

ONLINE RESOURCES

WOLVERINE

AGITATION BOAT (401-0000) INS-0010 WOLVERINE TROUBLESHOOTING GUIDE



TABLE OF CONTENTS

- 3 Troubleshooting
- 4-5 Machine Fault Codes
- 6 Display/System Parameters
- 7 Starting and Stopping
- 8 Remote Control
- 9-12 Electrical Troubleshooting
- 13 GPS Troubleshooting
- 14 Props and Sea Drive
- 15 Fuel level Sensor
- 16-19 Hydraulic Troubleshooting
- 20-25 Appendix



For videos and additional resources, point phone camera at QR code and click the link.

http://bazookafarmstar-5546834.hs-sites.com/en-

2

us/wolverine-series-resource-hub

BAZOOKA FARMSTAR 800 E 7th ST WASHINGTON, IA 52353 319.653.5080 WWW.BAZOOKAFARMSTAR.COM

TROUBLESHOOTING

All Wolverine documentation is maintained on the online Resource Page so that it can be continually updated and expanded. Visit the Wolverine Resource Page for:

- Troubleshooting:
 - Complete fault code lists
 - Detailed troubleshooting guide
- Operation:
 - Updated versions of this manual
 - Remote control quick reference
 - Cloud monitoring overview
- Maintenance:
 - Replacement filter part numbers
 - Propeller replacement video
 - Swivel rebuild guide
 - Bearing housing guide
 - Fuel level sensor calibration
 - Remote control pairing

- Engine info:
 - SPN codes
 - Part numbers
 - Warranty registration
 - Service locations
- Videos covering:
 - Troubleshooting
 - Prechecks
 - Startup and shutdown
 - Operation
 - Detailed GPS operation examples



Point your phone's camera at the QR Code above to go to the Wolverine Resource Page

https://bazookafarmstar-5546834.hs-sites.com/en-us/wolverine-series-resource-hub

MACHINE FAULT CODES

Fault codes starting with "520XXX" are machine codes, which come from the Wolverine controller, see fault code list on the next page. All other SPN codes will be from the engine and a list can be found on the Resource Page. Refer to the engine manual for troubleshooting those codes.

Engine codes cannot be cleared from the remote. It will require turning the power off and back on again. Most machine codes can be cleared from the remote by holding the ENGINE toggle switch down (OFF/CLEAR) for five seconds.

Most of these are wiring problems. In general:

- · Check wiring for broken or shorted wires.
- Check every connection for corroded terminals.
- Check CAN wiring: Check all green and yellow wires and terminals. The CAN bus is shared throughout the entire machine, so a CAN fault on one device can trigger a fault on another. The entire CAN network must be checked.

When an alarm first happens, the lights will flash, the alarm will sound, and the remote buzzer will sound. They will repeat again every 2 minutes as long as the engine is running. Low severity alarms won't make any noise or flash any lights.

SEVERITY:

HIGH Shut down engine immediately. Do not allow the engine to restart. Beep and flash (once).

- MEDIUM Stop GPS mode, prevent GPS mode from starting. Beep and flash.
- FLASH Beep and flash.

LOW Only display SPN code.

MACHINE FAULT CODES LIST

FAULT #	DESCRIPTION	SEVERITY	
520201 520203 520306 520307 520214 520215	ECU CAN TIMEOUT ENGINE CAN TIMEOUT - - FRONT GPS REAR GPS	LOW MEDIUM FLASH LOW MEDIUM MEDIUM	Communication lost to device. Check fuses, power, CAN wiring. I/O Module Engine TEC-10 Remote Receiver Front GPS Rear GPS
520204, 520301	LOW DEF	FLASH, HIGH	Fill DEF tank, troubleshoot DEF unit.
520205, 520302	LOW FUEL	FLASH, HIGH	Fill fuel tank, check wiring on fuel level sensor, recalibrate or replace fuel level sensor (pg 14)
520206	MACHINE NOT ENABLED	LOW	Operator tried to control the machine while disabled. Enable the machine.
520207	LOW VOLTAGE	LOW	The voltage dropped below 9 volts (18V on 24V units). Check batteries, wiring.
520208, 520303, 520304	LOW HYD LVL	FLASH, MEDIUM, HIGH	Fill hydraulic fluid. Check hydraulic level wiring, replace hydraulic level sensor. (pg 17)
520209	GPS OUT OF BOUNDS	MEDIUM	See GPS page. (pg 12)
520210	HYD OIL TEMP SENSOR	LOW	See Hydraulics page. Check wiring. Replace the sensor. (pg 16)
520211, 520212, 520213	HYD OIL TEMP WARN, HIGH, SD	LOW, MEDIUM, HIGH	See Hydraulics page. Confirm the fan is running. Check wiring. Replace the sensor. (pg 16)
520216	ENGINE TEMP HIGH	FLASH	Check engine manual.
520217	CHARGE PSI LOW	MEDIUM	Increase RPM. See Hydraulics – Charge Pressure (pg 18)
520218	CHARGE PSI SD	HIGH	See Hydraulics – Charge Pressure (pg 18)
520219	GPS – MACHINE STUCK	FLASH	See GPS page. (pg 12)
520220	LOST RF LINK	LOW	See Remote Control page (pg 7)
520305	-	HIGH	E-Stop button was pressed on the remote.
520221-520236	INPUT FAULTS	LOW, MEDIUM	The input voltage signal is outside the expected range. Check wiring and sensor. (pg 13,14,15,18)
520251-520274	OUTPUT FAULTS	LOW, MEDIUM	The output current is too high or too low. Check wiring. (pg 15)

Display/System Parameters

The table below describes all engine and system parameters shown on your remote-control display and explains the Typical or "Safe" operating ranges they should stay within. The "WARNING" column explains at what level a warning will show on the top of the remote display. The "CRITICAL" column explains at what level a critical shut-down or failure may occur. Operating outside of typical ranges may result in a system or component failure. If machine is unable to maintain operation in nominal ranges, stop using the machine and contact your Bazooka Farmstar or Engine Service Representative immediately before resuming operation.

Displayed Parameter	Description	Typical "Safe" Operating Range	Warning	Critical	Notes
ENG RPM	Engine RPM	800 – 2200/2400 rpm	-	-	Governed (engine dependent)
COOLANT	Engine Temp	195° - 215° F	215° F	225° F	Engine RPM derate starting at 205°F Engine shut down @ 225 - 235° F (engine dependent)
VOLTAGE	Battery Voltage	12V - 14V	-	Below 12V	Engine may not start
ENG OIL PSI	Engine Oil Pressure	70 - 100 psi	15 psi	10 psi	Engine shut down @ 10 psi
ENG LOAD	Engine Load	0%-95%	-	-	Governed @ 95%
FUEL LVL	Fuel Level (150 Gal Tank)	0%-100%	20%	10%	Alarms & Lights Flash @ 15%. Warning repeats every minute
FUEL GPH	Fuel consumption rate (Gal per Hr)	13 - 15 GPH	-	-	When running over 90% Engine Load
DEF LVL	Diesel Exhaust Fluid Level	0%-100%	20%	13%	Alarms & Lights Flash @ 20%. Engine shut down at 13%
HYD TEMP	Hydraulic Oil Temp	120° - 155° F	170° F	200° F	Fan turns on @ 140°, Warnings start @ 170°, Engine shut down @ 200° F Engine RPM derate below 100°F
HYD LVL	Hydraulic Oil Level (18 Gal Tank)	Visual on Tank	-	Below LOW	Warnings at 70% & 40% full, Engine shut down @ 10%
HYD FLTR	Hydraulic Filter Status	See Sight Glass	Red Zone	Bypassing	Visual only, Electronic indicator on dual filter only
PROP PSI	Propeller Hydraulic Pressure	300 - 5100 psi	-	-	Integrated pressure reliefs
PROP RPM	Propeller RPM (Front and Rear)	0 - 850 rpm	-	-	50 RPM difference Front to Back is Typical
PUMP 2 PSI	Hydrostat Charge Pressure	300 - 600 psi	275 psi	250 psi	LOW CHARGE PSI warning at 275 psi & Engine shutdown at 250 psi for 60 seconds. Increase Engine RPM when operating props or drive to avoid warning.
AUX PSI	Auxiliary Hydraulic Pressure (Cylinders)	0 - 3000 psi	-	-	Integrated pressure reliefs. Varies with each cylinder function.

STARTING AND STOPPING

STARTUP

- NEVER start the Wolverine from the TEC-10 except for brief testing purposes. If started from the TEC-10, all controller faults are bypassed and the engine will NOT shut down to protect itself.
- If the Tec-10 light is not green, it will not start from the remote. If it is not green, there should be an error code. Check the error code.
- Press the "Alarm silence key" to clear faults or hold down the Start/Stop switch on the remote for 3 seconds.
- If the Wolverine starts but then immediately dies, or dies while cranking:
 - 1. Check batteries. Monitor the battery voltage while cranking. If it drops below 9V, diagnose battery issues.
 - 2. Check all battery contacts and the bus bar for loose crimps, corrosion or loose bolts.



REMOTE CONTROL

LOST RF LINK

- Check receiver:
 - Wolverines with the receiver mounted near the radiator
 - This style of receiver has an internal antenna
 - Using a flat screwdriver, push in the tabs on either side of the box and slide the cover off. Check for water inside the receiver box or corrosion in the bottom.
 - Wolverines with the receiver mounted in the gray electrical box
 - This style of receiver has an antenna cable that runs from the receiver to the antenna mounted on the radiator
 - Check the screw connection on the receiver for tightness and check the cable for damage.
 - Check connectors for corrosion. Wiggle connectors and confirm there are no loose contacts or wires.
 - LED lights:
 - Status: OK/low battery/fault
 - I/O: Active/short to battery/short to ground
 - E-Stop: Linked to transmitter/radio fault/E-stop
 - CAN 1: Operational
 - CAN 2: Operational (not used on the Wolverine)

LOOKING FOR RECEIVER...

- Remote is not paired with machine.
 - Follow the Pairing Instructions printed on the back of the remote.
 - · If remote has been paired and issues continue
 - Check the receiver LEDs
 - Check the antenna and cables for any broken, loose or damaged connections

PROBLEM WITH PADDLE (X)

· Contact a bazooka farmstar representative for replacement.



ELECTRICAL GENERAL

- Remove the battery terminals at the batteries if doing any work on the boat. Welding while the batteries are ٠ connected may damage the electronics. The disconnect switch doesn't disconnect the starter, which is wired directly to the batteries.
- Review the document INS-0007 Wolverine Electrical Block Diagram ٠ for a guide to all the electrical part numbers and connections.



- Check ALL connectors for damage or water ingress. One shorted wire in one area can affect other areas.
- When opening a Deutsch electrical connector, it MUST be cleaned before it's reconnected. Wipe off the plastic ٠ connectors with a clean rag before they're plugged back in. Otherwise, the seal can be contaminated and it will not seal well again. Inspect the seal after cleaning and replace if damaged.
- If applying dielectric grease, avoid getting it on the electrical contacts themselves. The grease is to be used on the seals, not on the pins. If using on a battery post, do not put it between the post and the clamp, but only on the outside of the connection after it's been made.
- Try swapping connectors with a similar sensor or coil. If the problem follows the wiring, it's a wiring problem. If it ٠ follows the sensor or coil, it's a sensor or coil problem.
- A guick way to test the sensor wiring is to put 0v or 12v onto the wire and verify that the displayed value changes between the two extremes.
 - 1. Use a short piece of wire to jumper the signal wire with the power (12V) or ground (0V) wire.
 - 2. Power wire is usually red, ground wire is usually black, the colored wire is usually the signal.
 - 3. Do not jumper the power wire to the ground wire. It will cause a fuse to blow. If this happens, replace the fuse with the same size.

ELECTRICAL STATUS SCREEN

Viewing Wifi Status Screen

- Using a phone or computer, connect to the wifi network "Bazooka_Wolverine"
 - Wifi password is 12345678.
- Once connected type 192.168.1.2 into the web browser.
- The first screen is a duplicate of what is shown on the remote.
- The STATUS screen (if you have a newer version of the software) shows red or green lights for the status of all electrical inputs and outputs, as well as the millivolt input values and the milliamp output values.
- Input voltages should vary as the sensor's measured element varies. If the sensor is moving but the values stays constant, check the sensor.
- Solenoid output voltages should vary as the output is turned on and off.
- If the values ever go outside of the expected range, the light next to the name will go from red to green.
- If there is a CANBUS error:
 - 1. Check if the device is getting power
 - 2. Check CANbus wiring EVERYWHERE, the network that has common wires at all CANBUS devices. These are the green and yellow twisted wires.



Electrical System – Introduction





- 1. Tec-10 Engine Controller with key switch and E-Stop
- 2. Master Battery Disconnect Switch NOTE: STARTER IS WIRED DIRECTLY TO THE BATTERIES AND BATTERY CABLES SHOULD BE DISCONNECTED FROM THE BATTERIES BEFORE WELDING/SERVICING THE MACHINE
- 3. Electronic Control Box
- 4. Battery Box
- 5. Bus Bar (Battery Power Distribution Bus)

Inside Electronic Control Box

- 6. Master Controller
- 7. I/O Controller
- 8. CAN Splitter Harness
- 9. Relay Flood lights
- 10. Remote Receiver (not pictured)
- 11.24V to 12V Converter (if needed) (not pictured)

Electrical System – Fuse Locations (6 total)



If fuse blows quickly after being replaced, it is a sign of more serious electrical issues. Trace electrical harnesses for wire damage and check connectors for damage, water ingress, or corrosion. Work-arounds may cause expensive electrical damage to the machine; always consult Bazoooka Farmstar service personnel prior to doing electrical work beyond changing fuses or plugand-play wire harness replacement.

- 1. Tec-10 Engine Controller 25 Amp (Latched cover)
- 2. Engine Harness (CAT/Perkins) 25 Amp (x2)
- 3. Light Harness 30 Amp (Inside Electrical Box)
- 4. CAN Splitter Harness 20 Amp (Inside Electrical Box) (Newer models have individual fuses for each circuit)
- Glow Plug Relay (CAT & Perkins) 80 Amp (Engine Starter Motor, Left side of machine behind hydraulic cooling fan).





GPS TROUBLESHOOTING



GPS SIGNAL CHECK

- 1. Look at the STAT LED on side of the GPS unit.
 - The STAT LED displays the status of the tracked satellites.
 - Red blink Board is on, but no satellites being tracked.
 - Green blink Receiver is on and tracking GPS satellites. One blink per tracked GPS satellite.
 - Orange blink Receiver is on and tracking GLONASS satellites. One blink per tracked GLONASS satellite.
- 2. The GPS unit needs a total of 7 satellites at a minimum for the GPS to output a position. It can be a combination of GPS (Green) and GLONASS (Orange) satellites. If there are not 7 blinks total, the GPS head unit cannot find enough satellites and needs to be repaired.
- 3. If it does have 7 or more, then check the CAN communication wiring, which are the green and yellow twisted wires that are in all of the harnesses throughout the machine. See the document INS-0007 Wolverine Electrical Block Diagram for a guide to all the electrical part numbers and connections.

520209 – GPS OUT OF BOUNDS

- This error code means the boat is not currently inside the waypoint boundary or it has been overcome by outside forces and is unable to maintain GPS functions. It can be overridden by using any function on the remote to regain manual control of the machine.
 - This is often triggered by strong wind or getting stuck on something below the waterline.
 - Boat will turn off props and go to Engine Idle.
 - Lights will flash and alarm will sound on boat and remote. Look at top line of display for fault.
 - Take corrective action regarding the fault which caused the out of bounds or GPS Error.
 - Boat can be maneuvered back inside the waypoint area and GPS turned on again to resume.

GPS STUCK (Warning Message)

 This warning means the machine is "in-bounds", but has been moving slower than 0.2MPH for more than 60 seconds. Most likely the wheels are hung up on the bottom of the lagoon. Note – Props will remain active and machine is still trying to advance to the next waypoint.

PROPS & SEA DRIVE

520222, 520226, 520235, 520236 – FRONT AND REAR TILT/STEER FEEDBACK INPUT

- These faults signal that the Smart Cylinder position feedback sensors are not sending electrical voltage in the expected range.
- Find the cylinder related to the fault signal given.
 - Machine front is the gun side of the machine
 - Steer cylinders cause gimbal to tip right and left
 - Tilt cylinders cause gimbal to tilt forward and backwards
 - Check wiring for any damage.
 - There is one 4-pin connector above the water level to check.
 - There is one circular 4-pin connector that is mounted inside a hydraulic hose (no fluid, only used for protection) at the cylinder below the water level.

If the props immediately fully extend when operating sea drive joystick:

- Make sure home position hasn't been accidentally adjusted by holding PS1 for 6 seconds resetting home position to factory settings.
- Check the smart cylinder wiring for corrosion and contamination.
 - There are two electrical connections on each of the four smart cylinders.
 - One is a 4-pin mini-Deutsch up high.
 - One is an M12 inside a protective hose near the cylinder.
 - The hydraulic hose is for protection of the lower electrical cable only. There is not hydraulic fluid inside of the hose.
 - The lower connection is difficult to get to. When reconnecting, make sure the hose connections are tight.
- Check that the correct solenoid valves are turning on for the correct functions on the remotes.
 - Use the TRIM functions to move the props while diagnosing problems as that will directly trigger the solenoids.
 - Trim Front + Sea Drive up/down: Front Prop Tilt
 - Trim Rear + Sea Drive up/down: Rear Prop Tilt
 - Trim Front + Sea Drive left/right: Front Prop Steer
 - Trim Rear + Sea Drive left/right: Rear Prop Steer





TILT CYLINDER



STEER CYLINDER



SMART CYLINDER

SMART CYLINDER TOP CONNECTION

BOTTOM CONNECTION

FUEL LEVEL SENSOR

Fuel level sensor is located at the front of the fuel tank, underneath the hydrostats and the engine.

520205, 520302 – LOW FUEL, LOW FUEL SHUTDOWN

- Verify fuel level when machine is on level ground
 - Low Fuel warning may appear when entering or exiting a lagoon due to the slope causing the fuel to run to one side of the tank.
 - The Fuel level sensor and the fuel pickups are on opposite sides of the fuel tank
- Make sure to enter lagoons engine radiator first and exit lagoons radiator last. This will slope fuel towards the fuel pickups.
- If errors occur while there is plenty of fuel and boat is on level ground the fuel level sensor can be recalibrated
 - Call your Bazooka Farmstar representative for information on recalibrating sensor

520227 – FUEL LEVEL SENSOR INPUT

- This fault signals that the fuel level sensor has failed.
- Check the fuel level sensor and all wiring running to the fuel level sensor for damage.
- Replace the fuel level sensor if no damage to wiring is found



HYDRAULICS – AUX VALVE

The aux valve controls cylinder functions on the wolverine. This includes front and rear steer, front and rear prop movement and front gun movement.

520225 – AUX PRESSURE INPUT

- This fault signals that the aux pump pressure sensor has failed.
- · Locate pressure sensor on the right side of the aux valve
- Check the pressure sensor and all wiring running to the pressure sensor for damage.
- Replace pressure sensor if no damage to wiring is found.

520255 – 520266 – AUX VALVE OUTPUT FAILURES

- These faults signal that the aux valve solenoids are not drawing the electrical current that is expected.
- Find section of the aux valve related to the fault signal given. Check wiring to the plugs in that section for any damage.
 - The 2-pin connectors should light up when the machine is sending signal
 - Engine must be running to see movement in the valve handles.
 - Check Electrical Status Screen to help diagnose the issue (pg 9)
 - If all aux functions on the status screen are still green it is likely that the problem is hydraulic.
 - If one of the functions on the status screen are red it is likely a wiring issue or failed solenoid coil.





HYDRAULICS - TEMPERATURE

The wolverine Hydraulic system is designed to run between 120°F and 155°F

520210 - HYD OIL TEMP SENSOR

- This fault signals that the hydraulic oil temperature sensor has failed
- Check the temperature sensor and the wiring running to the hydraulic temperature sensor for any damage
- If sensor is failed use the thermometer built into the hydraulic tank to verify oil is not getting above operating temperature.
 - Running without an operating hydraulic temperature sensor will cause the machine to go through a 15-minute warmup sequence when starting

520211, 520212, 520213 – HYD OIL TEMP WARN, HIGH, SHUT DOWN

- These faults signal that the cooling fan is not running or not running efficiently causing oil to get above operating range
- The Cooling Fan will turn on when oil temperature reaches 140°F and turn off when oil temperature gets below 120°F
- If the fan is running all the time check the wiring going to the oil cooler fan relief valve for a failed plug or wires.
- The cooling fan uses the oil cooler fan relief valve to turn on and off.
 - The hydraulic cooling fan electrical control is fail-to-run, which means:
 - If the electrical solenoid is OFF (no light) the fan is RUNNING
 - If the electrical solenoid is ON (red light) the fan STOPS
- To test the hydraulic fan, unplug the oil cooler fan relief valve with the engine running. If the fan does not turn on there is a hydraulic issue in the fan motor or cooler hydraulic pump.

*If the fan turns on and off as it should but hydraulic temperature is still building above 170°F contact a Bazooka Farmstar Dealer or representative. HYDRAULIC TANK THERMOMETER

HYDRAULIC OIL

TEMPERATURE

SENSOR

OIL COOLER

FAN RELIEF

VALVE

(BEHIND FAN)



HYDRAULICS – HYD OIL LEVEL

520208, 520303, 520304 – LOW HYD LEVEL, WARN, WARN2

- This fault signals that the hydraulic tank is low on hydraulic oil
- Keep hydraulic tank at or above the full line on the site glass prior to operating – use Tractor Hydraulic Fluid or equivalent oil (API GL-4, ISO 68-46)
- Visually inspect machine for any leaking oil near fittings in the hydraulic system
 - If leaks are found tighten fitting and fill hydraulic oil tank to full again
 - If fitting is tight and oil is still leaking the seal on the hydraulic fitting could be broken
 - Replace seal on leaking fitting, reinstall in the system and fill the hydraulic system to full
- If no leaks are found and the hydraulic tank has not lost oil the hydraulic level sensor could have failed.
 - Locate the hydraulic level sensor in the top of the hydraulic tank and pull it vertically out of the seal
 - Check wiring running to hydraulic level sensor and look inside of the electronic control box for any blown fuses
 - Slowly raise the hydraulic level sensor from the tank watching the hydraulic level on the remote.
 - If the hydraulic level does not track correctly as the hydraulic fuel level sensor is removed replace the sensor



Oil used from factory THF - API GL-4, ISO 68



*Call a Bazooka Farmstar dealer or representative for replacement hydraulic level sensors

HYDRAULICS – CHARGE PRESSURE

Charge pressure must run between 300 - 600 psi to prevent damage to the hydrostat pumps. Charge pressure is shown as PUMP 2 PSI on the remote.

520217, 520218 – CHARGE PSI LOW, CHARGE PSI SD

- These faults signal that the hydrostat charge pressure is under the acceptable limit
- Fault 520217 "Charge PSI Low" may flash when turning on the props, ground drive or pump at low engine rpm.
 - Turn engine rpm to at least 1200 psi prior to operating any function to avoid this
 - Verify that Pump 2 Pressure has returned to the correct operating range (300 600 psi)
- Fault 520218 "Charge PSI SD" charge pressure under 250 psi for 60 seconds
 - check hydraulic pressure sensor located on the backside of the charge pressure relief valve for any damage. Check wiring going towards sensor.
 - If all wiring is correct the charge pressure relief valve could be stuck open.
 - To fix remove charge relief plug with a 5/16" allen key
 - Once the plug is removed use a 3/16" allen key to adjust the charge relief spring
 - BE CERTAIN TO KEEP TRACK OF ROTATIONS WHEN ADJUSTING SPRING. SPRING MUST BE RETURNED TO ORIGINAL LOCATION OR RISK CHARGE PRESSURE RELIEF BEING SET TOO HIGH OR TOO LOW
 - Turn Charge relief spring out 2 turns and then back in 2 turns to reset spring.
 - After adjustment ensure Pump 2 pressure is reading between 325 psi and 375 psi when engine is at low idle (800 rpm) and under 550 psi when engine is max rpm.
 - Check hydraulic pressure sensor located on the backside of the charge pressure relief valve for any damage. Check wiring going to sensor for any visible damage.

*If all steps are followed and faults continue contact a Bazooka Farmstar dealer or representative













APPENDIX

Page 20-22: INS-0007 Wolverine Electrical Block Diagram Page 23-24: Webvisu Default Settings – V2.00.02

INS-0007 Wolverine Electrical Block Diagram PAGE 1



INS-0007 Wolverine Electrical Block Diagram PAGE 2



INS-0007 Wolverine Electrical Block Diagram PAGE 3



Drive/Gun and Prop Speed settings – v2.00.02

	Drive					
HOME Drive/Gun Prop Prop Position						
	Drive RE	EV 9 mA				
	MIN mA: 450	MAX mA: 830				
	Ramp Down Rate: 10000	Ramp Up Rate: 200				
	 Front Steer Front Steer Rear Steer Rear Steer 	r Left 4 mA Right 4 mA Left 0 mA Right 2 mA				
	MIN mA: 740	MAX mA: 1150				
	Ramp Down Rate: 3200	Ramp Up Rate 500				

 Pump Enable 3 mA Drive FWD/Pump 4 mA 			
Drive MIN mA: 450	Drive MAX mA: 830		
Ramp Down Rate: 10000	Ramp Up Rate: 200		
Pump R	PM: 0.0		
MIN mA:	MAX manual: 700		
450	MAX GPS: 700		
Ramp Down Rate MIN: 100	Ramp Down Rate: MAX 600		
Ramp Up Rate MIN: 100	Ramp Up Rate: MAX 500		
Audio Alarm 0 mA			

Gun X EXT 9 mA				
MIN mA:	MAX mA:			
870	1120			
Gun X R	ET 6 mA			
MIN mA:	MAX mA:			
870	1120			
Gun Y E	XT 0 mA			
MIN mA:	MAX mA:			
850	1100			
Gun Y R	ET 0 mA			
MIN mA:	MAX mA:			
850	1100			
Ramp Down Rate:	Ramp Up Rate			
600	600			

	Prop Speed	
ном	E Drive/Gun Prop Prop Position	GPS

Prop Pres	Prop Pressure 0 PSI				
AUX Press	sure 0 PSI				
User Pres	sure 0 PSI				
Prop FWD 6 mA	0.0 RPM				
	0.0 RPM				
MIN mA: 450	MAX mA: 810				
Prop Max Engi	ne Load: 95 %				
Engine Temp Sta	art Derate: 205°F				
Engine Temp End Derate: 225°F					
Prop Min Engine Load: 50 %					
Ramp Down MIN	Ramp Up MIN				
Rate 30	Rate 30				
Ramp Down MAX	Ramp Up MAX				
Rate 300	Rate 300				
Prop 1 Rev	verse 0 mA				
MIN mA:	MAX mA:				
450	650				
Ramp Down Rate: 300	Ramp Up Rate: 300				

Engine RPM 0 Requested RPM 800					
MIN: 800	MAX: 2250				
Ramp Down Rate: 300	Ramp Up Rate: 300				
SD Idle 1	Time: 2 s				
Hyd Tem	p 101 °F				
MIN Hydraulic Derate Temp: 45	MAX Hydraulic Derate Temp: 100				
Warm Up 1	Time: 15 m				
Engine Ten Temp H	Engine Temp 168.8 °F Temp HI: 225				
Warning %: 15 SD Time: Shutdown %: 0 15 s					
Sensor MIN Fuel: Sensor MAX Fuel:	240 0=Ohms,1=mV 33 Setting: 0				
DEF Warning %: 20 Shutdown %: 0	SD Time:				
Charge Pressure 0 PSI					
PSI LOV	PSI LOW 1: 275				
PSI LOV	V 2: 250				
PSI LOW Run	Time: 60 Secs				

Hyd Temp 101.23077 °F				
Oil Coole	er 11 mA			
Cooler ON Temp: 140	Cooler Off Temp 120			
Cooler ON mA: 0	Cooler Off mA: 1200			
Hyd Temp	Reset: 150			
Hyd Temp	o HI 1: 170			
Hyd Temp	o HI 2: 185			
Hyd Temp HI 3: 200				
Enabled HYD Lev	vel 76%			
Warning %: 70	Time: 3 s			
Warning 2 %: 4	0 Time: 2 s			
Shutdown %: 1	0 Fime: 2000 ms			
Sensor MIN Oil: 4500 mV/Ohms				
Sensor MAX Oil: 500 mV/Ohms				
0=Switch OR mV, 1=Ohms - Setting: 0				
HYD Level OK				
Filter OK 😑				

Prop Position and GPS settings – v2.00.02

	Prop P		
НОМ	E Drive/Gun Pro	pp Prop Position	GPS
	Front Prop T Rear Prop Ti	ilt EXT 7 mA ilt EXT 0 mA	
	MIN mA: 880	MAX mA: 1100	
	Front Prop T Rear Prop Til	ilt RET 9 mA t RET 18 mA	
	MIN mA: 880	MAX mA: 1100	
	 Front Prop S Rear Prop ST 		
	MIN mA: 880	MAX mA: 1125	
	 Front Prop S Rear Prop ST 	TR RET 9 mA TR RET 0 mA	
	MIN mA: 880	MAX mA: 1125	



Override PCT 0.98					
	Load Default Values				
C C	PS1 Default	-User-	PS2 Defaul	t-User-	- Neutral
Front Steer:	3.00	3.00	3.00	-19.55	3.00
Front Tilt:	0.00	0.00	-40.00	-0.15	0.00
Rear Steer:	3.00	3.00	3.00	2.48	3.00
Rear Tilt:	0.00	0.00	40.00	0.42	0.00

GPS	
HOME Drive/Gun Prop Prop Position GPS	
Front GPS X Longitude -91.68159650580 Y Latitude 41.30694100 Speed 0 MPH COG 0	
Rear GPS X Longitude -91.68181140 ^{515.0} 45.0 Y Latitude 41.30686380 270.0 90.0 Speed 0 MPH 225.0 135.0 Calcualted COG 70 190.0 190.0	

Anchor Mo	ode Settings
	+/- Tilt Limit 43.00°
	+/- Steer Limit 34.00°
	Proportional Gain 150.000
	Integral Gain 0.000
Pause Se	et Time: 1 s
P2P Stee	er Settings
Turn DB 8 ft	P Gain 200.000
Turn 0.5 mph	l Gain 0.000
+/- Limit 35.00°	P Rotate 1.000
Time to reach	I Rotate 0.000
Point 1: 180 s	DB Rotate 30.000

Min Position	Proportional Gain
1.00°	5.000
Max Position	Integral Gain
25.00°	1.000
Cover Ste	eer Settings
Stuck MPH	Proportional Gain
0.2	1.000
+/- Max Position	Integral Gain
25.00°	0.000
GPS Zon	e Settings
P2P Inside DB	Cover Inside DB
5 ft	5 ft
P2P Outside DB	Cover Outside DB
15 ft	15 ft
GPS Stuc	k Time: 30 s



