I/B2I/B3I、GPS L1C/A/L2(P/Y)/L2C/L5、Galileo E1/E5a/E5b、GLONASS L1/L2、QZSS L1/L2/L5
视频	360°全向视频	通道	7408通道
安全	浅滩自动刹车、毫米波测速自动报警和视觉观察、支持半自动和全自动测量	冷启动tt	< 30s
避障距离	0.2-40m	初始化时间	≤ 5s（典型值）
避障范围	俯仰*方位：14°*112°，最多支持64个目标同时探测跟踪	单点定位精度	平面1.5m、垂直2.5m
防护措施	船身配备防撞条，安全可靠，双层船壳防沉没	DGNSS定位精度	平面40cm+1ppm、垂直80cm+1ppm
动力类型	电动	RTK定位精度	平面±8mm+1ppm、垂直±15mm+1ppm
电机类型	无刷电机	CORS差分源	支持网络CORS，赠送3年内账号
转向类型	无舵机转向，支持倒车	电台差分	支持北斗协议/TT450协议/透明传输协议/南方协议、Satel 3A5协议
马达功率	单马达最大800W	定向精度	0.1°（1m基线）
马达转速	最大7200转每分钟	测速精度	6°/h；205精度衰减1m，支持桥下持续自主导航及测量
马达安装方式	插拔设计，易拆换	IMU更新率	200Hz
防水罩方式	半嵌入式滑盖式设计，防水罩罩，无外挂防雨棚	数据类型	华测格式、NMEA SDOPT/SDDBT和原始波形
电池规格	32.4V 23.1Ah*4可充电锂电池、18650电芯	操作系统	Linux
供电方式	支持单电池独立供电，双电池均衡供电	液晶屏	1.46英寸，分辨率128 x 128
电池更换	支持不关机插拔更换	WiFi	802.11n-2.4G
续航时间	标配2锂电池@2m/s、11h@15m/s 选配可达12h@2m/s、22h@15m/s	蓝牙	BT5.0，向下兼容BT2.x
续航里程	经济续航里程40km（以1:1000 10m航线向测算约0.4km²）	主机重量	840g
最大船速	8m/s支持安全穿越4m/s流速断面	测深范围	0.15-300m
显示屏	10.1寸工业触摸屏+阳光可视屏	测深精度	±1cm+0.1%h（h为水深）
分辨率	1920*1200	分辨率	1cm
安卓系统	Android 9.1	最大采样率	30Hz
内存	运行4GB，存储容量64GB	频率	200kHz
通讯频率	800MHz/1.4GHz/2.4GHz	水温传感器	-55℃~+100℃、实时修正声速
通讯距离	数传电台常规2km、极限3km，4G无限制	波束开角	6.5°±1°
电池容量	20000mAh	声速调整范围	0m/s~1700m/s
工作续航	5小时	供电电压	10-36V DC或100-240V AC适配器
充电功率	36W快充；充电时长4小时	防尘防水	IP67
接口	1USB、Nano SIM卡槽、LAN接口、创捷接口、HDMI接口、TF卡最大支持128GB、Type-C	最大发射功率	300W
按键	主摇杆*2、次摇杆*2、旋钮*2、按键*8	功耗	10W
船体控制	物理按键控制/手动、悬停控制、一体化软件控制/遥控、规划航线、水下地形数据采集		
操作系统	Linux		
基站通讯	电台&网络&CORS		
数据通讯	标箱2G（支持LTE-FDD、LTE-TDD、UMTS、GSM全球网络制式）&电台4G&电台		
视频通讯	4G&电台		
SIM卡槽	eSIM（赠送10G*16月网络流量）和Nano卡槽		
接口	2*RS45网口、3*RS232串口、7*RS485串口、7*PPS、2*指示灯、1*蜂鸣器、1*WiFi		
内存	主控内存存储32GB		
船型识别	支持船型自动识别，并将各传感器安装偏差值自动写入记录文件中		
控制模式	手动&半自动&免规划全自动		
主控防水防尘	IP67		

软件系统

定位系统

测深系统

控制系统

本文件所列出的各项参数数值均为理论值或华测导航测试人员在特定受控测试环境下测得值（请见各具体说明），实际使用中可能因产品个体差异、固件版本、使用条件、使用方式和环境等因素不同使得结果或有不同程度的差异，请以实际使用的情况为准。
为提供尽可能准确的产品信息，参数数值、华测导航可能实时对本文件的文字表述、参数数值等内容进行调整和修正，以求与实际产品性能、规格等信息相匹配。由于产品批次和生产供应因素等实时变化，如如有必要进行前述修改和调整的，恕不专门通知，请以官网实时信息为准。

版本：23.11



User Manual for CHCNAV APACHE USV



华微4号 水文测验船

水文测流全自动，方便省心又精准

技术参数

船体尺寸	1200 mm *750 mm *400 mm
材质	高分子聚酯碳纤维、凯夫拉布
船体自重	13kg
最大载重	40kg
抗风浪等级	3级风, 2级浪
船型	三体船
GNSS	船体内置GNSS双天线, 无需外接RTK
ADCP安装孔径	24cm
ADCP兼容性	兼容搭载RCP、M9、RiverPro、RiverRay、RioGrande等走航式ADCP
挂载设备	同时搭载ADCP和测深仪, 可扩展取样、水质仪、测日
防水防尘	IP67
吃水	10cm
指示灯	双色灯, 可指示定位信号状态和差分源
视频	360°全向视频
安全	浅滩自动倒车, 毫米波雷达自动避障和视频观察
避障距离	0.2-40m
避障范围	俯仰+方位: 14°*112°, 最多支持64个目标同时探测跟踪
防护措施	船身配备防撞条, 安全可靠, 双层船壳防沉没
动力类型	电动
电机类型	无刷电机
转向类型	无舵机转向, 支持倒车
马达功率	单马达最大1000W
马达转速	最大7200转每分钟
马达安装方式	插拔设计, 易拆换
防水罩方式	半嵌入式通道式设计, 防水罩罩, 无外挂防刮蹭
电池规格	32.4V 23.1Ah*2可充电锂电池, 18650电芯
供电方式	支持锂电池独立供电, 双电池均衡供电
电池更换	支持不关机热插拔更换
续航时间	8h@1.5m/s, 选配可达12h@2m/s
最大船速	7.5m/s
显示屏	10.1寸工业触摸屏+阳光可视屏
分辨率	1920*1200
安卓系统	Android 9.1
内存	运行 4GB, 存储空间64GB
通讯频率	800MHz/1.4GHz/2.4GHz
通讯距离	数传电台常规2km, 极限3km, 4G无限制
电池容量	20000mAh
工作续航	5小时
充电功率	36W快充, 充电时长4小时
接口	USB口, Nano SIM卡槽, LAN网口, 音频接口, HDMI接口, TF卡最大支持128GB, Type-C
按键	主摇杆*2, 次摇杆*2, 旋钮*2, 按键*8
船体控制	物理按键控制/手动, 悬停控制, 一体化软件控制船体, 规划航线, 水下地形数据采集
操作系统	Linux
基站通讯	电台和网络GPRS
数据通讯	标配4G (支持LTE-FDD, LTE-TDD, UMTS, GSM全球网络制式) &电台
视频通讯	4G&电台
SIM卡槽	eSIM (赠送10G*36月网络流量) 和Nano卡槽
接口	2*RJ45网口, 3*RS232串口, 1*RS485串口, 1*PPS, 2*指示灯, 1*蜂鸣器, 1*WiFi
内存	主控内存存储32GB
船型识别	支持船型自动识别, 并将各传感器安装偏差值自动写入记录文件中
控制模式	手动&半自动&免规划全自动

水文模式	自动悬停、自适应流速、自动规划航线
主控防水防尘	IP67
数据储存	本地储存 (可多通道储存) 和远程储存
控制功能	任务规划, 可实现自主导航, 船体参数控制, 总航行里程统计, 剩余里程提醒, 多角度视频, 支持水文模式, ADCP一键配置, 电池温度显示
底部加载	支持在线地图, MapBox, ArcGIS卫星影像加载
数据采集功能	支持坐标转换, 轨流, 水深, 波形实时显示, 支持软件与无人船本地B通道存储
数据后处理功能	支持单波束数据后处理, 支持波形叠加显示, 支持姿态改正
PPK解算	支持定位+水深数据PPK后差分解算
自检	开机系统自检, 异常提醒; 巡航速度异常语音提醒; 流量监控与提醒
升级	支持软件在线推送升级
返航逻辑	低电量自动返航, 失联自动返航 (接近路径返航)
成果导出方式	U盘, Type-C线, 分享码远程数据共享
卫星系统	BDS B1/B2/B31, GPS L1C/A/L2P(Y)/L2C/L5, Galileo E1/E5a/E5b, GLONASS L1/L2, QZSS L1/L2/L5
通道	1408通道
冷启动	<30s
初始化时间	<5s (典型值)
单点定位精度	平面1.5m, 垂直2.5m
DGNSS定位精度	平面40cm+1ppm, 垂直80cm+1ppm
RTK定位精度	平面+8mm+1ppm, 垂直+15mm+1ppm
CORS差分源	支持网络CORS, 赠送3年内账号
电台差分	支持华测协议/TT450协议/透传传输协议/南方协议, Satel 3AS协议
定向精度	0.1° (1m基线)
测导精度	6°/m, 20s精度衰减1m, 支持桥下持续自主导航及测量
IMU更新率	200Hz
数据类型	华测格式, NMEA SDDPT/SDCBT和原始波形
操作系统	Linux
液晶屏	146英寸, 分辨率128 x 128
WiFi	802.11n-2.4G
蓝牙	BT5.0, 向下兼容BT2.x
主机重量	840g
测深范围	0.15-300m
测深精度	±1cm+0.1‰h (h为水深)
分辨率	1cm
最大采样率	30Hz
频率	200kHz/25kHz双频
水温传感器	-55°C~+100°C, 实时修正声速
波束开角	6.5°±1°/28°±1° (25kHz)
声速调整范围	0m/s~1700m/s
供电电压	10-36V DC或100-240V AC适配器
防尘防水	IP67
最大发射功率	300W
功耗	10W

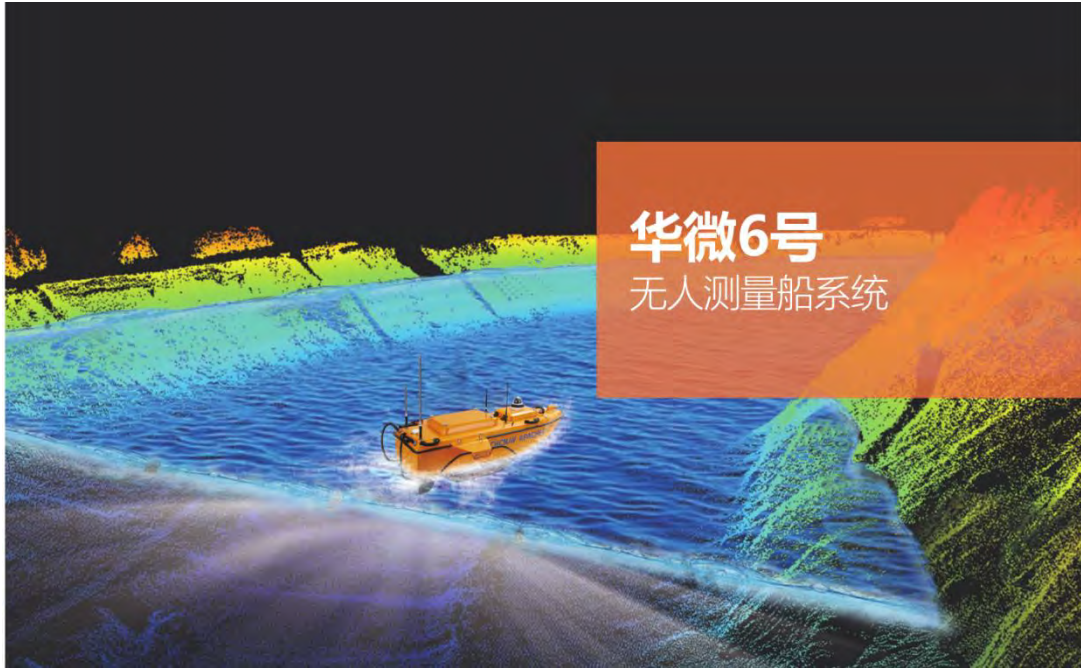
本文件所列出的各项参数数值均为理论值或华测导航测试人员在特定受控测试环境下测得值 (请见各具体说明), 实际使用中可能因产品个体差异, 固件版本, 使用条件, 使用方式和环境等因素不同使得结果或有不同程度的差异, 请以实际使用的情况为准。

为提供尽可能准确的产品信息, 参数数值, 华测导航可能对本文的文字表述, 参数数值等内容进行调整和修正, 以求与实际产品性能, 规格等信息相匹配。由于产品批次和生产供应因素等实时变化, 如如有必要进行前述修改和调整的, 恕不专门通知, 请以网页实时信息为准。

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华微6号 无人测量船系统

技术参数

船体	船体尺寸	1800 mm * 500 mm * 250 mm	卫星系统	BDS B1/B2/B3L, GPS L1C/A/L2P(Y)/L2C/L5, Galileo E1/E5a/E5b, GLONASS L1/L2, QZSS L1/L2/L5			
	材质	高分子聚酯碳纤维, 凯夫拉布		通道	1408通道		
	船体自重	15kg		冷启动	< 30s		
	最大载重	60kg		初始化时间	< 5s (典型值)		
	抗风浪等级	6级风, 4级浪		单点定位精度	平面1.5m, 垂直2.5m		
	船型	可拆卸式三体船		DGNSS定位精度	平面40cm+1ppm, 垂直80cm+1ppm		
	防水防尘	IP65		RTK定位精度	平面±8mm+1ppm, 垂直±15mm+1ppm		
	吃水	15cm		CORS差分源	支持网络CORS, 赠送3年内账号		
	指示灯	双色灯, 可指示定位信号状态和差分源		电台差分	支持华测协议/TT450协议/透明传输协议/南方协议, Satel 3AS协议		
	视频	360°全向视频, 可实时回传		定向精度	0.1° (1m量程)		
	安全	浅滩自动倒车, 超声波避障和视频监控		测导精度	6"/h; 20S精度衰减1m, 支持桥下持续自主导航及测量		
	返航	低电量自动返航, 失联自动返航 (择近路径返航)		IMU更新率	200Hz		
	动力	动力类型		电动	数据	数据类型	华测格式, NMEA SDDPT/SDDBT和原始波形
		电机类型		无刷电机		主机重量	1.1kg
转向类型		无舵机转向	测深范围	0.15-300m			
马达功率		单马达最大700W	测深精度	±1cm+0.1%/h (h为水深)			
马达转速		最大7000转每分钟	分辨率	1cm			
马达安装方式		插拔设计, 易拆换	频率	200kHz			
防水草方式		涵道式设计, 防水草罩	供电电压	10-30V DC或220V AC适配器			
电池规格		32.4V 23.1Ah*9, 可充电锂电池, 10650电芯	波束开角	6.5°±1°			
续航时间		6h@2m/s, 选配可达12h@2m/s	功耗	10W			
最大船速		6m/s	脉冲功率	300W			
通信	基站通讯	电台&网络&CORS	最大采样率	30Hz			
	数据通讯	标配4G&网桥&电台	接口	RS232串口			
	遥控通讯	2.4GHz电台&4G&网桥					
	视频通讯	4G&网桥					
	遥控距离	智能遥控2公里, 4G unlimited (视网络情况) 和网桥2公里					
	SIM卡槽	eSIM (赠送10G*36月网络流量) 和Nano卡槽					
	控制模式	手动&自动					
	主控防水防尘	IP67					
软件	数据存储	本地存储 (可多通道存储) 和远程存储					
		任务规划, 数据采集和数据后处理等功能, 可实现自主导航, 船体参数控制, 多角度视频显示和坐标转换等功能, 支持卫星地图导入, 方便规划测区。					

本文件所列出的各项参数数值均为理论值或华测导航测试人员在特定受控测试环境下测得值 (请见各项具体说明), 实际使用中可能因产品个体差异, 固件版本, 使用条件, 使用方式和环境等不同使得结果或有不同程度的差异, 请以实际使用的情况为准。为提供尽可能准确的产品信息, 参数数值, 华测导航可能实时对本文件的文字表述, 参数数值等内容进行调整和修正, 以求与实际产品性能, 规格等信息相匹配。由于产品批次和生产供应因素等实时变化, 如如有必要进行前述修改和调整的, 恕不专门通知, 请以官网实时信息为准。

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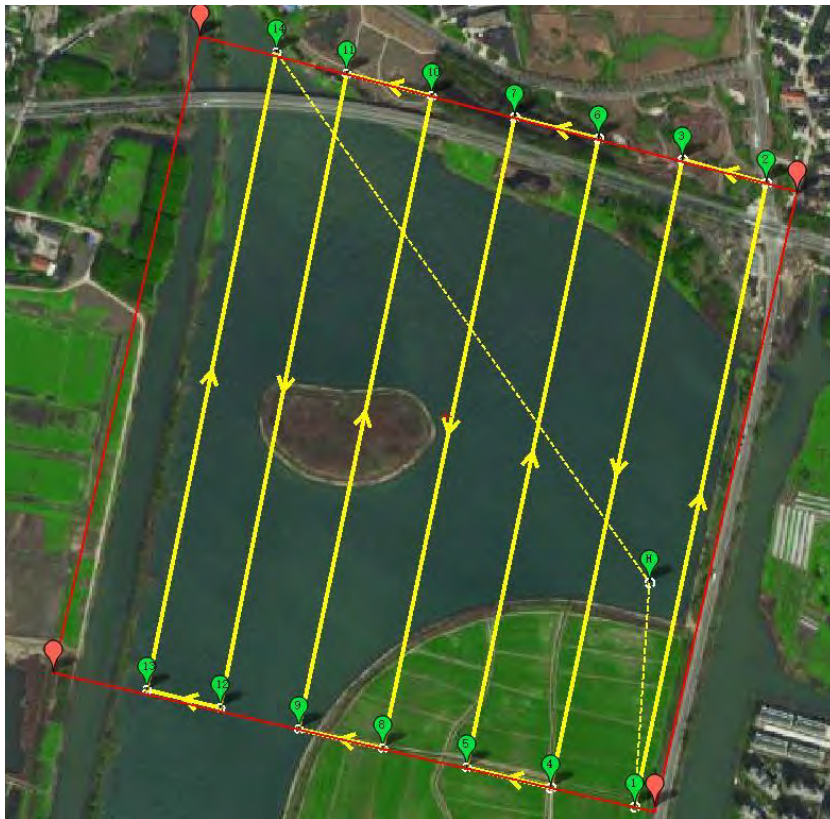


11.2 Detailed Explanation of USV Operation Mode

Surveying mode: Conventional operation mode. After switching to automatic mode, the USV executes commands according to the preset route. After reaching the target task point, it automatically navigates towards the next task point.

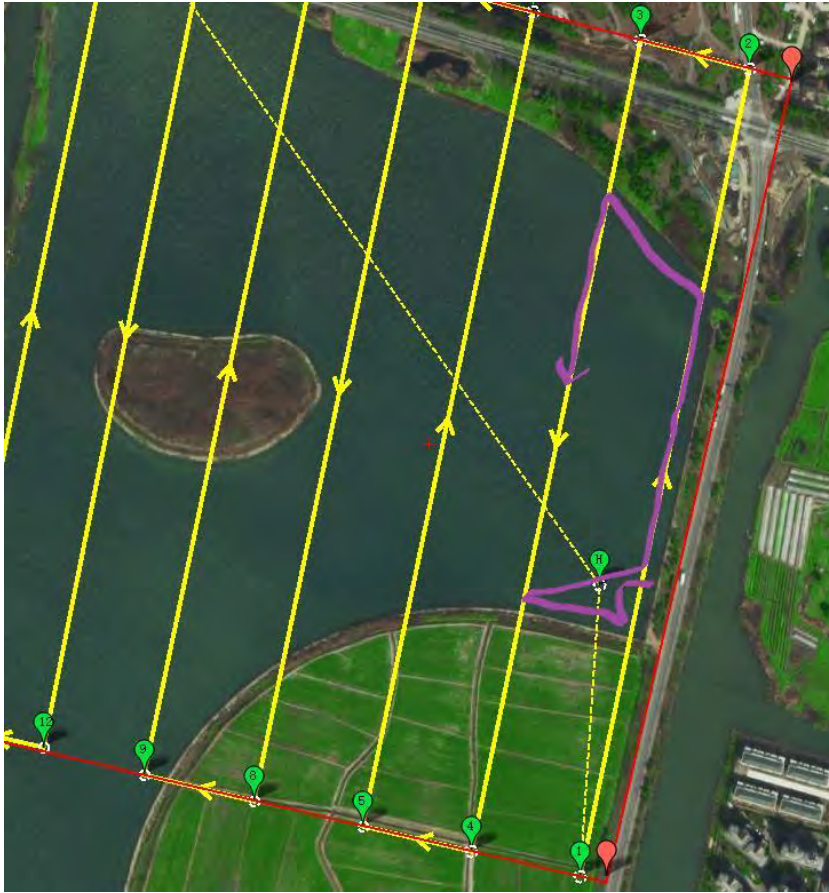
Hydrological mode: mainly used for hydrological testing. On the map, there are two points on the left and right banks of the river section. After the USV switches to automatic mode, it will travel back and forth along the line between the two points. When it reaches the task point, it will automatically hover and continue to travel after the hover is released.

11.2.1 Semi automatic mode: (manual rough route planning)



Cover the measuring water area, islands, and other obstacles with the polygonal range. After the USV is launched, switch to automatic mode. For example, when the ship is launched from the Home position, the USV is sailing towards 1 o'clock, millimeter wave detects obstacles, and the USV is turning towards the rear route direction to try to bypass obstacles (in this case, turning right to try to bypass). When the ship continuously encounters obstacles and reaches the next survey line, it is judged as shore and abandoned waypoint 1 to waypoint 2.

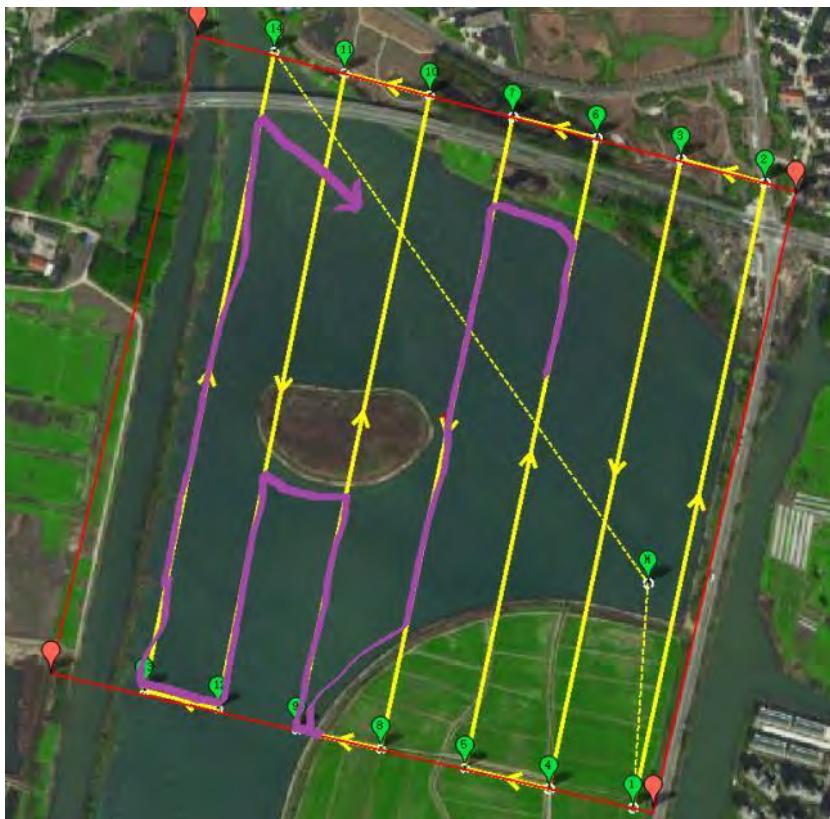
User Manual for CHCNAV APACHE USV



Encounter continuous obstacles at waypoint 2, and waypoint 3 is also under obstacle detection. Abandon waypoints 2 and 3 and go to waypoint 4 (as shown in the above picture).

The logic behind the waypoint is the same as above. The USV follows the route shown in Figure 3, because the USV cannot know the blank waters of the two survey lines behind the island. The blank waters near the two survey lines of waypoint 10 and route 11 need to be measured separately by setting up a route. (As shown in the figure below)

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If the obstacle does not cover the next survey line, bypass the obstacle and continue the route (as shown in the figure below).



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11.2.2 Full automatic mode:

After the USV is launched, it travels along the direction of the desired measurement route (as shown in the blue trajectory line in Figure 5), automatically enters the fully automatic measurement mode, and the software prompts "Please move the left and right joysticks to determine the direction of the next route" for voice synchronization broadcasting. The operator moves the remote control left joystick to determine the direction of the route (as shown in the blue arrow in Figure 5, the route will move to the left);



USVs automatically plan their routes in parallel directions, with millimeter wave and obstacle logic consistent with semi-automatic logic.

Note:

Semi automatic and fully automatic measurement modes are only available for USVs equipped with millimeter wave obstacle avoidance modules.

Cooperating with low battery automatic return logic, millimeter wave obstacle avoidance, and shallow beach recognition to avoid obstacles on the water surface and underwater, achieving automated measurement of large areas of water for USVs.

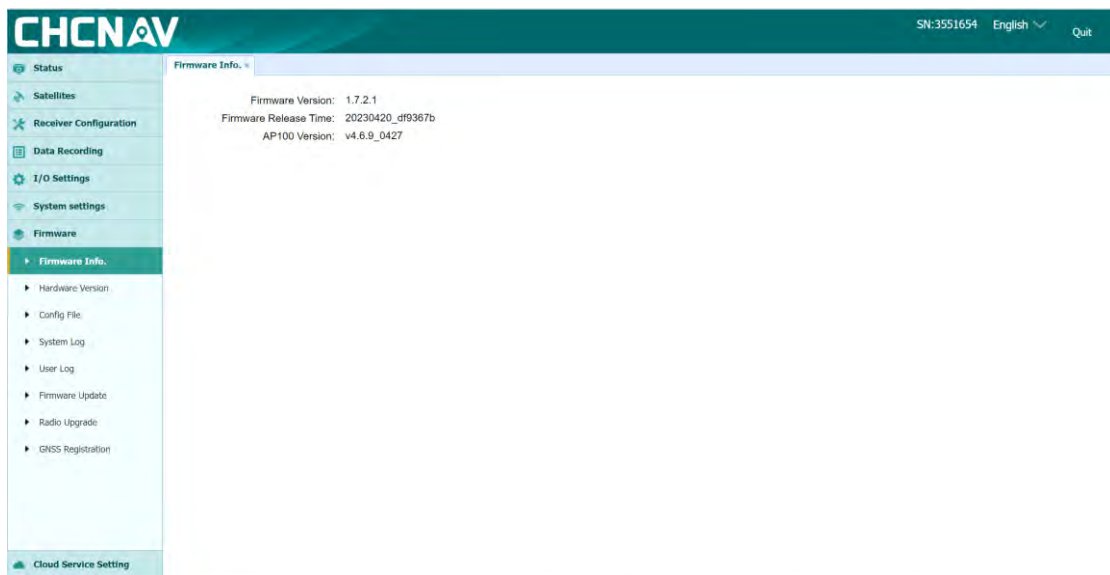
11.3 Firmware Upgrade

Firmware (*.hex;*.px4;*.vrx;*.bin) The firmware has two formats: bin and px4, which can be upgraded separately.

There are two ways to upgrade the firmware of USV GD100, each of which includes manual upgrade and online upgrade.

Method 1: Upgrade through GD100 web page.

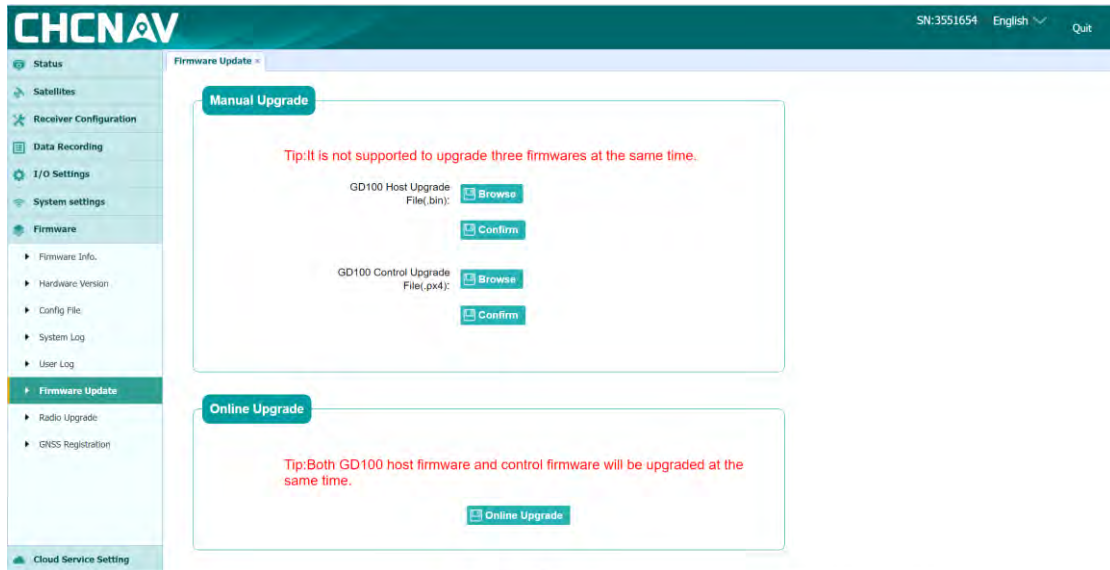
In the GD100 webpage backend, go to [Firmware] - [Firmware Information] to view the current firmware version



Manual upgrade: Click browse, select the local firmware, and then click OK to upgrade the GD100 host firmware (bin) and control firmware (px4) in sequence.

Online upgrade: When the network environment of the USV is stable, clicking on online upgrade will automatically upgrade the firmware to the server and upload the latest version.

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Method 2: Upgrade the software and firmware with just one click using AutoPlanner software.

Manual upgrade: After connecting to the USV, in the help interface, select [Firmware Upgrade]. This interface allows you to view the current firmware version and select [Upgrade Firmware (USB only)]



Online Upgrade: In the help interface, select [Software Upgrade], check [Firmware Sync Upgrade], click Upgrade to upgrade the AutoPlanner software and firmware to the server and upload the latest version.



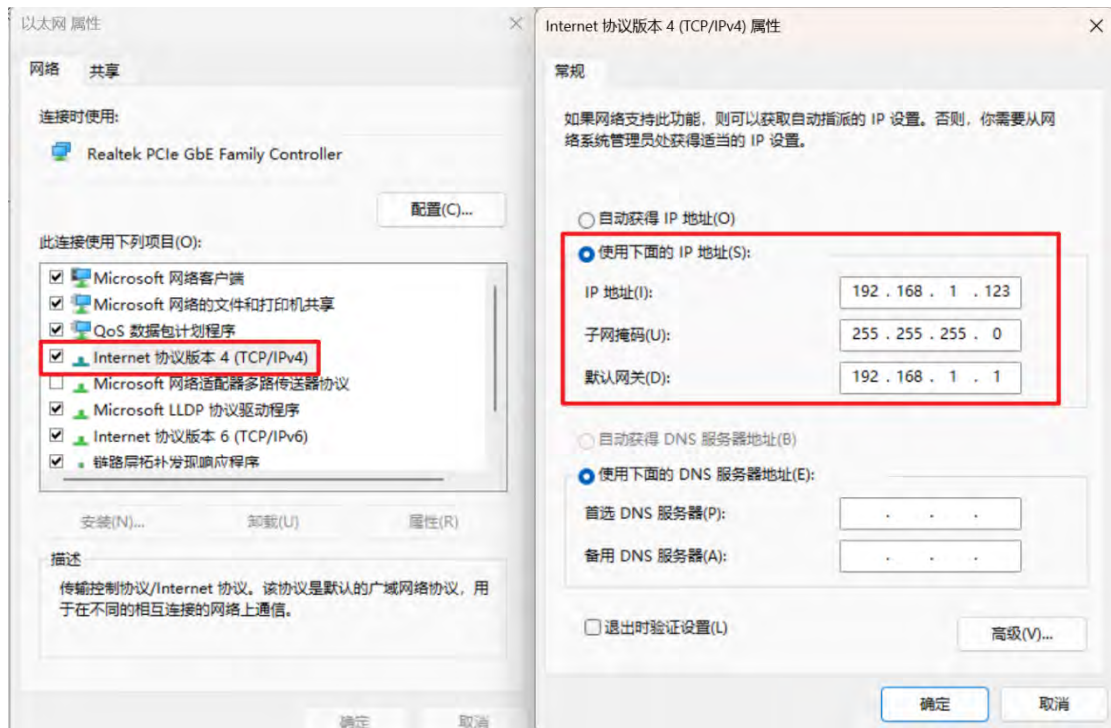
Note:

Upgrading using a 4G network is relatively slow. It is recommended to connect to the GD100 lan1 port through a network cable in data transmission mode. At this time, the upgrade time will be shortened to about 5 minutes.

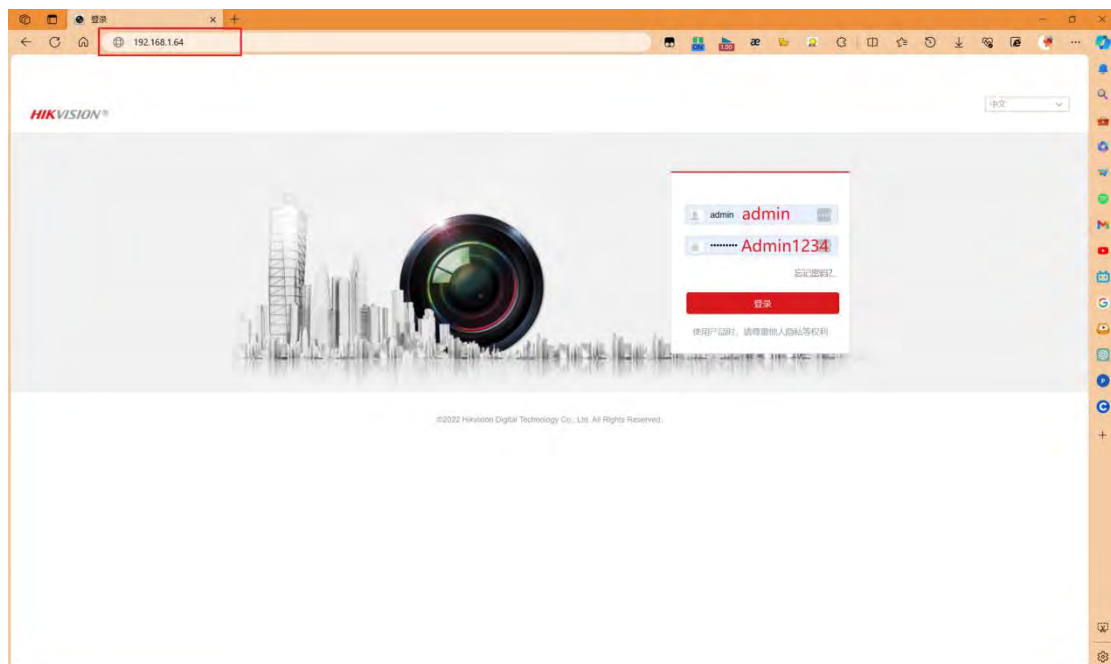
11.4 Camera debugging

To replace the camera, the following methods can be used for debugging: connect the computer and camera through a network cable, modify the IPV4 protocol to the network segment 1

User Manual for CHCNAV APACHE USV

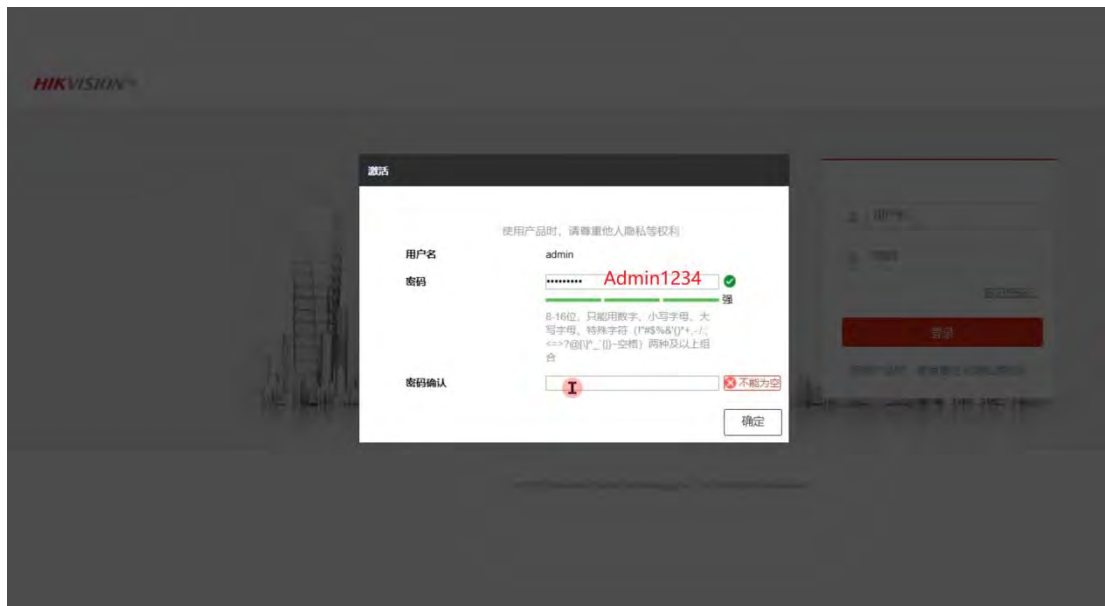


Open the Internet Explorer , enter 192.168.1.64 in the address bar, and enter the camera webpage management platform

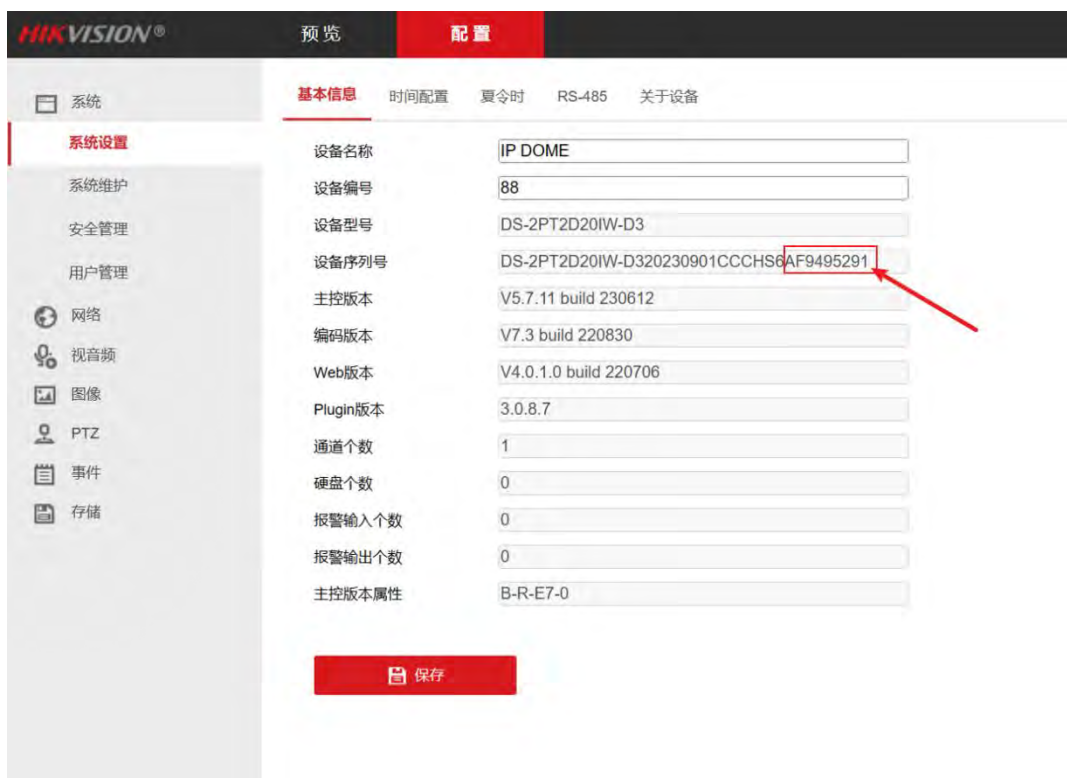


Enter the username: admin. and password: Admin1234

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Click on the configuration interface, and in the [System] - [System Settings] interface, record the last 9 digits of the device serial number (mixed with letters and numbers)



Click on 【 Image 】 - 【 Display Settings 】 - Right side list 【 Video Adjustment 】 , and change the image to 【 Center 】 .

User Manual for CHCNAV APACHE USV

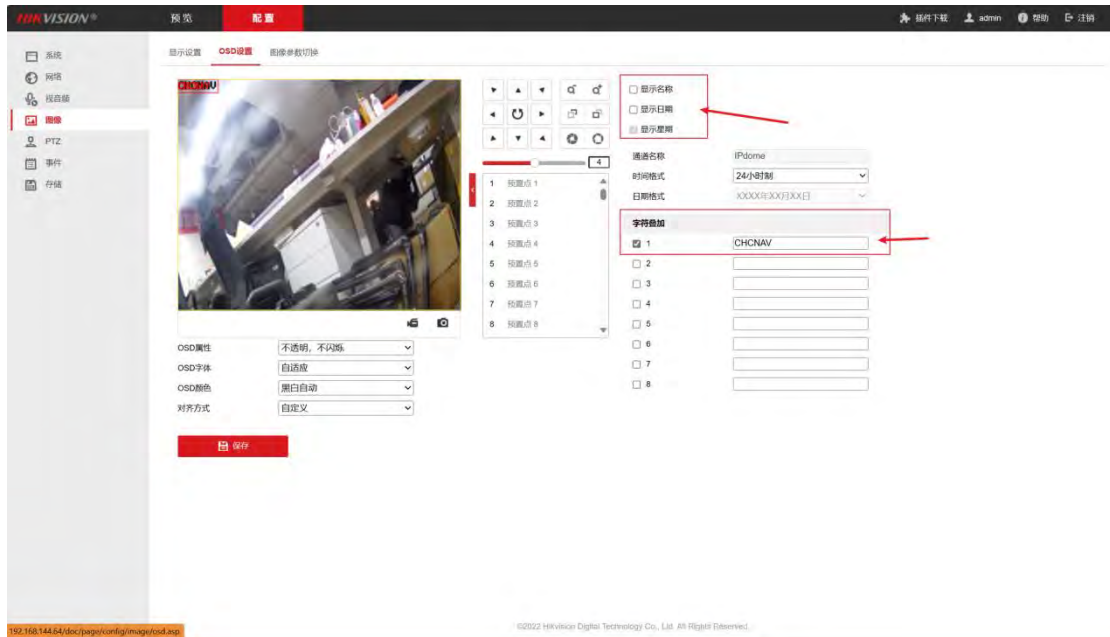


Click on the "Focus" option in the list, select "Auto" as the focus mode, and select "Compatible" as the minimum focus distance.

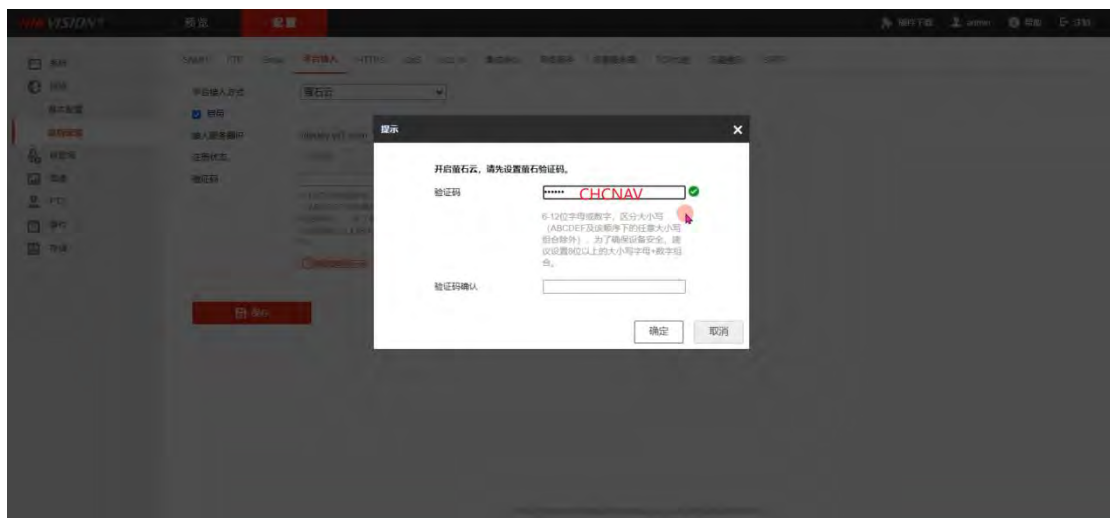


[Image] - [OSD Settings], uncheck display date, add character overlay 1 [CHCNAV]

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Configuration interface, 【 Advanced Configuration 】 - 【 Platform Access 】, select 【 Firestone Cloud 】 as the platform access method, and input the verification code into “CHCNAV”,



Configuration interface, [Basic Configuration], modify the IPV4 address of the device to 192.168.53.64, subnet mask 255.255.255.0, default gateway 192.168.53.254 for IPV4, click the save button, restart the device, and connect the network cable to the USV GD100 LAN1 network port.

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HIKVISION® 预览 **配置**

系统 网络

基本配置

高级配置

视音频

图像

PTZ

事件

存储

TCP/IP DDNS PPPoE 端口 端口映射 多播配置

网卡类型 自适应

自动获取

设备IPv4地址 192.168.53.64 测试

IPv4子网掩码 255.255.255.0

IPv4默认网关 192.168.53.254

IPv6 模式 路由公告

设备IPv6地址

IPv6子网掩码

IPv6默认网关 ::

物理地址 08:54:11:fd:a4:8d

MTU 1500

启用多播搜索

DNS服务器配置

首选DNS服务器 223.5.5.5

备用DNS服务器 8.8.8.8

域名配置

启用动态域名

注册域名

11.5 Electrical debugging

Replace with a new electrical regulator, power on the USV, and follow this step to configure the electrical regulator parameters:

USVs equipped with a PowerBox need to enter the USV web management system and turn on the electrical dispatch parameter switch. USVs without a PowerBox can skip step 1.



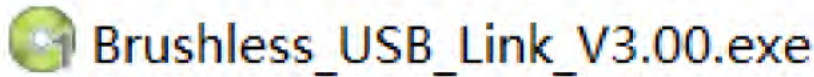
For USVs equipped with a PowerBox, adjust the left side electrical adjustment, connect the electrical adjustment parameter line to the PWM3 interface, and adjust the right side electrical adjustment to connect to the PWM4 interface.

USVs that are not equipped with a PowerBox can directly connect the electrical adjustment parameter line to the electrical adjustment.

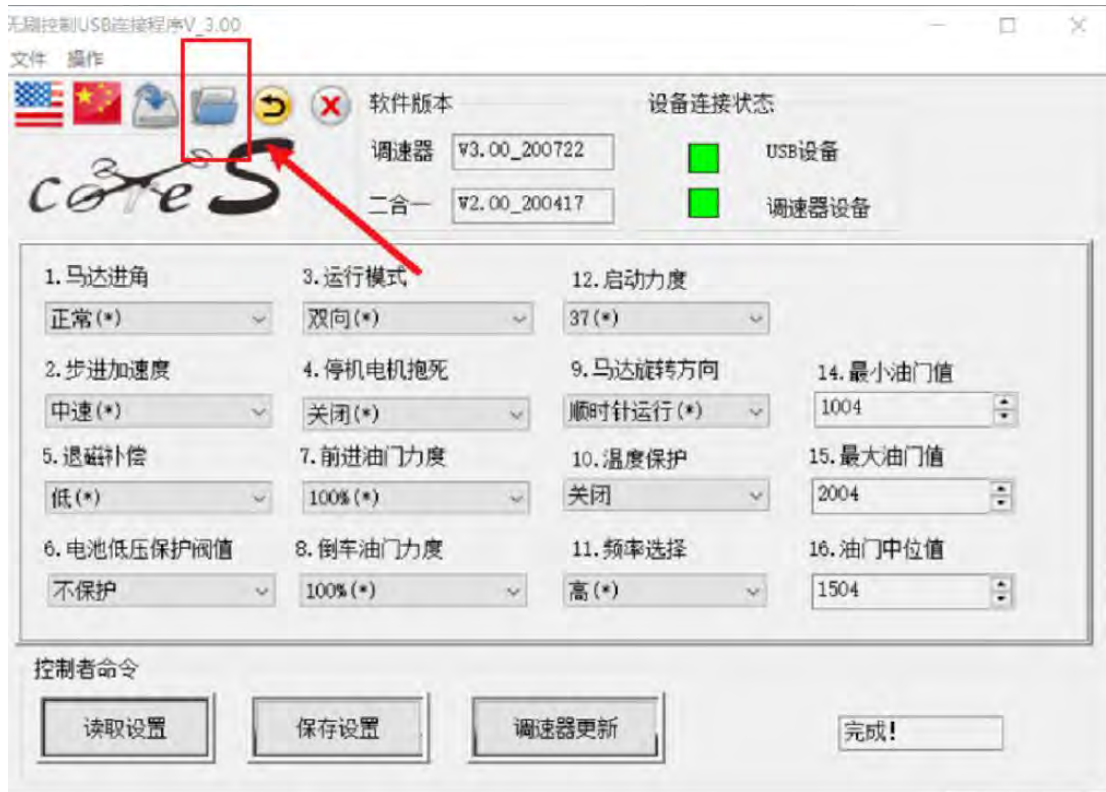
User Manual for CHCNAV APACHE USV



Open the Brushless software.

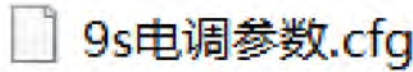


When the device is connected normally, the two status indicator lights in the device connection status bar display green. If they display red, please check if the connection interface and direction are correct.



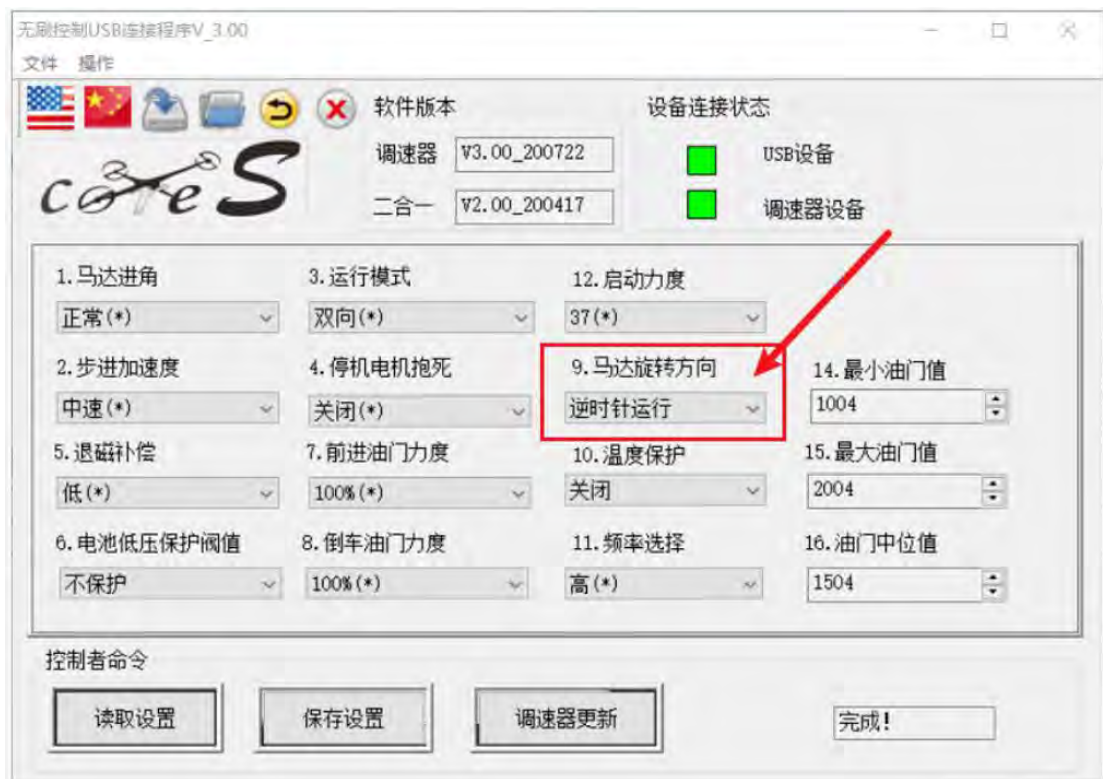
User Manual for CHCNAV APACHE USV

Click on "File Identification", select "9S Electric Adjustment Parameters", click on "Save", and the motor will "beep" prompt, indicating successful writing (the left and right electric adjustment settings are the same). After successful parameter writing, the USV needs to be restarted.



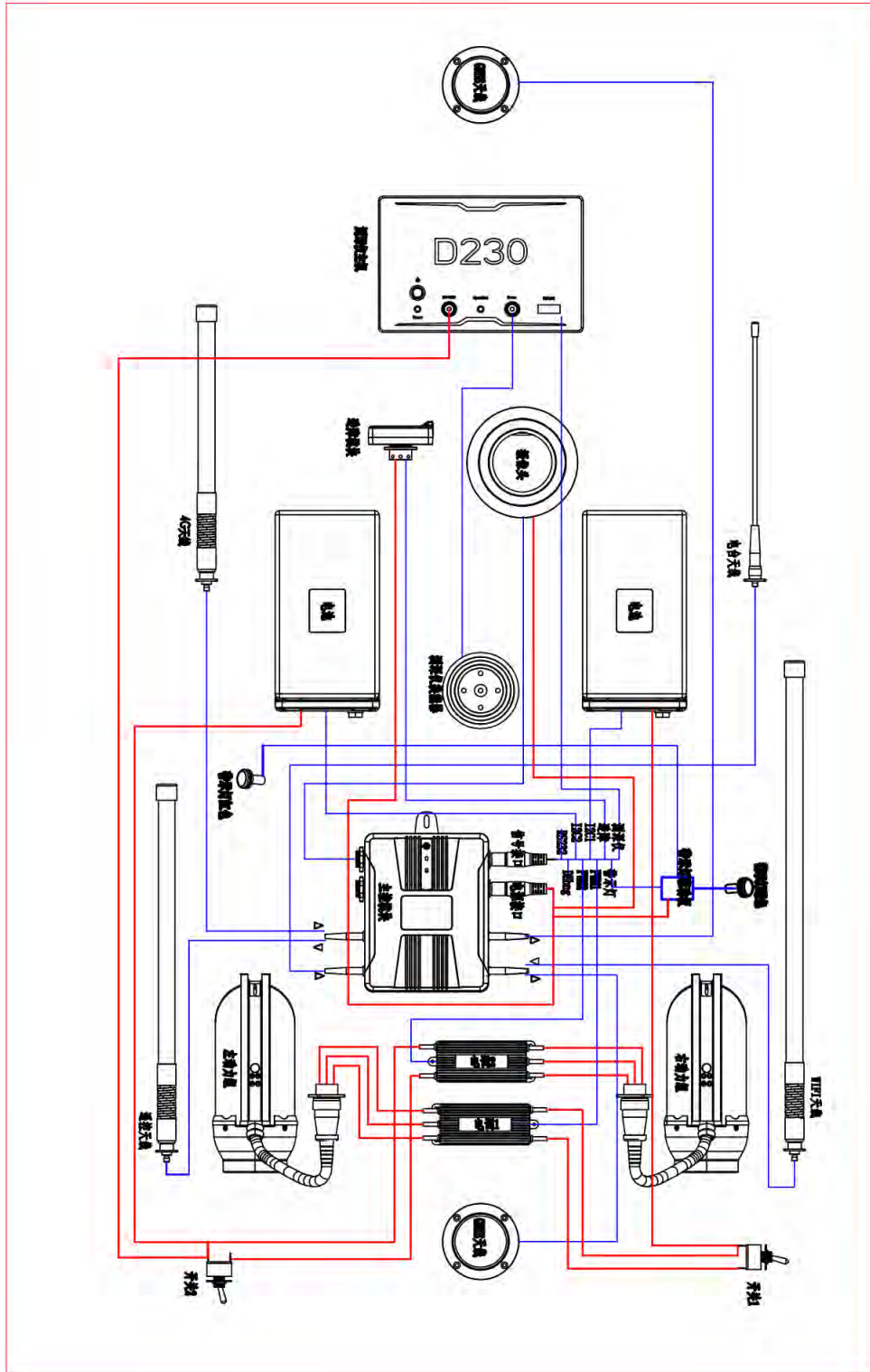
Check if the wind direction is correct, and remotely control the motor to turn left and right (forward, blow air backward from the left and right motors; backward, blow air forward from the left and right motors; left turn, blow air backward from the right motor, blow air forward from the left motor; right turn, blow air backward from the left motor, blow air forward from the right motor).

If the direction of blowing on one side is opposite, simply brush the motor on that side again to rotate in the correct direction.



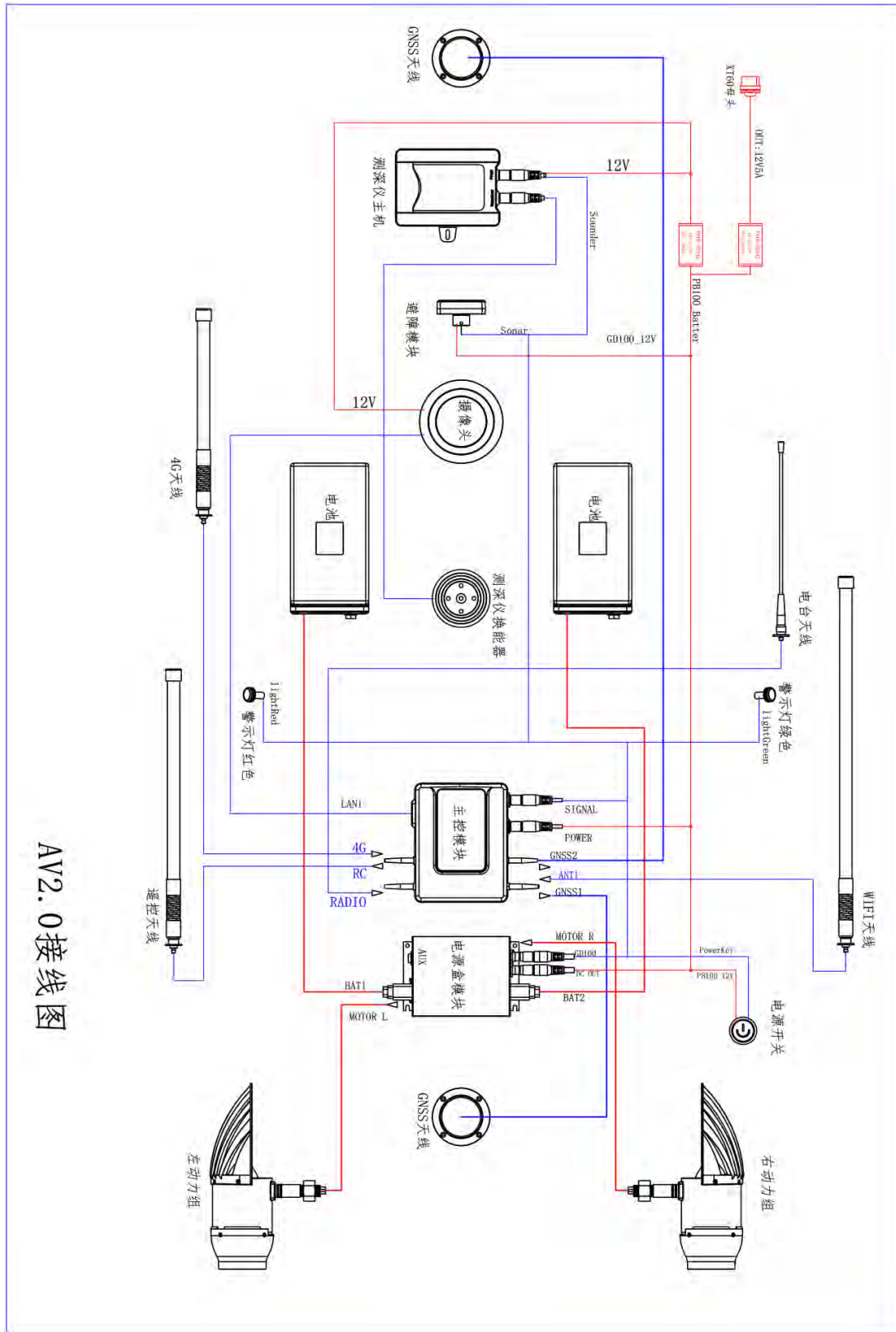
11.6 Wiring diagram

11.6.1 APACHE 3 USV Wiring Diagram



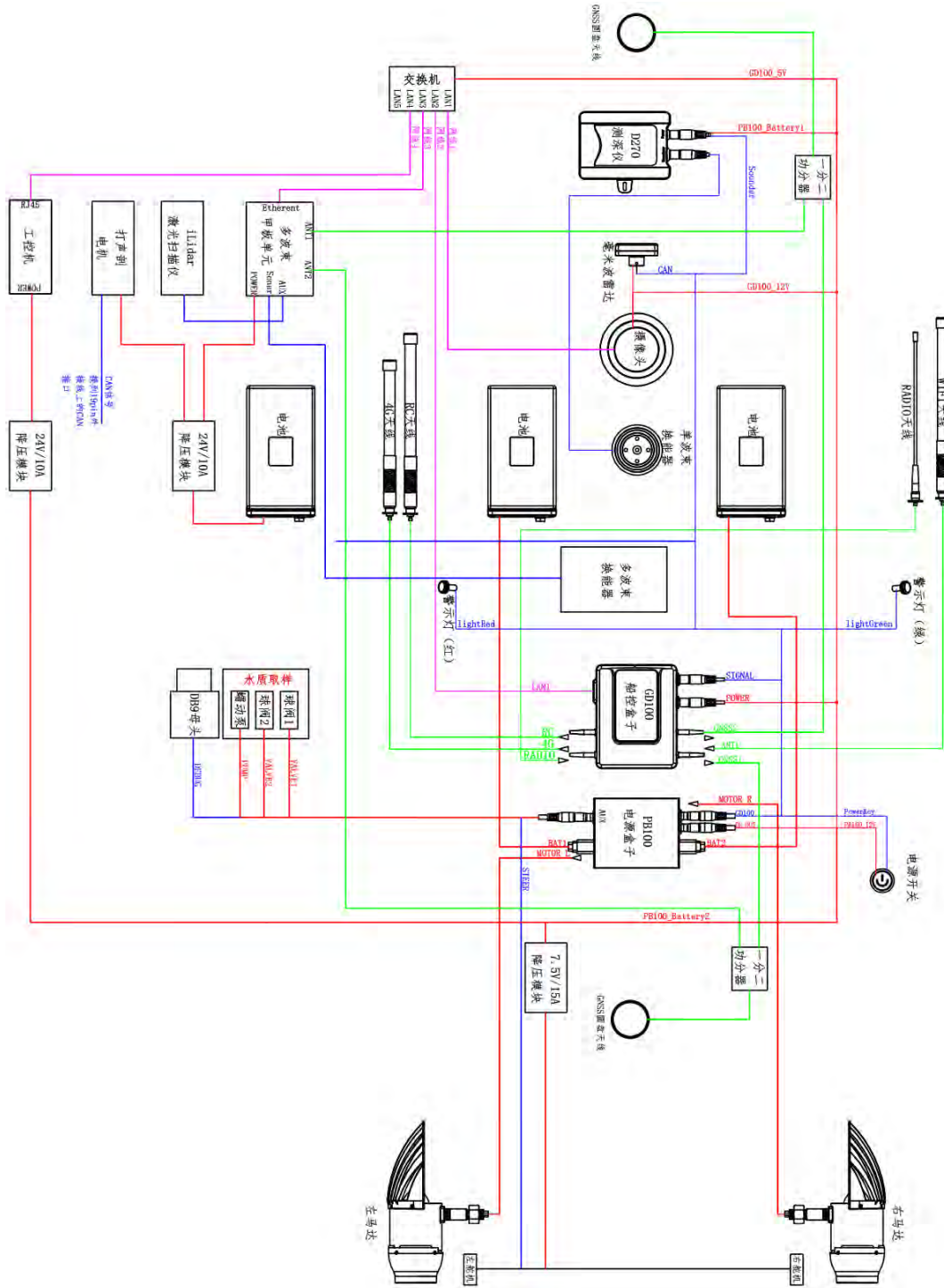
APACHE 3 USV Wiring Diagram

11.6.2 APACHE4 V2.0 USV Wiring Diagram



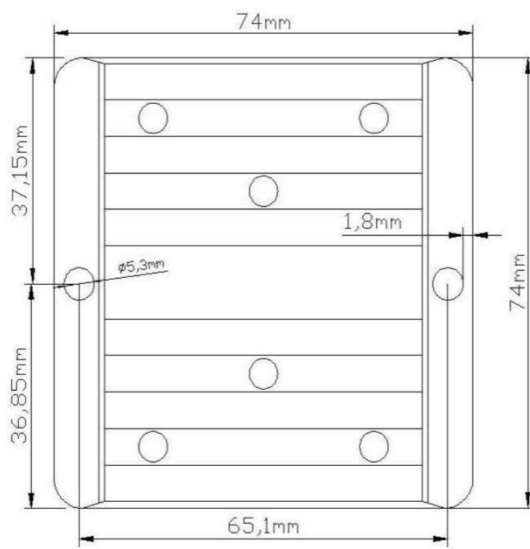
APACHE 4 V2.0 USV Wiring Diagram

11.6.3 APACHE 6 V2.0 USV Wiring Diagram



APACHE 6 V2.0 USV Wiring Diagram

11.6.4 Wiring diagram of voltage reduction module



11.6.5 ADCP wiring specification diagram for APACHE USV

11.6.5.1 River Star Series Wiring Specification Diagram

接线定义表					线束说明表				
信号描述	CN1	CN2	CN3	CN4	线材规格	颜色/线号	导通阻抗	最大电流	备注
RXD (ADCP接收)	1		3		CN1-分叉处: 8芯护套线 (8C*0.5mm ²) CN1自带线缆 分叉处-CN2: 16AWG双并线 分叉处-CN3: 28AWG 分叉处-CN4: 28AWG	/	≤20mΩ	CN1-分叉处: 8A 分叉处-CN2: 8A 分叉处-CN3: 0.5A 分叉处-CN4: 0.5A	未使用的线 用热缩套管 包好, 防止 短路
TXD (ADCP发送)	2		2	/					
POWER+	3	+		/					
RXD (ADCP接收)	5			2					
TXD (ADCP发送)	6			3					
POWER-/SIGNAL-	7	-	5	5					



11.6.5.2 RCP Series Wiring Specification Diagram

接线定义表					线束说明表				
信号描述	CN1	CN2	CN3	CN4	线材规格	颜色	接触阻抗	最大电流	备注
RXD	1		3		CN1-分叉处: 8芯护套线 (8C*0.5mm ²) CN1自带线缆 分叉处-CN2: 20AWG 分叉处-CN3: 22AWG 分叉处-CN4: 22AWG	/	≤ 2mΩ	CN1-分叉处: 8A 分叉处-CN2: 5A 分叉处-CN3: 1A 分叉处-CN4: 1A	
TXD	2		2			/			
POWER+	3	+				/			
SGND	4		5	1		黑			
RS485+	5			2		红			
RS485-	6			3		蓝			
POWER-	7	-			/				



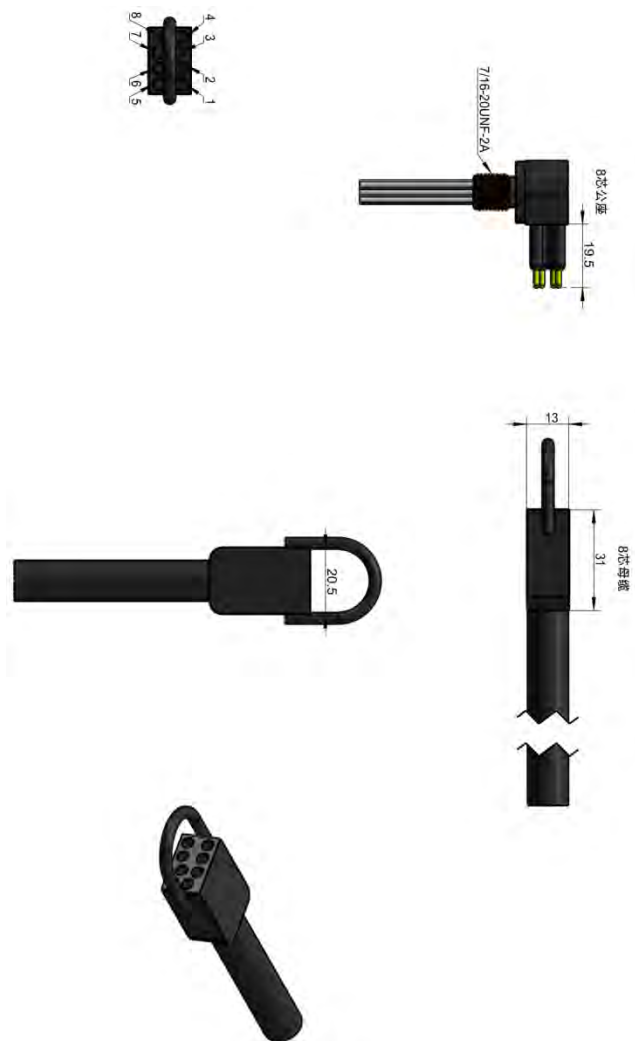
11.6.5.3 RDI Series (Riverpro/Riverray) Wiring Specification

Diagram

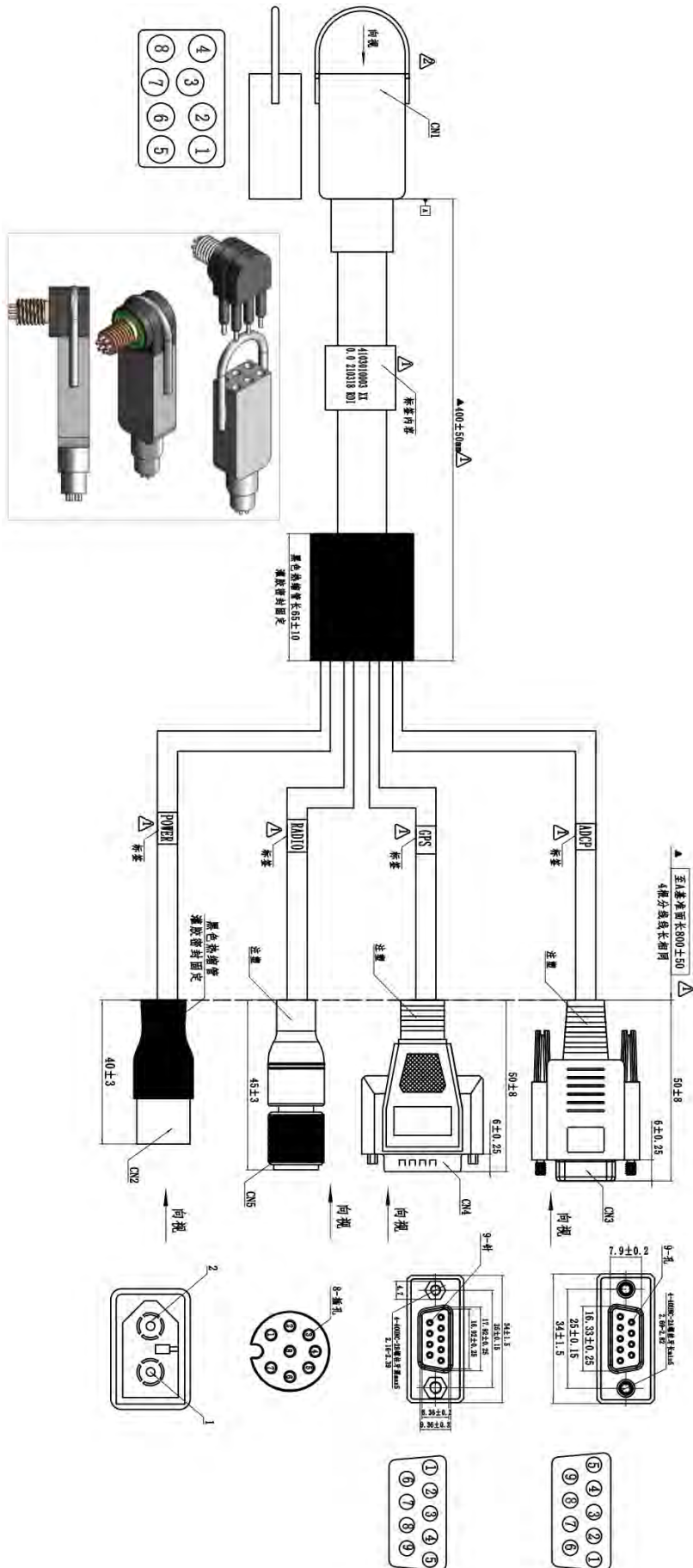
接线定义表						线束说明表				
信号描述	CN1	CN2	CN3	CN4	CN5	线束规格	颜色	接触阻抗	最大电流	备注
RXD	1		3			24AWG	不做要求	$\leq 2m\Omega$	1.7A	
TXD	2		2							
SGND	3		5	5						
POWER+	4	1			20AWG	4A				
RXD_GPS	5			2	24AWG	1.7A				
TXD_GPS	6			3						
POWER-	8	2			20AWG	4A				
RXD	1				22AWG	2.5A				
TXD	2			7						
SGND	3			5						
POWER+	4			8						
RXD_GPS	5			4						
TXD_GPS	6			3						
POWER-	8			2						

注：
 1、线缆外被需满足：阻燃等级VW-1，耐高低温-40℃-85℃，颜色：黑色。满足以上要求的外被材料均可，不指定具体牌号。
 2、若有绞线要求，对绞距无特殊要求，仅需满足成品线外观圆滑通畅无明显变形，鼓起，划伤刮伤等不良。
 3、若有线束编织网，对具体牌号无要求，仅需满足阻燃等级VW-1，耐高低温-40℃-85℃，颜色黑色，成线外观圆滑通畅无明显变形，鼓起，划伤刮伤等不良。
 4、图示所有注塑接头不指定具体结构形态，满足标注尺寸的注塑模均可。

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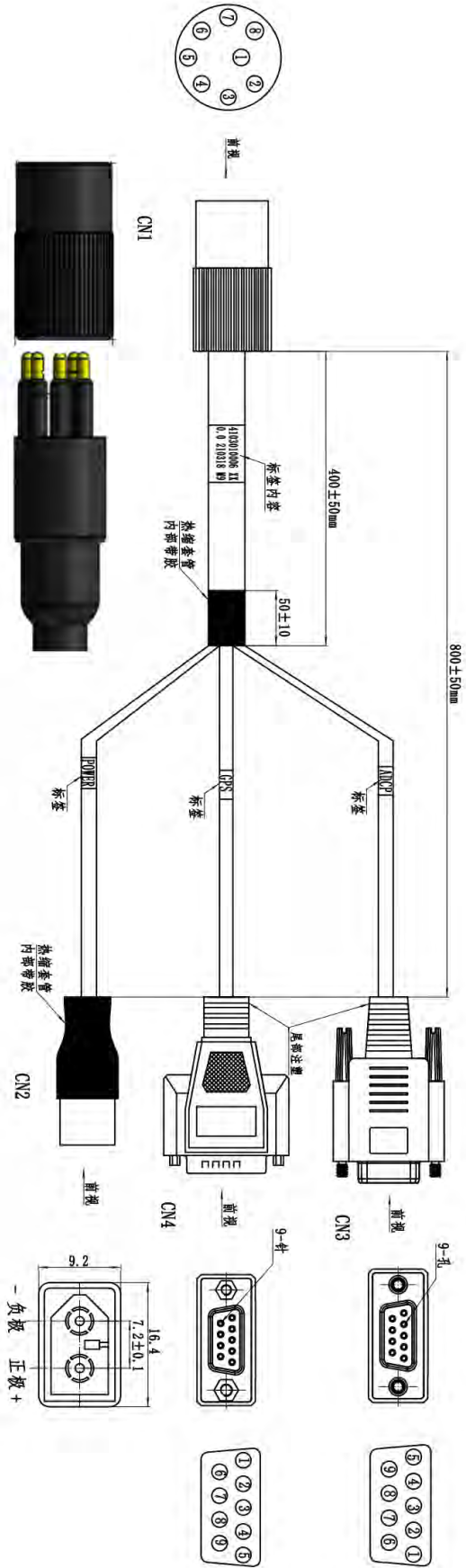
11.6.5.4 SONTEK M9 wiring specification diagram

接线定义表					线束说明表				
信号描述	CN1	CN2	CN3	CN4	线束规格	颜色	接触阻抗	最大电流	备注
VCC	1	+			22AWG	/	$\leq 2m\Omega$	2.5A	
TXD	2		2			/	$\leq 2m\Omega$	2.5A	
RXD	3		3			/	$\leq 2m\Omega$	2.5A	
TXD_GPS	4			3		/	$\leq 2m\Omega$	2.5A	
RXD_GPS	6			2		/	$\leq 2m\Omega$	2.5A	
GND	8	-	5	5		/	$\leq 2m\Omega$	2.5A	

注：
 1、线缆外被需满足：阻燃等级VW-1，耐高低温-40℃-85℃，颜色：黑色。满足以上要求的外被材料均可，不指定具体牌号。
 2、若有绞线要求，对绞距无特殊要求，仅需满足成品线外观圆滑通畅无明显变形，鼓起，划伤刮伤等不良。
 3、若有线束编织网，对具体牌号无要求，仅需满足阻燃等级VW-1，耐高低温-40℃-85℃，颜色黑色，成线外观圆滑通畅无明显变形，鼓起，划伤刮伤等不良。
 4、图示所有注塑接头不指定具体结构形态，满足标注尺寸的注塑模均可。

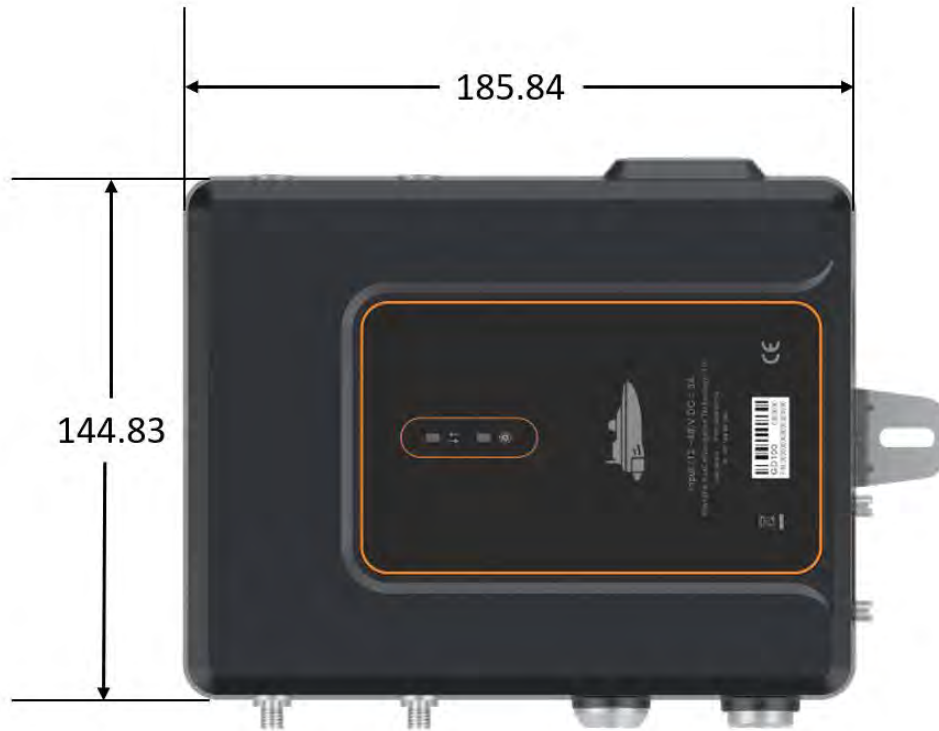


User Manual for CHCNAV APACHE USV



11.7 Dimensional specification drawing

11.7.1 GD100 Dimensional Drawing



GD100 vertical view

unit mm



GD100 side view

unit mm

11.7.2 PB100 Dimensional Drawing



PB100 top view

Unit mm



PB100 side view

unit mm

User Manual for CHCNAV APACHE USV

CHCNAV Technology Support

Tel: 400 620 6818 to Line 5

S



CHCNAV Official Account



APACHE USV Official Account

User Manual for CHCNAV APACHE USV

FCC Warning:

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 or more 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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

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.

The device has been evaluated to meet general RF exposure requirement. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.