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OWNER'S MANUAL

Overview

The Boar Bot is a remote controlled steerable vehicle powered by 2 rechargeable 12 volt deep cycle batteries connected to operate as a 24 volt system. A set of wheels on each side of the vehicle are separately powered to permit steering of the vehicle. The power source, drive motors, and receiver are encased within the housing assembly. An opaque protection screen is used to permit safe release of the boar from the vehicle.

Options and accessories

The Boar Bot is available in several options--

Single speed Boar

Two speed Boar Bot for faster transport between places

Single speed Boar Bot narrow version for narrower alleys.

The Boar Bot can be fitted with several accessories—

Hearse with power winch for ease in removing dead carcasses

Side shields to limit the boars visibility

Lead boar harness to add the capability of attaching two boars

Specifications

Mode of operation- remote controlled

Weight—over 500 lbs

Power Source— 2 – 12 volt deep cycle batteries

--24volts single speed Boar Bot or 12/24volts two speed Boar Bot

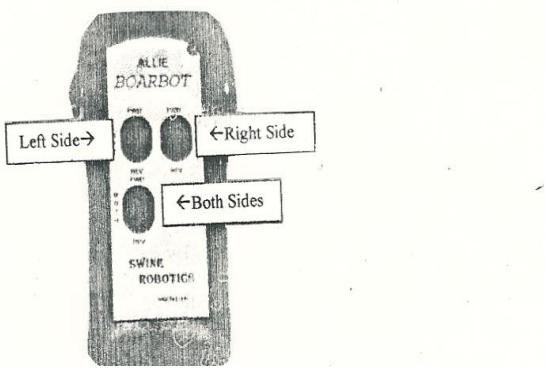
Operating time—over 8 hours continuous use

Operating the Boar Bot

No one under the age of eighteen should operate a Boar Bot!

Remote control

The remote control for the Boar Bot has three switches capable of performing six functions. The two top switches control each side of the Boar Bot independently in the forward and reverse direction. The bottom switch controls both sides of the Boar Bot allowing straight forward or reverse operation.



Power switch

The power switch which is a rocker switch is located on the top of the Boar Bot near the front left corner. **Always turn off the switch when the Boar Bot is not in use.**

Battery charger

The Boar Bot is shipped with an external battery charger with automatic shutdown to avoid overcharging the batteries. The charger receptacle is located on the top of the Boar Bot near the front left corner. Because the charger has a low ampere rating, it may take several days to fully charge a dead battery. **Connect the battery charger whenever the Boar Bot is not in use!**

Boar harness

The boar is attached to the Boar Bot with a harness. The boar harness is easy to adjust to fit any size adult animal. When training the boar to be lead by the Boar Bot, firmly tighten the harness to the boar.

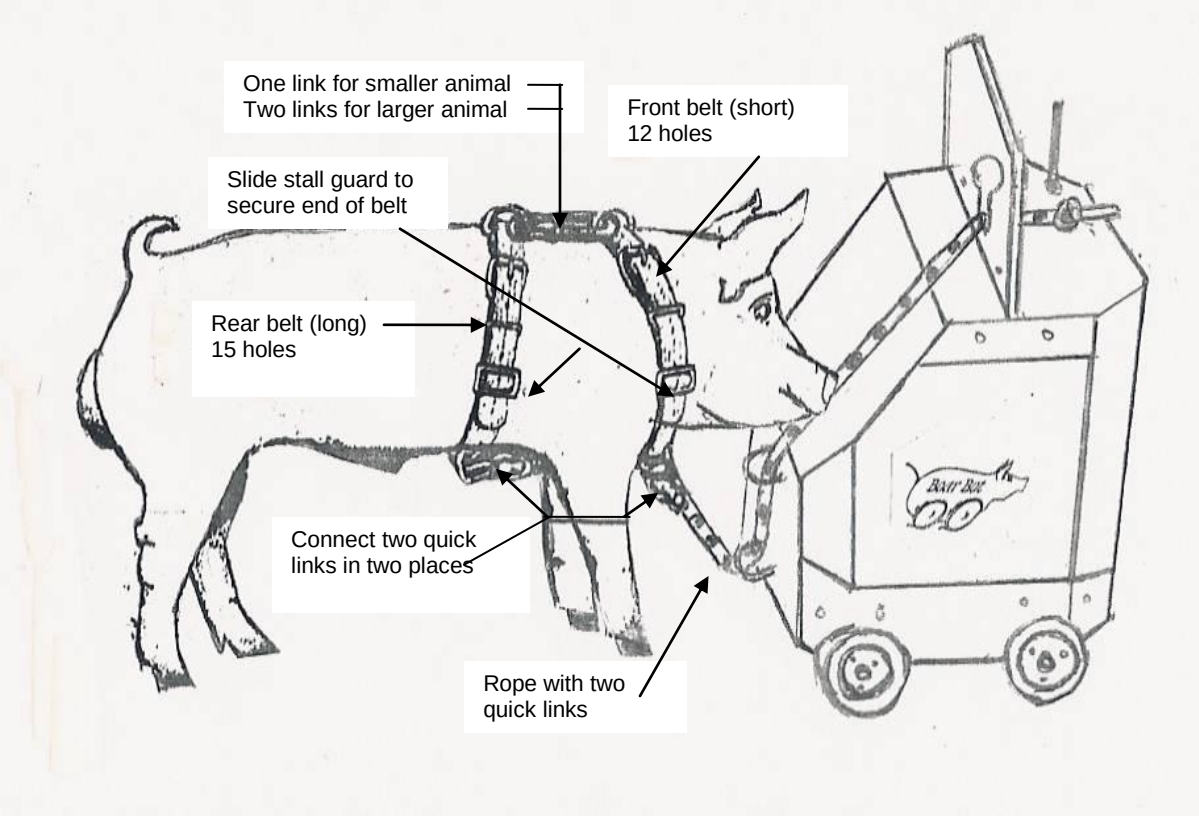


Figure 1

Boar harness properly attached to boar and boar properly attached to Boar Bot

Boar attached to Boar Bot

The boar must be pulled from the bottom U-bolt in the rear plate of the Boar Bot. **Attaching the boar to another location on the machine may result in overturning the Boar Bot!** Loop the rope through the bottom U-bolt attached to the rear plate and up to the slot in the top vision guard. A series of knots in the rope can be used to pull the boar closer to the Boar Bot. Advance the knots in the rope through the keyhole slot in the top vision guard until the boar is hooked at the desired length.

READ AND UNDERSTAND THE OPERATIONS MANUAL BEFORE USING THE BOAR BOT!!

Warranty

Swine Robotics, Inc. will replace any part found to be defective in workmanship within the first year of purchase. The warranty covers the cost of the replacement part, but does not cover the shipping or labor costs associated with the removal and installation of the defective part.

The factory installed batteries carry a two (2) year warranty. Batteries found to be defective within one year from the original purchase date will be replaced. Batteries found to be defective within the second year from original purchase date will be replaced at a pro-rated cost. *Do not return batteries under warranty to Swine Robotics: contact the nearest Delco battery dealer with battery warranty issues.*

Service and Parts

For parts and technical support, contact your local distributor or

Swine Robotics, Inc. at **(605)439-3510.**

Please return parts under warranty to the following address

Swine Robotics, Inc.
748 Sherman St
Leola, SD 57456
USA

Maintenance

The Boar Bot has been designed to give you many hours of trouble free service with a minimum of maintenance. To help extend the life of your machine and to keep it operating smoothly the following maintenance should be performed.

1. Grease the wheels--MONTHLY

The wheels can be greased with a standard grease gun. The grease zerks are located on the outside of the wheels near the hub. ***Under extreme conditions it may be necessary to grease the wheels more often***

2. Clean the battery connections--MONTHLY

To reduce battery terminal corrosion, the battery terminals need to be cleaned. Turn the power switch to the "OFF" position. Remove the terminal connections from the batteries. Remove the corrosion from the battery terminals using emery paper or a wire brush. Reconnect the wire terminals and apply anticorrosion grease or spray. ***Under extreme conditions it may be necessary to clean the battery terminals more often.***

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3. Check the chain tension--MONTHLY

Support the machine with a hoist or blocks to suspend the wheels off the floor. If supporting with a chain hoist, lift from the U-bolt on the top of the machine. With the wheels suspended, run the machine so the chain slack is on the bottom portion of the chain. Turn the power switch to the "OFF" position and disconnect the negative battery terminal on the rear battery. Loosen the idler sprocket with a ¾ inch wrench and slide the sprocket up to snug the chain. If the idler sprocket can not be moved to tighten the chain, it maybe necessary to remove the offset link or a link from the chain. Proper chain tension will allow you to move the slack side of the chain about ½ inch
The chain should be snug but not extremely tight. Over tightening the chain will shorten the life of the drive components.

4. Oil the drive chains--MONTHLY

Turn the power switch to the "OFF" position. Open both the front and rear doors. Lubricate the drive chains using a spray type chain lubricant. ***Under extreme conditions it may be necessary to lubricate the chains more often.***

5. Check gear box oil level--YEARLY

Turn the power switch to the “OFF” position. Open the rear door and remove the rear battery. Remove the gearbox oil plug through the access hole in the gearbox mounting bracket. The oil level of each gearbox should be at the bottom of the plug hole. If the oil level is low, fill the gearbox with 80W90 gear oil to the oil plug l Tighten the plugs and reinstall the rear battery. ***Do not remove the low oil plug. Filling the gearbox only to the low oil plug level will result in severe gearbox damage***

Trouble shooting

1. Machine does not move

Possible Cause	Check/Repair
Receiver fuse is blown	Check fuse and replace with a 3 amp fuse if necessary
Corrosion on battery connections	Clean battery connections as outlined in the Maintenance section
Discharged or faulty batteries	Charge or replace batteries as necessary.
Loose wire in electrical box	Check connections in electrical box
Battery charger not properly attached	Check if the charger receptacle wires are connected to batteries.
Faulty power switch	Check power switch. Refer to Electrical service-Checking the power switch.

Faulty remote control	Check remote control. Refer to Electrical service- Checking the remote control.
Faulty receiver	Check receiver. Refer to Electrical service- Checking the receiver unit inside the Boar Bot.

2. Wheels on one side of the Boar Bot do not turn

Possible Cause	Check/Repair
30 Amp circuit breaker blown	Check and reset circuit breaker.
Corrosion on battery connections	Clean battery connection as outlined in the maintenance section.
Discharged or faulty batteries	Charge or replace batteries.
Loose wire in junction box	Check connections in electrical box.
Battery charger not properly attached	Check if the charger receptacle wires are connected to batteries.
Loose or broken drive chain	Tighten or replace chain.
Faulty remote control	Check remote control. Refer to Electrical service- Checking the Remote Control
Faulty receiver	Check receiver. Refer to Electrical service-Checking the receiver unit inside the Boar Bot.
Faulty solenoid	Check solenoids. Refer to Electrical service-Checking the solenoids.

Faulty motor	Check motor. Refer to Electrical service-Checking the drive motor.

3. Motor runs but wheels do not turn.

Possible Cause	Check/Repair
Loose or broken drive chain	Tighten or replace chain.
Worn sprockets	Replace sprockets if sprockets have excessive wear.
Sheared key on gearbox sprocket	Replace key, if key is sheared.
Sheared key on motor driveshaft.	Remove motor and replace key if key is sheared.
Faulty gearbox	Check that the gearbox output shaft is not turning when motor is running. Replace gearbox.

4. Drive chains do not stay on sprockets.

Possible Cause	Check/Repair
Improper chain tension	Adjust chain tension with idler sprocket.
Worn wheel bushings	Replace bushings if bushings have excessive wear.
Worn axle shaft	Replace axle shaft if axle has excessive wear.
Bent axle shaft	Replace axle if bent.

5. Batteries do not charge or maintain a charge

Possible Cause	Check/Repair
Corroded battery connections	Clean battery connections.
Charger not plugged in correctly	Properly attach charger plug.
Charger receptacle not attached to battery	Inspect wires from battery charger receptacle to the batteries.
Faulty battery charger	Check for faulty battery charger. Refer to Electrical service-Checking the battery charger.
Faulty batteries	Check batteries with digital voltmeter or battery tester. Refer to Electrical service-Testing the individual batteries.

6. Erratic operation.

Possible Cause	Check/Repair
Low remote control batteries	If voltage is less than 1.3 volts per battery, replace remote control batteries.
Low main battery voltage	Check for low voltage. Refer to Checking for low voltage symptoms.
Faulty 12-volt main battery	Replace battery.
Faulty antenna lead	Inspect antenna lead. Replace if faulty.

Faulty remote control	Verify if remote control is functioning. Replace if faulty.
Faulty receiver	Replace if faulty. Refer to Electrical service-Checking the receiver unit inside Boar Bot.

7. Clicking noise coming from the machine

Possible Cause	Check/Repair
Improper chain tension	Adjust chain tension with idler sprocket.
Worn wheel bushing	Replace bushings if bushings have excessive wear.
Worn sprockets	Replace sprockets if sprockets have excessive wear
Sheared key on gearbox sprocket	Replace key if key is sheared.
Sheared key on motor driveshaft.	Remove motor and replace key, if key is sheared.
Faulty gearbox	Check that the gearbox output shaft is not turning when motor is running. Replace gearbox.
Low battery voltage	Check if solenoids are clicking. Recharge or replace 12-volt main batteries.

8. Circuit breaker blows

Possible Cause	Check/Repair
Dirty drive chain	Clean drive chain if dirty.
Drive chain too tight	Check chain tension and make necessary adjustments. Refer to Maintenance-Check the chain tension.
Loose electrical wire	Open electrical box and check wires and connectors
Faulty circuit breaker	Check circuit breaker and replace if necessary
Motor brushes faulty	Check motor brushes and replace if necessary. Refer to Electrical Section-Checking the drive motor.
Drive chain idler sprocket does not turn	Check if idler sprocket turns. Replace if necessary
Drive motor faulty	Check motor. Check if wire to motor is overheating. Replace motor if necessary. Refer to Mechanical Service-Removing a drive motor.

Mechanical Service

I. Removing the top cover

1. Disconnect the negative battery cables from the rear battery.
2. Disconnect the switch wires from the on/off the switch.
3. Disconnect the charger receptacle wires from the batteries.
4. Remove the top portion of the antenna with a 7/16 inch wrench.
5. Remove the antenna retaining nut to remove the antenna base from the cover.
6. Remove the four cap screws retaining the receiver to the top cover.
7. Remove the front door support chain.
8. Remove the two cap screws retaining the top cover to the rear plate.
9. Remove the four cap screws retaining the top cover to the base plate.
10. Lift the top cover straight up and off the machine.
11. To reinstall top cover reverse the above procedure.

II. Removing the wheels

1. Disconnect the negative battery cables from the rear battery.
2. Raise and support the machine with a chain hoist or blocks to suspend the wheels off the ground.
3. Remove the plastic bottom side bumper to gain access to the chain and idler sprocket.
4. Loosen drive chain idler sprockets and remove chains.
5. Remove cap screw from the end of the axle shaft and pull wheel/hub assembly off the end of the axle.
6. Remove the three nuts retaining the hub assembly to the wheel (Note when reinstalling the hub assembly to the wheel, do not tighten the three nuts until the assembly is on the axle to ensure proper alignment.)
7. Wheels should be installed in sets of four to keep the machine driving straight.
8. When installing new bushings, coat axle with grease before reinstalling the wheels.

III. Removing the drive motor

1. Disconnect the negative battery cables from the rear battery.
2. Follow the procedure for removing the top cover.
3. Remove the wiring access cover at the top of the motor and disconnect the wire nut connectors.
4. Separate the plastic conduit at the motor by loosening the plastic conduit nut and then feeding the wires out of the motor wiring access box.
5. Remove the four cap screws holding the two drive motors together.
6. Remove the four cap screws mounting the drive motor to the gearbox..
7. Lift drive motor straight up off gearbox.
8. To reinstall drive motor reverse the above procedure.
   Note: Be sure to stall shear key when reinstalling drive motor.

IV. Removing a gearbox

1. Disconnect the negative battery cable from the rear battery.
2. Follow the procedure for removing a drive motor.
3. Remove the batteries.
4. Remove the drive chain.
5. Remove the eight ¼ inch cap screws holding the gearbox to the mounting bracket.
6. Remove the gearbox.
7. To reinstall gearbox reverse the above procedure.

V. Removing an axle

1. Disconnect the negative battery cables from the rear battery.
2. Follow the procedure for removing the wheels.
3. Loosen the set screws holding the axle to the axle housing.
4. Slide the axle out of the axle housing.
5. To reinstall axle reverse the above procedure.

VI. Replacing the gearbox seal

1. Disconnect the power.
2. Remove drive chain on side of bad seal.
3. Loosen the sprocket set screw and remove sprocket and square key from gearbox shaft.
4. Remove the 4 cap screws from the shaft end of the gearbox to remove gearbox endplate.
5. Remove the old seal from the endplate.
6. Drive the new seal into the endplate with care that the seal is not ruined.
7. Replace end plate, key and sprocket.
8. Replace drive chain and tighten.

VII. Replacing gearbox broken shaft

NOTE: The broken shaft can be replaced without removing the cover.

1. Disconnect the power.
2. Remove the rear battery.
3. Remove the drive chain
4. Remove both end plates from the gearbox.
5. Remove the seal from shaft side of the endplate.
6. Drive the new seal into the endplate, taking care that the seal is not ruined.

NOTE: If replacing shaft only, remove old bearings and gear from old shaft and fit them unto the new shaft. If replacing gearbox shaft assembly, continue.

7. Feed the shaft assembly into the gearbox from the inside gearbox cover.
8. Align bevel gear with worm gear by slightly turning the shaft.
9. Replace both end plates.
10. Replace sprocket and square key and tighten sprocket set screw.
11. Replace and tighten chain.
12. Replace rear battery and reconnect power.

V. Replacing the remote control batteries

1. Remove the remote control from the protective case.
2. Remove the four screws from the back of the remote.
3. Open the remote and replace the two AA batteries.
4. Replace the remote control cover and reinsert the four screws.
5. Tighten the four screws and put back into the protective case.

Electrical service

Refer to Electrical Block Diagram of the single speed Boar Bot on page 23.

I. Checking the power switch

1. Disconnect the wires from the circuit breaker to the main drive motors.
2. Attach the black lead of the digital voltmeter to the negative terminal of the rear battery.
3. Turn on the power switch.
4. Test for voltage on both terminals of the power switch with the red lead of the digital voltmeter. NOTE (If the Boar Bot is a two speed than the battery voltage will be 12 volts not 24 volts.)
    a. 24 volts only on one side of the switch – Faulty switch Replace switch.
    b. 24 volts on both sides of the of the switch - Switch OK.
    c. 24 volts on neither side of the switch – Dead batteries, blown 3 Amp fuse or a bad connection between switch and batteries.

II. Checking the Remote Control

1. Check if the LED light located in the corner of the remote control flashes when any or all the remote switches are pressed.
    a. Flashing LED light usually indicates that remote control is OK.
    b. No flashing LED light.—Replace remote control batteries.
    c. Batteries replaced and no flashing LED light.—Replace remote control.

NOTE: When the operation of the Boar Bot is erratic, replace the remote control's AA batteries.

III. Checking the receiver unit inside the Boar Bot

1. Disconnect the drive chains or place the Boar Bot on blocks allowing the wheels to turn without the Boar Bot moving.
2. Turn on the power switch.
3. Test the power switch as outlined above.
4. Test the remote control as outlined above.
5. Check the 3 Amp receiver fuse on the cover of the electrical box.
6. Check if the light in the corner of the receiver unit is on.

   NOTE: If the receiver unit light is on, you have power to the receiver.
   If the receiver unit light is not on, proceed as follows.
7. Remove the cover of the electrical box.
8. Remove the two orange wire nuts.
9. Place the red lead of the digital voltmeter on the heavier red wire coming from the switch. Place the black lead of the digital voltmeter on the black wire coming from the terminal block.
10. If the voltmeter reads 24 volts and the receiver unit light is not on, the receiver is faulty.(Two speed Boar Bot voltage will be 12 volts instead of 24 volts.)
11. If the voltmeter does not read 24 volts, check for a bad connection.

IV. Checking the Solenoids

1. Verify that the receiver unit is working properly by following the procedure outlined above.
2. Place the Boar Bot on blocks allowing the wheels to turn freely without the Boar Bot moving.
3. Remove the cover of the electrical box.
4. Turn on the power switch.
5. Press the remote control switch corresponding to direction in which the Boar Bot is not responding and listen for a click from the solenoid.
6. If the solenoid does not click, place the black lead of the digital voltmeter on the black wire connection on the bottom of the solenoid and the red lead on

signal wire in question(white, blue, green or brown)and press the remote control button in question. If the digital voltmeter reads 24 volts, replace the solenoid. (The voltage will read 12 volts for the two speed in LO speed.)

7. If the solenoid does click, place the red and black leads of the digital voltmeter, across the bottom terminals of the forward solenoid for the side in question (left or right). The digital voltmeter should read 24 volts when the forward direction button of the remote control for the side in question is pressed and 0 volts when the reverse direction button of the remote control for the side in question is pressed. If the two digital voltmeter readings are not 24 volts and o volts, respectively, replace the solenoid. If the digital voltmeter readings are correct, continue.

8. If the solenoid does click, place the red and black leads of the digital voltmeter across the bottom solenoid terminals of the reverse solenoid for the side in question (left or right). The digital voltmeter should read 0 volts when the forward direction button of the remote control for the side in question is pressed and 24 volts when the reverse direction button of the remote control for the side in question is pressed. If the two digital voltmeter readings are not 0 and 24 volts, respectively, replace the solenoid. If the digital voltmeter reading is correct, the solenoid is good.

V. Checking a drive motor

1. Test all other electrical components as outline In **Electrical Service.**
2. Disconnect the negative battery terminals from the rear battery.
3. Check the motor brushes by removing the small cover on the side of the motor and inspect for worn, broken or stuck brushes.
4. Replace the brushes if necessary, otherwise continue with checking drive motor procedure.
5. Remove the drive as outlined in the **Mechanical Service** section.
6. Have the motor tested at an authorized motor repair service center.

V. Checking the battery charger

1. Attach the digital voltmeter to the negative terminal of the rear battery and to the positive terminal of the front battery, record the reading.
2. Attach the battery charger to the Boar Bot by way of the charger plug and allow the charger to charge the batteries for a couple of hours.
3. Reattach the digital voltmeter and record the reading.
4. If the digital voltmeter reading increased, the charger is good. Otherwise, the charger is not working. Replace the battery charger.

VI. Checking for low voltage symptoms for the single speed Boar Bot

Low voltage symptoms include but are not limited to

a. Boar Bot does not move when the remote control buttons are pressed.

b. Erratic movement of the Boar Bot.

c. Solenoids are clicking but the Boar Bot does not respond.

The Boar Bot obtains power from a 24 volt electrical system. Two 12 volt deep cycle batteries connected in series furnish the power to operate the Boar Bot. For the Boar Bot to work properly, the battery voltage needs to be 24 volts, minimum and each individual battery voltage needs to be 12 volts, minimum. If the battery voltage is below 24 volts, the Boar Bot will exhibit the low voltage symptoms described.

Keep the battery voltage above 24 volts by charging the batteries whenever the Boar Bot is not in use.

1. Testing the individual batteries

   Using a digital voltmeter, check each individual battery for a minimum of 12 volts. To test the batteries, place the black lead of the digital voltmeter on the (-) negative terminal of the battery and the red lead of the digital voltmeter on the (+) positive terminal of the battery. If the voltage is less than 12 volts on either battery, the battery will need to be charged or replaced. If each battery has a minimum of 12 volts, than check the system for a combined voltage of 24 volts.

2. Testing the combined battery voltage

To test for 24 volts, the digital voltmeter must be placed across both batteries. Place the black lead of the digital voltmeter on the (-) negative terminal of the rear battery. (The rear battery is located on the side the boar is attached to.) Place the red lead of digital voltmeter on the (+) positive terminal of the front battery. (The front battery is located behind the large door and below the gray electrical box.) The digital voltmeter reading should be at least 24 volts. If the reading is less than 24 volts, than the white wire connecting the rear battery positive post to the front battery negative post has a bad connection. Check for loose or bad terminal connections.

3. Testing internal voltage

If the digital voltmeter reading of the two combined batteries is at least 24 volts and the 3 amp fuse is good, remove the cover of the electrical box and check the voltage at the center fuse for a minimum of 24 volts. To test, place the red lead of the digital voltmeter on the bottom side of the fuse holder and place the black lead of the digital voltmeter on the black wire connection on the bottom of a solenoid. If the voltage reading is not 24 volts, check the battery connections on the positive terminal of the front battery and the negative terminal of the rear battery.

4. Testing receiver unit for voltage

If the digital voltmeter reading is 24 volts and the Boar Bot does not operate, remove the two orange wire nuts connecting the receiver to 24 volts. Place the red lead of the digital voltmeter on the heavier red wire coming from the power switch which was connected inside the wire nut. Place the black lead of the digital voltmeter on the black wire coming from the terminal block which was connected inside the other wire nut. If the reading is 24 volts, reconnect the two orange wire nuts. If the power light on the receiver unit is not on, the receiver may be bad and may need to be replaced.

VII. Checking the two speed Boar Bot

Refer to the Electrical Block Diagram of the two speed Boar Bot on page 24.

Mode of operation

The two speed Boar Bot operates mechanically the same as the single speed Boar Bot but it also has the added feature of being able to change the speed it travels. In the single speed Boar Bot the receiver, solenoids, and motors always operate with 24 volts; whereas in the two speed Boar Bot the receiver and solenoids operate with 12 volts and the motors operate at 12 or 24 volts depending on the mode of operation—Lo speed or Hi speed.

The two switching solenoids have the function of providing 12 volts or 24 volts to the two electric motors depending on the mode of operation and when traveling in a forward direction. When the two speed Boar Bot travels in reverse, the speed will automatically default to Lo speed regardless of the position of the Hi/Lo switch.

Checking voltages on a two speed Boar Bot

With the two speed Boar Bot in Lo speed operation both batteries are forced to have the same voltage because of the way the two switching solenoids connect the two batteries. If the two battery voltages are not the same, then there is a bad connection between the two batteries. To measure the voltage of each individual battery, one of the battery terminals has to be disconnected. Once the batteries terminals are disconnected, measure the voltage across each battery by placing the digital voltmeter across the battery terminals of each individual battery. Any battery voltage under 12 volts will result in erratic or no operation of the Boar Bot.

In Hi speed operation the battery voltage across both of the batteries (positive terminal of the rear battery to the negative terminal of the front battery) should be 24 volts.

Trouble shooting a two speed Boar Bot

1. The switching solenoids should always click by switching the Hi/Lo switch when the Boar Bot switch is on regardless if the receiver will operate. If the switching solenoids do not click then there is no power at the terminal block in the electrical box. Check the circuit breakers (or fuses), the batteries or the wire /wire terminals.

The switching solenoids operate from the main (front) battery. If the main battery is bad or has a bad connection, switching to Hi speed will cause the switching solenoids to clatter because the floating (rear) battery is being switched between being in series and being in parallel with the main battery. (Powering and not powering the solenoids.) The receiver will also not work.

2. Unlike the single speed Boar Bot where a blown circuit breaker only effects one side of the Boar Bot, a blown circuit breaker on the two speed effects the entire Boar Bot.

A. A blown circuit breaker on the floating (rear) battery will cause the Hi speed to stop working but the Lo speed will still work but with reduced power and less operating time between charging the battery.

B. A blown circuit breaker on the main (front) battery will cause the switching solenoids to clatter as discussed above.

C. Both circuit breakers blown will result in a dead Boar Bot.

3. If the two speed Boar Bot does not work in Lo or Hi speed and the receiver LED light is off, check the following:

A. Check the two main circuit breakers.

B. Check the 3 amp fuse.

C. Check the he batteries for low voltage.

D. Check the on/off switch and associated wiring.

E. Check if there is power to the receiver. Refer to **Checking the receiver unit inside the Boar Bot** (page 16). If the receiver has power, then the receiver could be bad.

4. If the two speed Boar Bot does work in Lo speed but not in Hi speed, then the receiver and solenoids are working.

A. Check if the switching solenoids are clicking.

B. Check the Hi/Lo switch.

C. Check the rear battery, associate wiring and terminals.

5. Default relay failure will cause the following symptoms.

A. The Boar Bot will not operate in Hi speed.

B. The Boar Bot will not default to Lo speed in reverse operation.

6. Default isolation diodes failure will cause the following symptoms.

A. The Boar Bot will not default to Lo speed in reverse operation.

B. Right or left reverse will result in all wheels in reverse.

7. Switching solenoid failure of either solenoid or both solenoids will result in no Hi speed operation.

8. Circuit breaker failure of either circuit breaker has occurred if the Boar Bot while operating properly begins a gradual slow down and finally comes to a stop. If the Boar Bot is switched off and then switched on again, the movement of the Boar Bot will repeat the gradual slow down. Replace the bad circuit breaker or breakers.

Electrical Block Diagram Single Speed Boar Bot

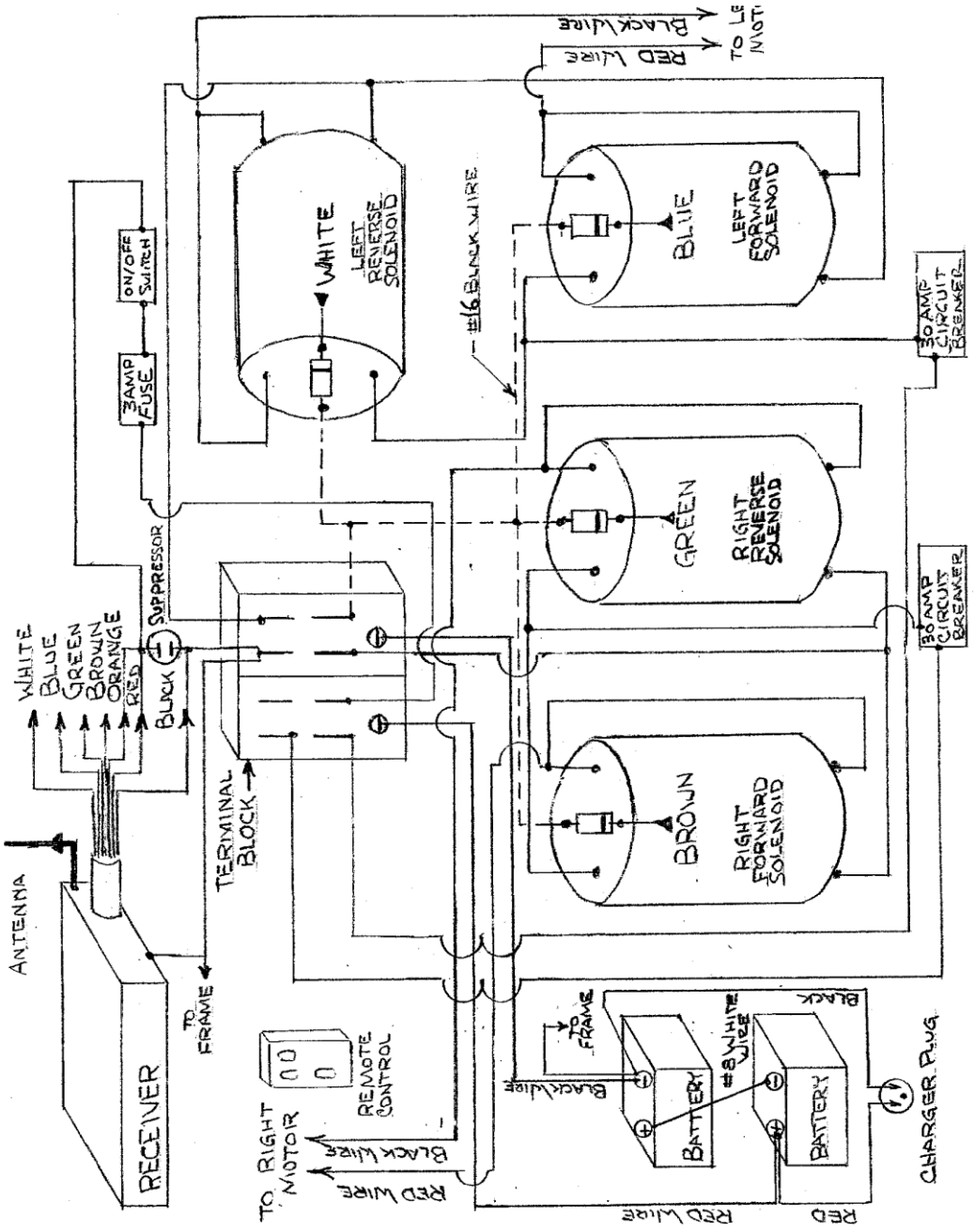


Figure 2

Electrical Block Diagram of Single Speed Boar Bot

Boar Bot Serial # 095501and Above

Old Receiver 990397-20

ELECTRICAL BLOCK DIAGRAM SINGLE SPEED BOAR BOT

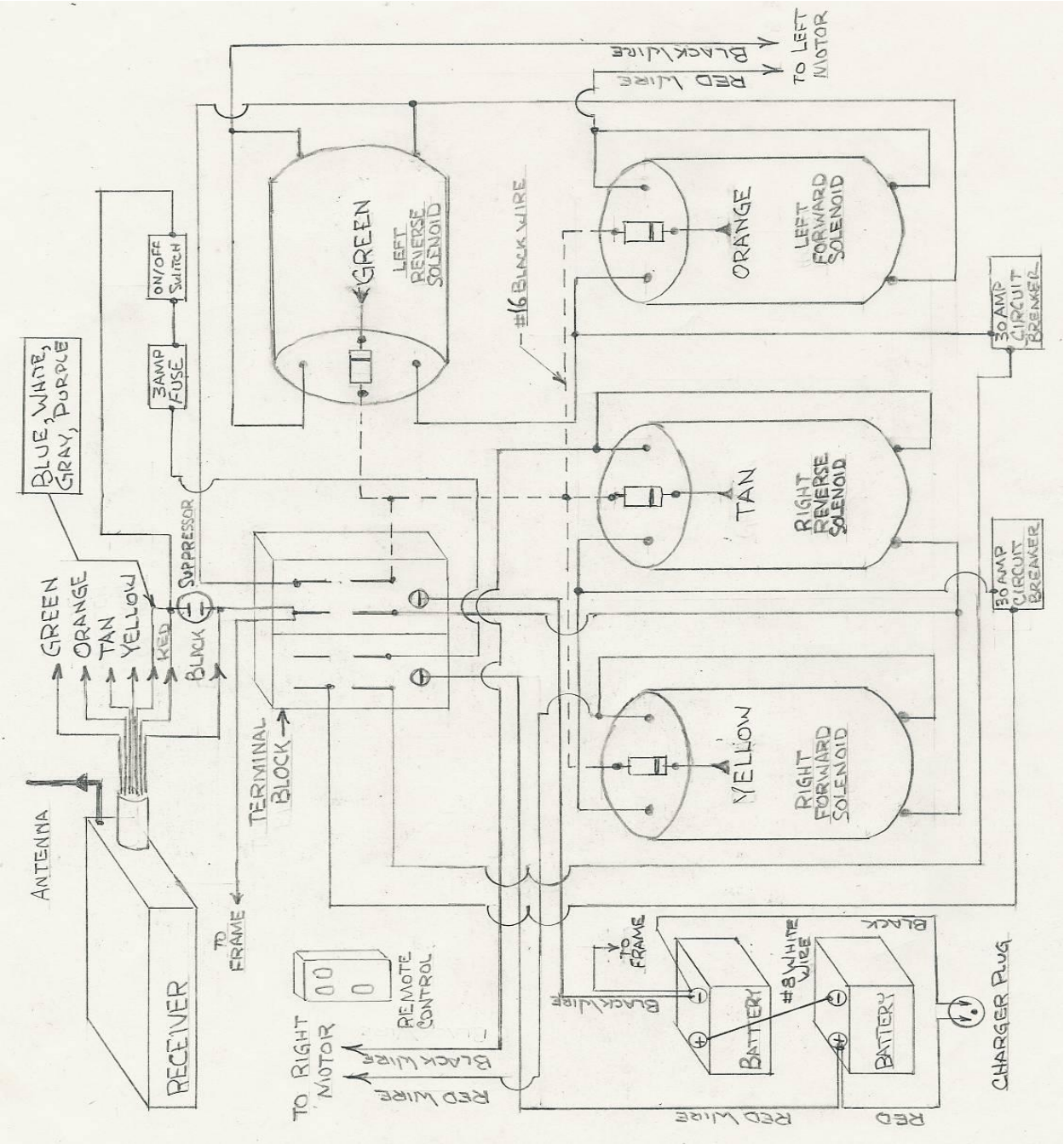


FIGURE 3

ELECTRICAL BLOCK DIAGRAM OF SINGLE SPEED BOAR BOT

BOAR BOT SERIAL # 095601 AND BELOW

NEW RECEIVER 983107-20

ELECTRICAL BLOCK DIAGRAM TWO SPEED BOAR BOT

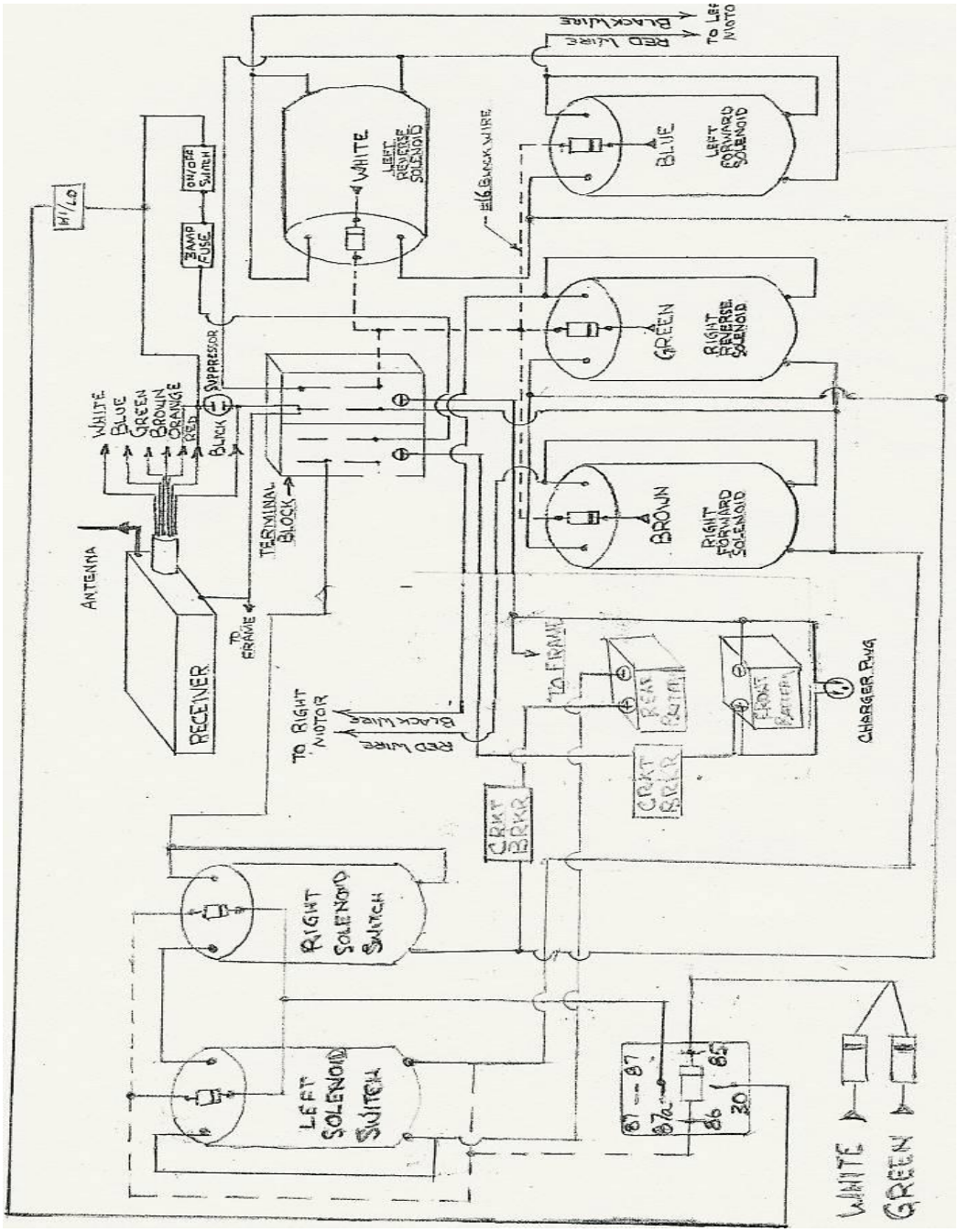


FIGURE 4

ELECTRICAL BLOCK DIAGRAM OF TWO SPEED BOAR BOT

BOAR BOT SERIAL # 095502 AND ABOVE

OLD RECEIVER 990397-20

ELECTRICAL BLOCK DIAGRAM TWO SPEED BOAR BOT

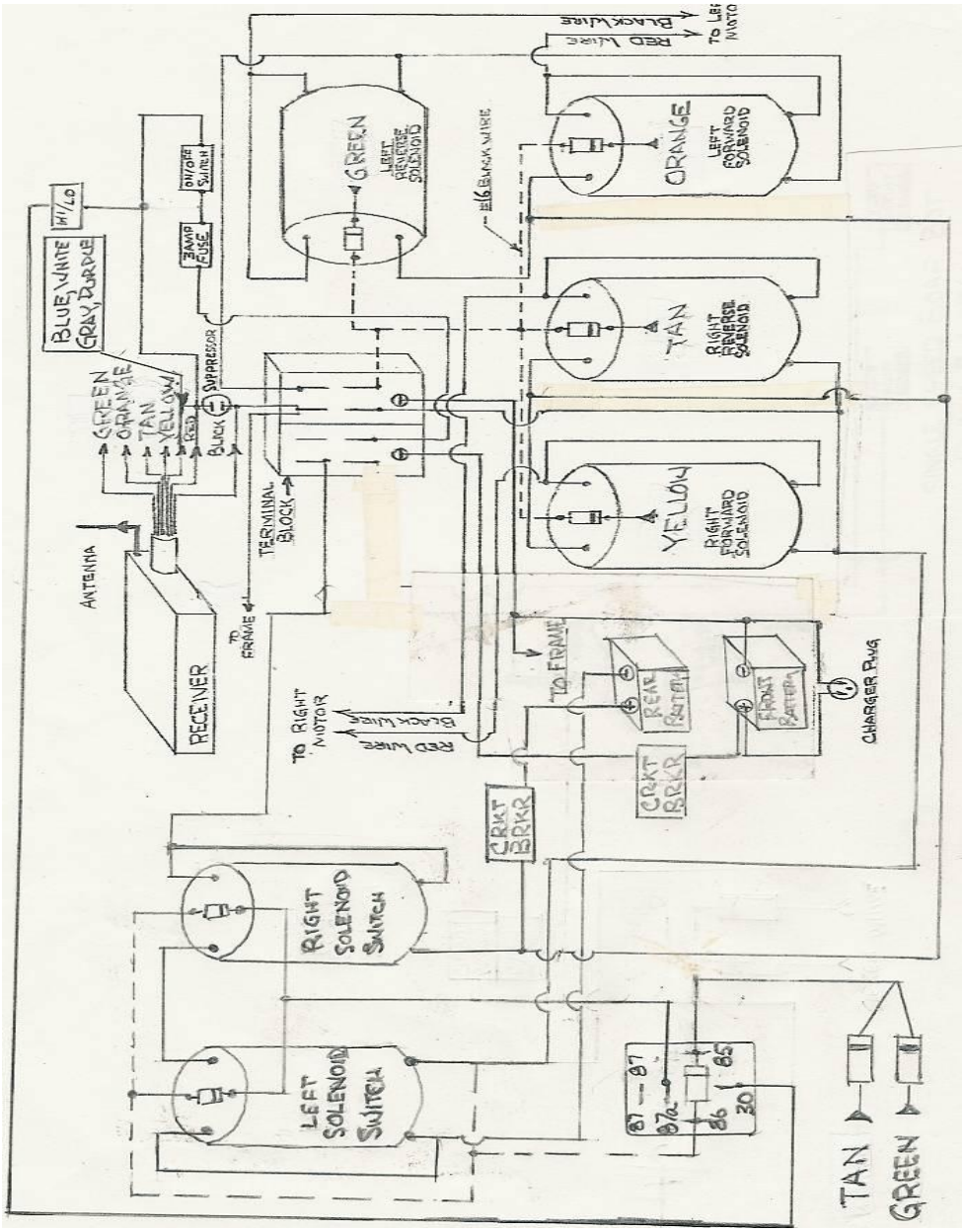


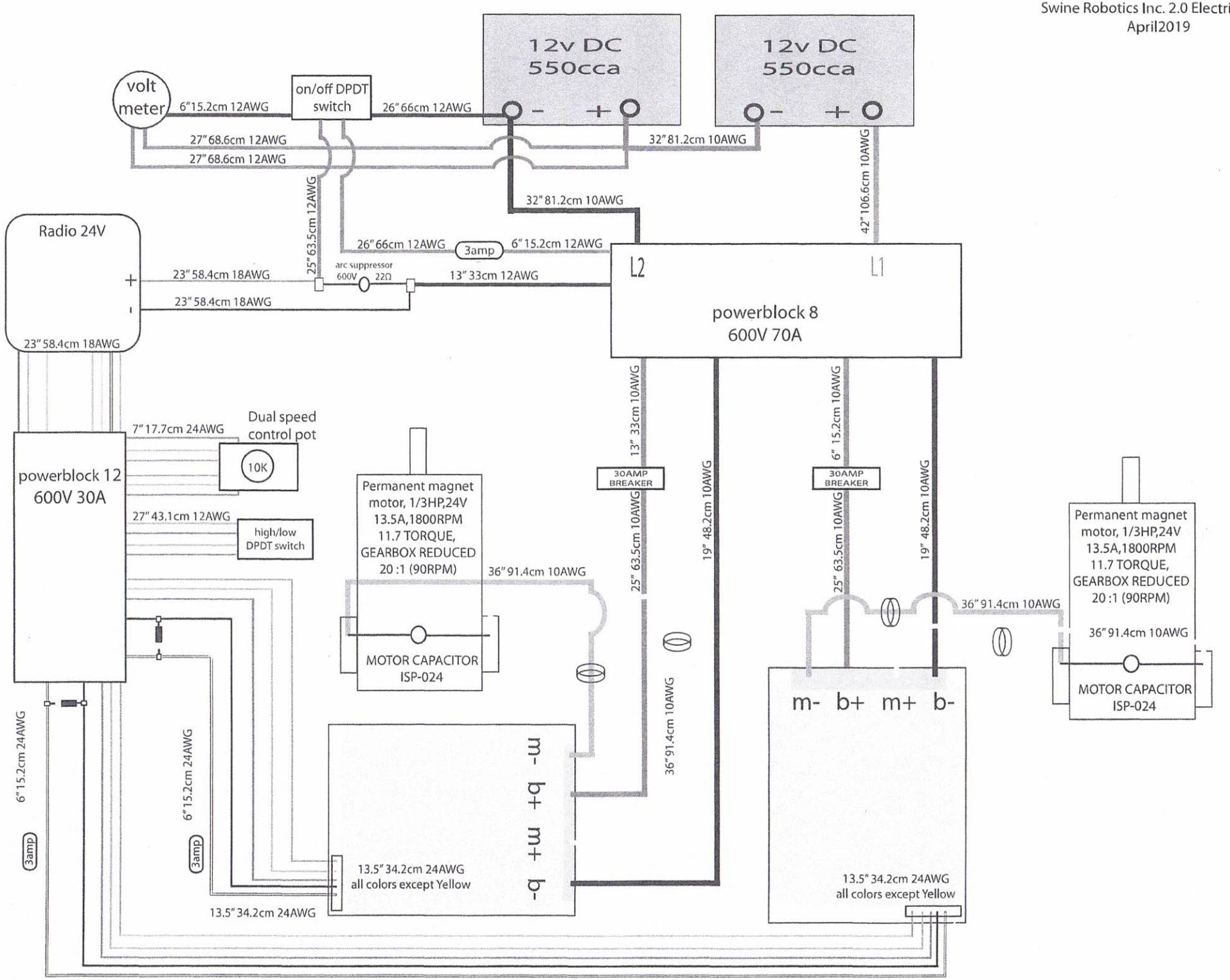
FIGURE 5

ELECTRICAL BLOCK DIAGRAM TWO SPEED BOAR BOT

BOAR BOT SERIAL # 095602 AND BELOW

NEW RECEIVER 983107-20

Swine Robotics Inc. 2.0 Electrical Box
April2019



Parts Diagram Main Assembly

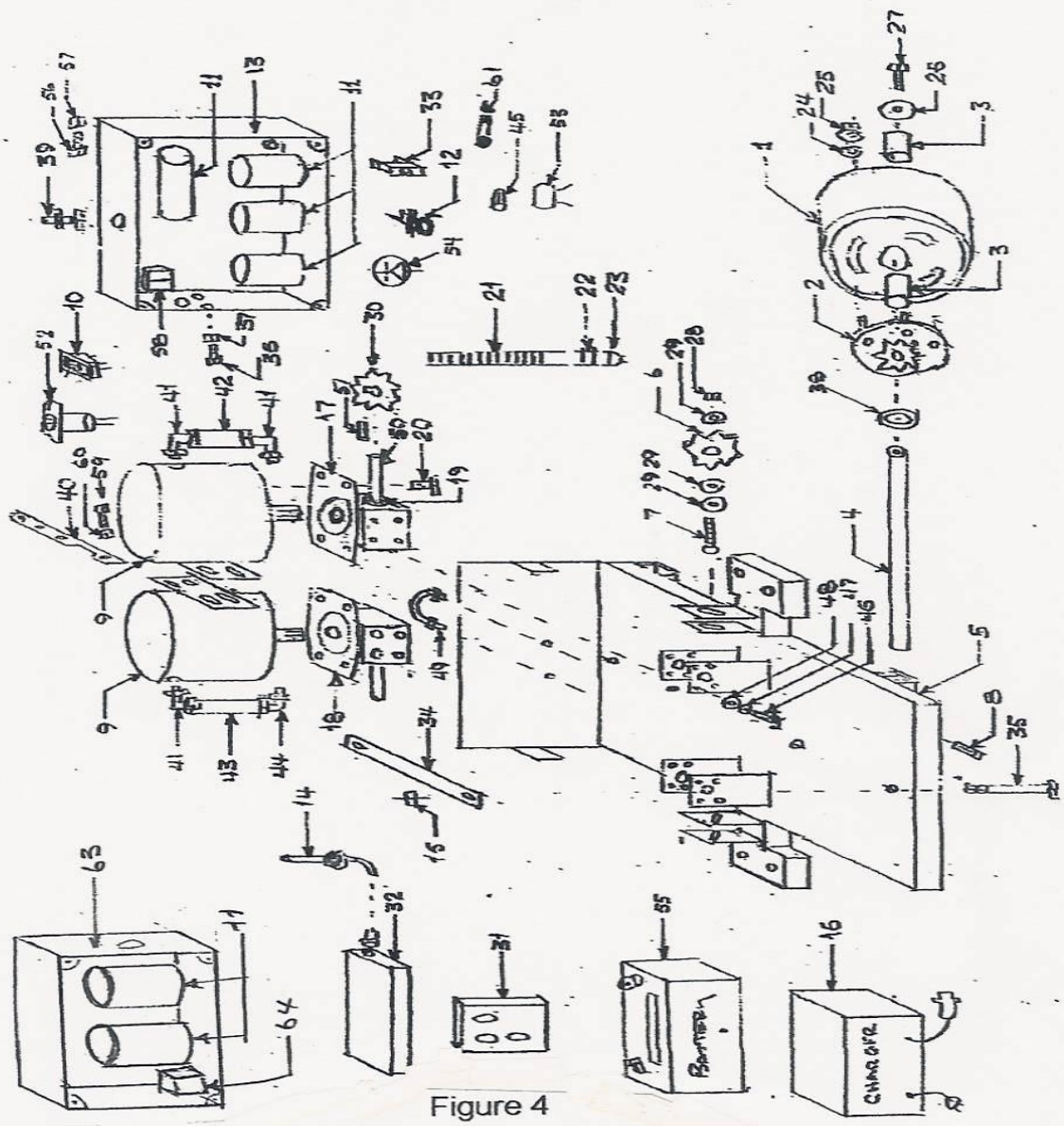


Figure 4

Boar Bot Mechanical Parts Diagram

Parts Diagram Cover Assembly

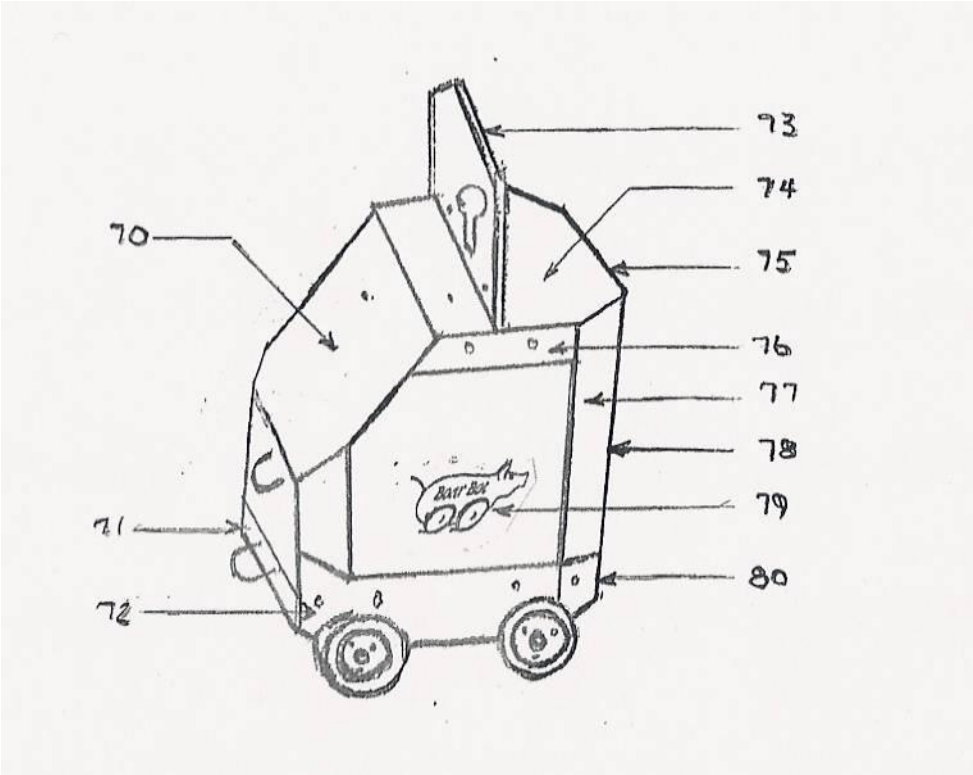


Figure 5

Boar Bot Cover Assembly

Boar Bot Parts List

Part no.	Description
BB1.	Wheel (4 required)
BB2.	Wheel plate sprocket assembly
BB3.	Axle bushing (2 per wheel)
BB4.	Axle shaft-specify if narrow version Boar Bot
BB5.	Main frame single speed
BB5a.	Main frame two speed

BB5b.	Main frame-narrow version
BB6.	Idler sprocket (2 per machine)
BB7.	Idler sprocket bolt
BB8.	Axle set screw
BB9.	Drive motor-single speed
BB9a.	Drive motor-two speed
BB10.	ON/OFF power switch
BB10a.	Hi/Lo switch-two speed (not shown)
BB11.	Solenoid (4 per machine) single speed
BB11a.	Solenoid (6 per machine) two speed
BB12.	Fuse holder (3 amp)
BB13.	Electrical box
BB14.	Antenna
BB15.	Battery bolt lock nut
BB16.	Battery charger (24 volt) single speed
BB16a.	Battery charger (12 volt) two speed
BB17.	Left gear box
BB18.	Right gear box
BB19.	Gear box seal
BB20.	Gear box cap screw
BB21.	Drive chain (No. 50) single speed
BB21a.	Drive chain (No. 50) two speed
BB22.	Connector link (No. 50)
BB23.	Offset link (N0. 50)
BB24.	Flat washer
BB25.	Wheel lock nut
BB26.	Wheel washer
BB27.	Wheel cap screw
BB28.	Nut (Idler sprocket)
BB29.	Idler sprocket flat washers
BB30.	Drive gear (2 per machine) single speed
BB30a.	Drive gear (2 per machine) two speed
BB31.	Remote control (specify receiver ID number)
BB32.	Receiver unit (specify machine ID number) single speed
BB32a.	Receiver unit (specify machine ID number) two speed
BB33.	Circuit breaker (2 required) single speed 30amp
BB33a.	Circuit breaker (2 required) two speed 50amp
BB34.	Battery hold down bracket
BB35.	Battery hold down bolt
BB36.	Electrical box securing bolt
BB37.	Electrical box securing nut
BB38.	Axle shims
BB39.	Receiver electrical wire feed-thru
BB40.	Electrical box bracket
BB41.	Motor wire flexible elbow
BB42.	Left motor wire flexible conduit

BB43.	Right motor wire flexible conduit
BB44.	Right motor wire electrical box connector
BB45.	Wire nut (2 required)
BB46.	Gear box cap screw
BB47.	Gear box lock washer
BB48.	Gear box flat washer
BB49.	U bolt (2 required)
BB50.	Gear box shaft
BB51.	Gear box key
BB52.	Charger/hearse receptacle
BB53.	Arc suppressor (3 required)
BB54.	Diode (4 required) single speed
BB54a.	Diode (7 required) two speed
BB55.	Battery (12 volt deep cycle-2 per machine) specify if narrow Boar Bot
BB56.	Solenoid hold down bolt (6 required) single speed
BB56a.	Solenoid hold down bolt (9 required) two speed
BB57.	Solenoid hold down nut
BB58.	Terminal block
BB59.	Motor bracket bolt
BB60.	Motor bracket nut
BB61.	Fuse-3 amp
BB62.	Wiring harness (not shown) single speed
BB62a.	Wiring harness (not shown) two speed
BB63.	Electrical box – two speed
BB64.	Reverse default relay-two speed
BB69.	Boar Bot cover assembly specify
BB70.	Rear door
BB71.	Rear nose guard
BB72.	Bottom side bumper (right) specify single or two speed
BB72a.	Bottom side bumper (left) (not shown) specify single or two speed
BB73.	Top vision guard
BB74.	Outer cover single speed
BB74a.	Outer cover two speed
BB75.	Front top bumper (not shown)
BB76.	Top side bumper (right)
BB76a.	Top side bumper (left) (not shown)
BB77.	Front door support chain (not shown)
BB78.	Front door
BB79.	Decal set
BB80.	Front bottom bumper
BB81.	Cover shims (not shown) two speed

BB082	**Charger Plug**
BB083	**D Ring For Harness**
BB084	**Harness**
BB84A	**Strap For Harness**
BB085	**Rope**
BB086	**Gear Box Bearing**
BB087	**Gear Box Cap**
BB088	**Motor Brush Spring**
BB089	**Motor Brush Clip**
BB090	**Axle Tube**
BB091	**Front Plastic Top**
BB092	**Large fuseHolder**
BB093	**Brass Gear**
BB094	**Hinges**
BB095	**Hour Meter**
BB096	**Leather Case**
BB097	**Seal Plate**
BB098	**Side Guard**
BB099	**Brush Kit**
BB100	**Electrical Box Complete**
BB101	**Electrical Cover Lid**
BB102	**Electric Wire Per. Ft.**
BB103	**Boar Bot Cover**
BB104	**Conduit Connector**
BB105	**Conduit Per. Ft.**
BB106	**Receiver Cord**
BB107	**Snaps**
BB108	**12 Volt Relay**
BB109	**Wiring Harness**
BB110	**Wire Ends**
BB111	**Washers For Wheels**
BB112	**Transmitter Strap**
BB113	**Transmitter Battery**
BB114	**Volt Meter**
BB115	**Wire Nut**
BB116	**Battery Charger Cord**
BB117	**Electrical Box Bracket**
BB118	**FrameBracket**

APPENDIX

Hearse Winch Parts Diagram

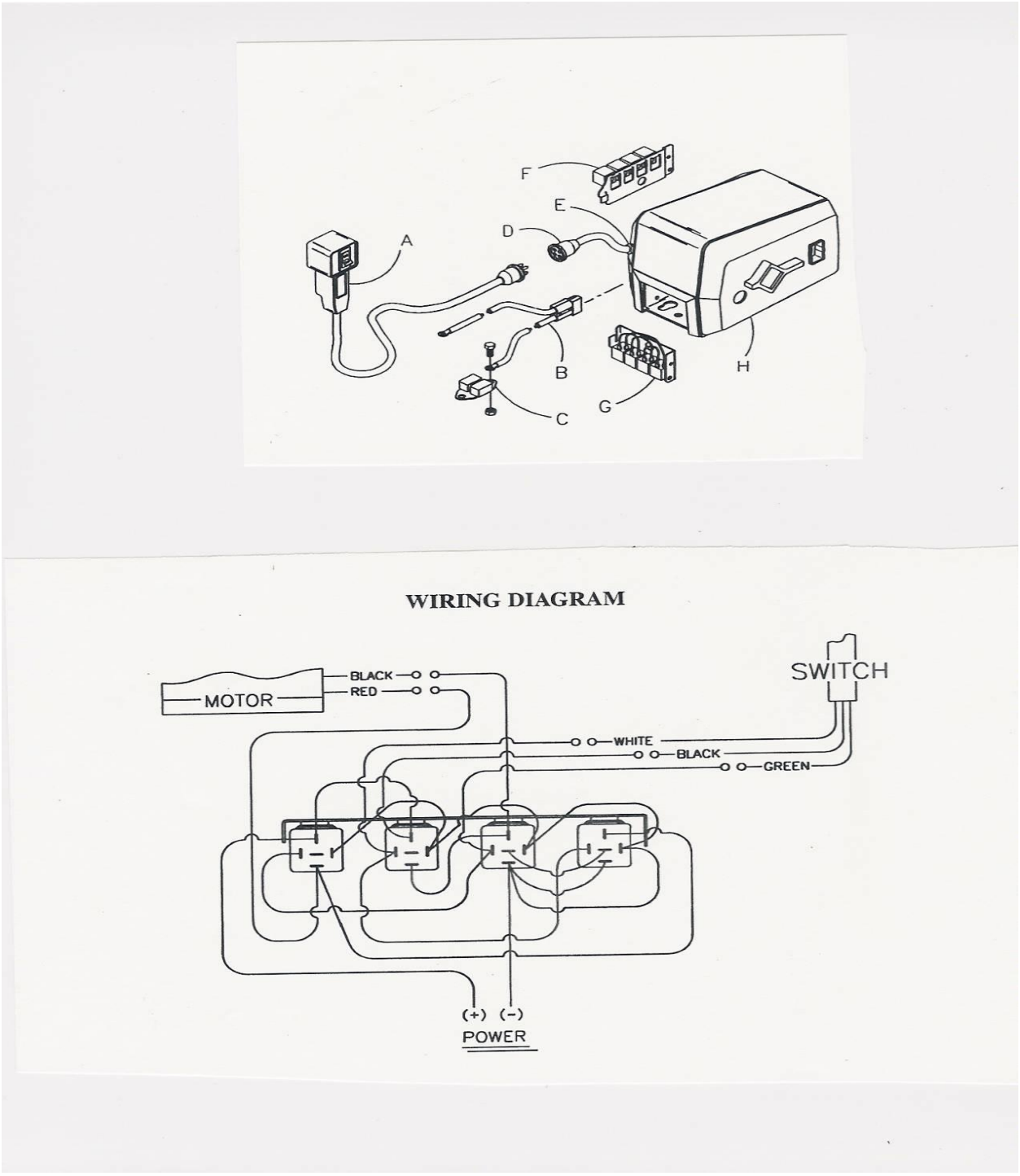


Figure 6
Hearse winch wiring diagram Version II

Hearse winch parts diagram
Version II

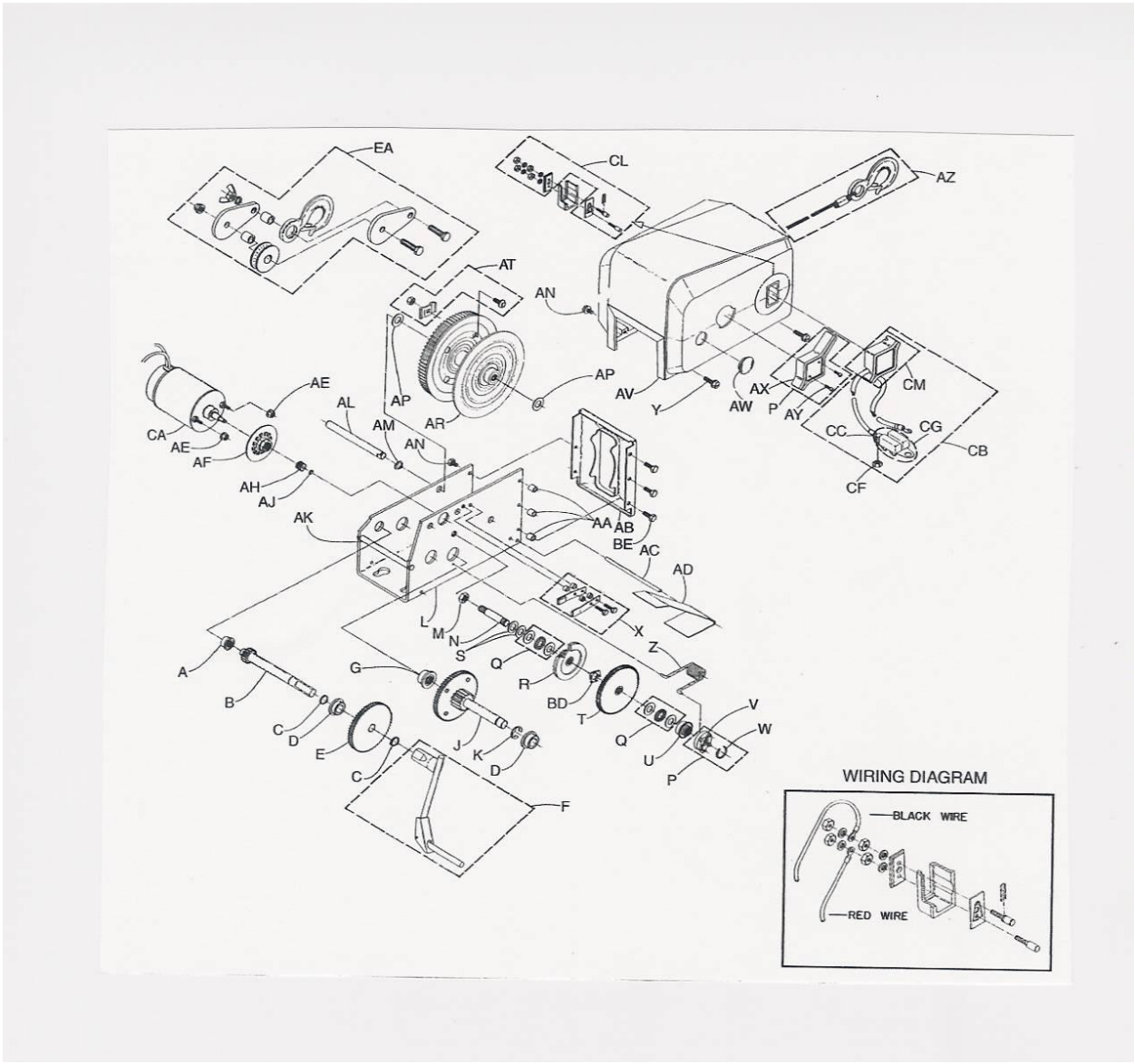


Figure 7
Hearse winch parts diagram Version II

Parts list Version II
Figure 6

Part no.	Description
A.	Switch assembly
B.	Wiring harness (complete)
C.	Circuit breaker assembly
D.	Pigtail. 9”
E.	Strain relief bushing
F.	Relay assembly (SA5015/SA7015)
G.	Relay assembly SA9015/SA12015)
H.	Cover
J.	Motor assembly

Parts list Version II
Figure 7

Part no.	Description
A.	Bearing housing assembly
B.	Primary drive shaft assembly
C.	Retaining ring (2)
D.	Bushing (2)
E.	56T gear
F.	Aux. handle assembly
G.	Drive shaft bushing housing assembly
J.	Interim. drive shaft assembly
K.	“E” ring
L.	Base
M.	Nut, 7/16 locknut
N.	Clutch stud
P.	Clutch handle replacement kit(includes V, W, AX, & AY.)
Q.	Thrust bearing replacement kit (includes item W, O-ring)
R.	Clutch gear assembly
S.	Washer (2)
T.	84T Gear assembly
U.	Clutch handle nut
V.	Clutch spring keeper
W.	“O”-ring
X.	Brake spring replacement kit
Y.	Screw, ¼-20x1 (5)
Z.	Clutch spring
AA.	Spacer (3)
AB.	Front plate
AC.	Level wind ping
AD.	Level wind

AE.	Nut, 10-32 locknut (2)
AF.	Brake disc assembly
AH.	12T Pinion gear
AJ.	“E” ring
AK.	Base spacer
AL.	Reel shaft
AM.	Retaining ring
AN.	Screw, 1/4x20x1/2 (4)
AP.	Washer (2)
AR.	Reel assembly
AT.	Rope clamp kit
AV.	Cover
AW.	Cover plug
AX.	Clutch handle
AY.	Screw - #4x1/2
AZ.	Cable & hook
BD.	Finger spring washer
BE	Top decal (not shown)
BG.	DL decal (not shown)
BH.	Clutch decal (not shown)

MOTOR PARTS

CA.	Motor assembly
CB.	Switch assembly (includes CC, CE, CF & CG)
CC.	Screw- 1/4x20x3/8
CE.	Washer – ¼ starlock
CF.	Nut – ¼-20
CG.	Circuit breaker assembly
CL.	Pocket plate replacement kit
CM.	Replacement switch kit

PULLEY BLOCK

EA.	Pulley block & hook (complete)

Hearse winch parts
Version I

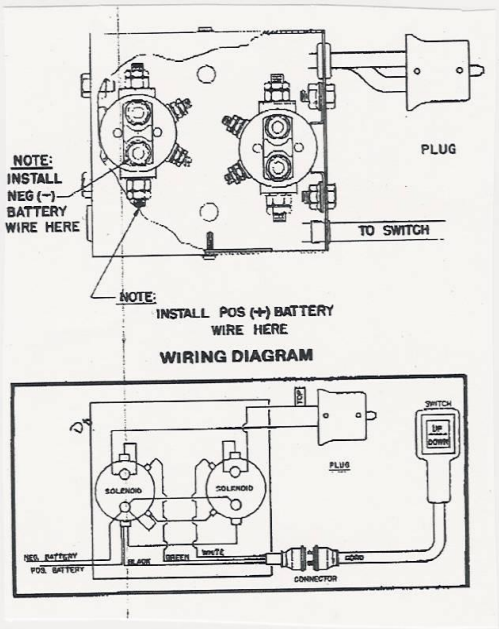


Figure 8
Hearse winch parts Version I

Parts list – Version I

Figure 8

Part no.	Description
a.	Switch box
b.	Switch box cover
c.	Solenoid (2)
d.	Switch assembly with male connector
e.	Plastic grommet (4)
f.	Cord grommet
g.	Cap screw 5/16-18x5/8 lg. (4)
h.	Nut 5/16-18 (4)
i.	Cover screw (2)
j.	#8 heavy red wire assembly (4 ¾ lg)(2)
k.	#8 heavy red wire assembly (3 3/8 lg)
l.	#18 light black wire assembly (3 ½ lg)
m.	#18 light black wire assembly (4 3/8 lg)
n.	Cord assembly with female connector
o.	Cord assembly with switch & male connector
p.	Connector
q.	Terminal (2)
r.	Plug assembly