

**BUILDING an INBOARD ELECTRIC**  
**BOAT from a 14 Ft O'Day**  
**JAVELIN**



## ELECTRIC BOAT

1969 O'DAY JAVELIN, WITH TRAILER on E-BAY  
JUST ACROSS THE DELAWARE RIVER, ONLY 15 MILES AWAY  
\$107.50 IS THE WINNING BID



14 FT LONG

SWING  
CENTERBOARD KEEL

NO MAST, NO SAILS

A GOOD FIBERGLASS  
HULL

AN OK TRAILER  
NEEDS SOME WORK

PURCHASED MAY  
2005



ELECTRIC BOAT

TRAILER REBUILT, SELLER PUTS ON NEW TIRES, NEW BEARING  
BUDDYs, NEW LIGHTS, AND DELIVERS EVERYTHING TO  
HOME FOR \$225



## ELECTRIC BOAT

HULL SOFTWARE FOR LARGE COMMERCIAL SHIPS, WHICH IS ALSO APPLICABLE TO SMALL DISPLACEMENT BOATS WHICH OPERATE AT OR BELOW "HULL SPEED" ALLOWS ANALYSIS OF THE PROPER PROPULSION PARAMETERS.

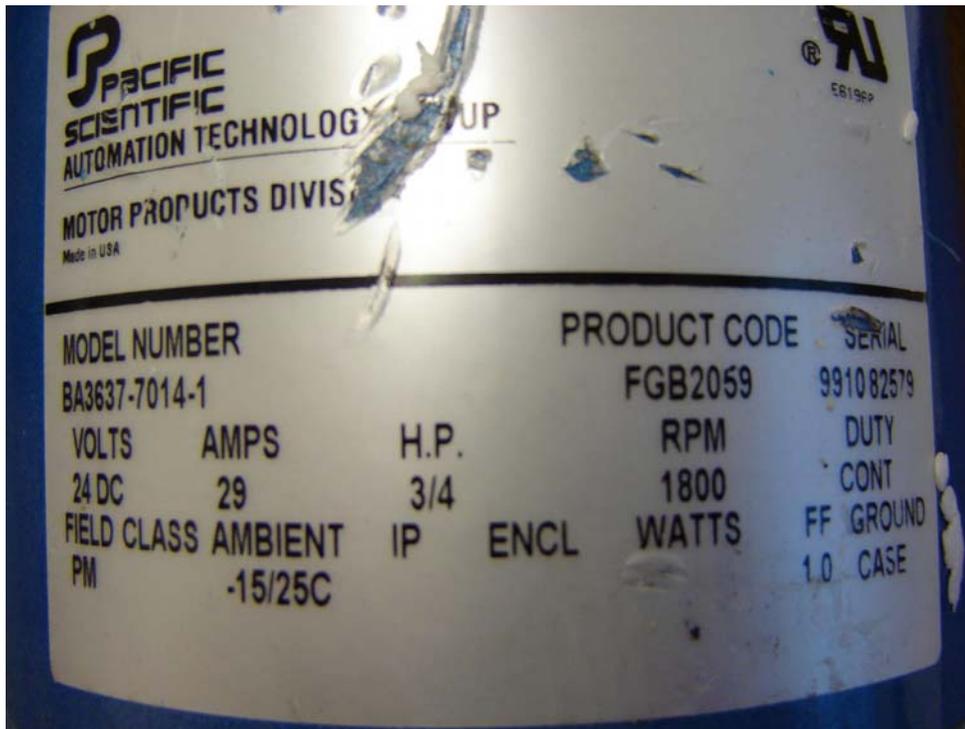
"HULL SPEED" IN KNOTS IS EQUAL TO ABOUT  $1.3 \times$  THE SQUAREROOT OF WATERLINE LENGTH IN FEET

A ROUGH ESTIMATE IS THAT ONE HORSEPOWER PER TON OF DISPLACEMENT WILL GET YOU TO APPROXIMATELY "HULL SPEED". THIS IS WITH A REASONABLY STREAMLINED HULL FORM, WHICH IS TYPICALLY THE CASE WITH GOOD FIBERGLASS SAILBOAT HULLS.

## ELECTRIC BOAT

DESIGN CALCULATIONS SHOW THAT ABOUT 3 /4 HORSEPOWER WILL DRIVE THE BOAT AT HULL SPEED, ABOUT 5 MPH.

A NEW 3 /4 HP CONTINUOUS DUTY 24 VDC PM MOTOR ON E-BAY, \$42 TOTAL WINS THE MOTOR



THE SAME MOTOR IS USED ON  
A \$12,000 ELECTRIC  
LAUNCH SETUP

## ELECTRIC BOAT

AN EFFICIENT PROPELLER SETUP IS REQUIRED FOR SUCH A LOW POWER OUTPUT, THIS TRANSLATES TO A BIG PROP AT LOW RPM.

FOR A FIRST APPROXIMATION, GET A THREE BLADE PROPELLER WITH A DIAMETER EQUAL TO ABOUT 8 TO 10 PERCENT OF THE BOAT LENGTH, AND A PITCH (ADVANCE THRU WATER IN ONE REVOLUTION) WHICH IS MORE THAN THE PROPELLER DIAMETER.

EBAY COMES THRU AGAIN, \$25 FOR A 14 INCH DIA, 17 INCH PITCH THREE BLADE PROP. THE PROP IS REPRESENTED AS EXCELLENT, BUT ARRIVES WITH BENT BLADES.

ITS HARD TO TELL BY THE EBAY PHOTO (LEFT) ..... BUT IT IS BADLY BENT

THIS REQUIRES RESTORATION WITH THE USE OF A BIG "BEAD BLOW" HAMMER



## ELECTRIC BOAT

NOW FOR THE SAILBOAT CONVERSION TO A PROPELLER DRIVEN BOAT. THE CENTER BOARD WELL IS CUT OUT OF THE BOAT HULL, WITH AN ORDINARY ELECTRIC CIRCULAR SAW. A PVC PIPE (1-1/2 INCH SCHEDULE 40) IS FIBERGLASSED INTO THE HULL. I USED ORDINARY AUTOMOTIVE REPAIR RESIN AND GLASS CLOTH. PROPELLER SHAFT TUBE IS GLASSED INTO THE HULL SHOWN AT RIGHT.



## ELECTRIC BOAT

WITHOUT A KEEL, STEERING WOULD BE "SQUIRLEY", TWO ALUMINUM ANGLES (2 X 2 X 1/8) ARE BOLTED TO THE HULL, EACH ABOUT 1 FT FROM THE CENTERLINE OF THE BOAT. IN BIG SHIPS THESE ARE CALLED "BILGE KEELS". THE BOLTS THRU THE HULL WILL ALSO SECURE THE NEW DECK ON THE INSIDE OF THE HULL, THE MOTOR MOUNTS, AND THE STERN BEARING STRUTS FOR THE PROPELLER SHAFT

PICTURE UNDER HULL, ON TRAILER



## ELECTRIC BOAT

THE ELECTRICS ARE SETUP WITH TWO DEEP CYCLE MARINE 12 VOLT BATTERIES.

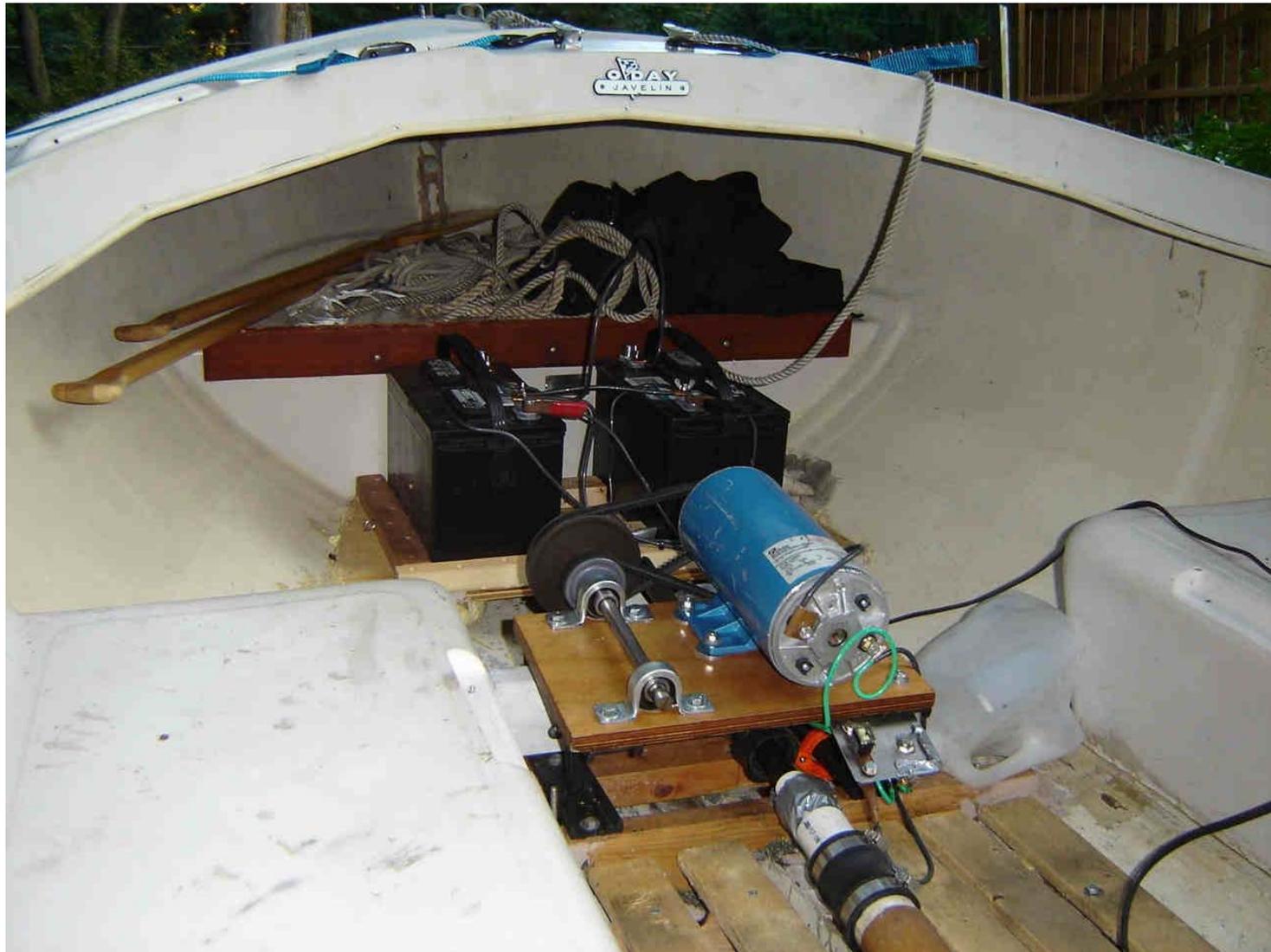
AT FIRST, JUMPER CABLES ARE USED TO GET 12 OR 24 VDC TO THE MOTOR, AND TO ALLOW FORWARD / REVERSE

THE MOTOR MOUNT HAS  
DOUBLE  
REDUCTION BELT  
DRIVE FROM THE  
1800 RPM MOTOR  
TO THE 400 RPM  
PROP SHAFT

THE SHAFT STUFFING BOX  
IS A HOME DEPOT  
PVC PIPE  
EXTENSION, WITH  
PACKING NUT.

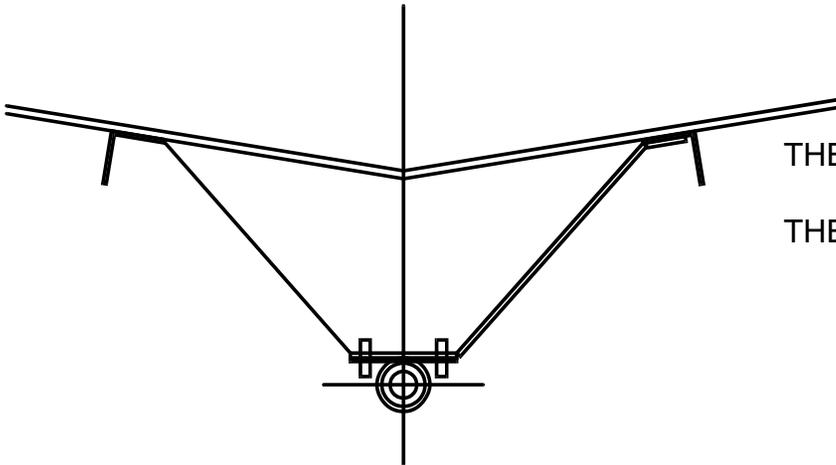
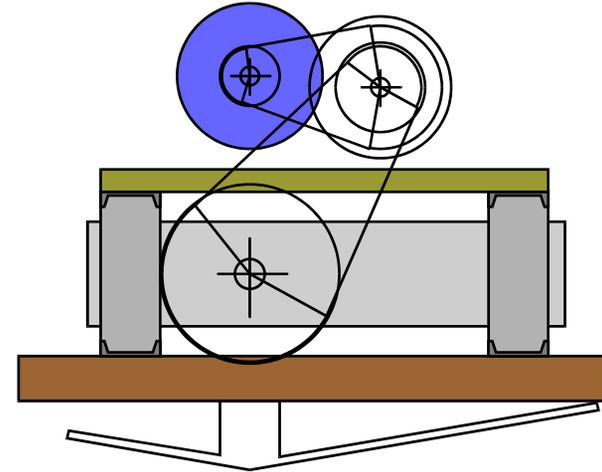
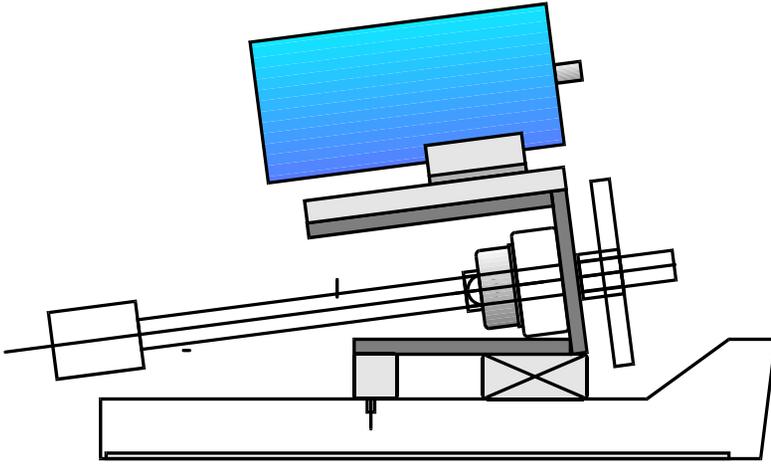
THE STERN SHAFT  
BEARING IS A  
GRAINGER FOOD  
SERVICE UHMW  
PLASTIC  
SPHERICAL  
BEARING, WITH  
PRESSED  
STAINLESS STEEL  
MOUNT

OPEN FLOORBOARDS ARE  
MADE OF SPRUCE  
1 X 4 SCREWED  
AND GLUED IN  
PLACE



## ELECTRIC BOAT

THE MOTOR MOUNT AND THRUST BALL BEARING DETAILS. BELT DRIVE FOR FRACTIONAL HORSEPOWER SYSTEMS (UP TO SEVERAL HORSEPOWER) IS ADEQUATE, AND EASILY SIZED USING INTERNET SOFTWARE FROM THE BELT AND PULLEY MANUFACTURERS.



THE STERN SHAFT BEARING AND STRUTS.

THE STRUTS ARE FROM 1 / 4 X 2 INCH STEEL FLAT BAR. THE UHMW (ULTRA HIGH MOLECULAR WEIGHT PLASTIC) BEARING IS A STANDARD "FOODSERVICE" PILLOW BLOCK, READILY AVAILABLE AT COMMERCIAL SUPPLY HOUSES, ABOUT \$20US

ELECTRIC BOAT

A COAT OF BLUE PAINT, AND A RUDDER FROM THE OLD  
STEAMBOAT THAT BURNED, NOW WE CAN GET ONTO THE  
WATER, AUG 2005



## ELECTRIC BOAT

THE RUDDER CLAMPS ON, JUST LIKE AN OUTBOARD MOTOR. THIS RUDDER IS SMALL, BUT DOES THE JOB WITHOUT CREATING MUCH DRAG. WE USE A 30 POUND THRUST ELECTRIC OUTBOARD TROLLING MOTOR TO MANEUVER AT THE DOCKS AND LAUNCHING AREAS



ELECTRIC BOAT

OUT ON LAKE NOXIMIXON,  
LATE AUGUST 2005



## ELECTRIC BOAT

### **2006, REFINEMENTS**

RELAYS NOW PROVIDE FORWARD / REVERSE, AND HIGH / LOW SPEED.

THE FLOORS ARE PAINTED, INTERIOR WOODWORK ADDED, AND A NEW, MORE EFFICIENT 3 BLADE PROP, 14 INCH DIAMETER, 18 INCH PITCH

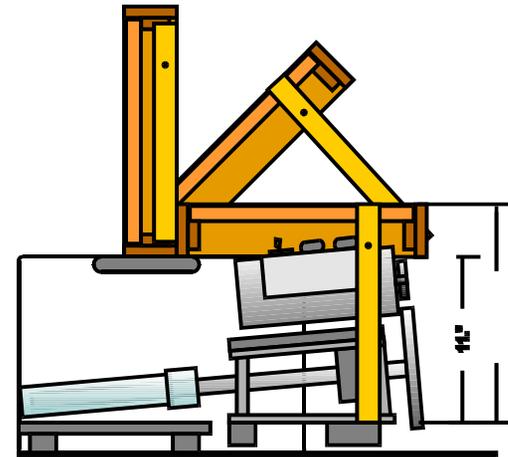
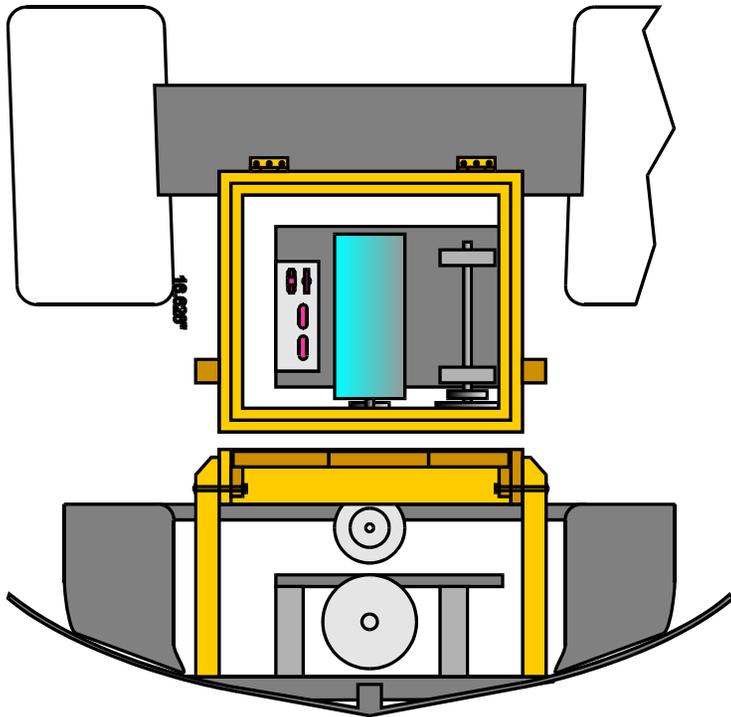
TWO SWITCHES ARE ALL THAT IS REALLY NEEDED, EACH DOUBLE POLE DOUBLE THROW. ONE SWITCH CONTROLS FORWARD / REVERSE, THE OTHER PROVIDES FULL AND HALF SPEED (24 VOLTS OR 12 VOLTS)

I USED RELAYS WHICH HAVE LOW VOLTAGE ACTUATION COILS, AVAILABLE AT GRAINGERS SUPPLY. THEY WERE CHEAPER THAN MANUAL SWITCHES, (ABOUT \$30US EACH) BUT DID NOT HAVE AN "OPEN CENTER" POSITION, SO I NEED A MASTER SWITCH FOR "ON / OFF" POWER. ALSO ADDED A FUSE, WHICH IS GOOD PRACTICE.



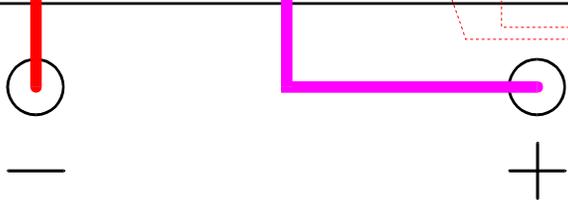
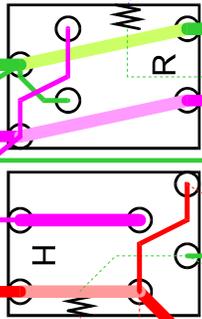
# ELECTRIC BOAT

2006, REFINEMENTS  
HELM STATION  
CONTROL SEAT  
LUNCH TABLE



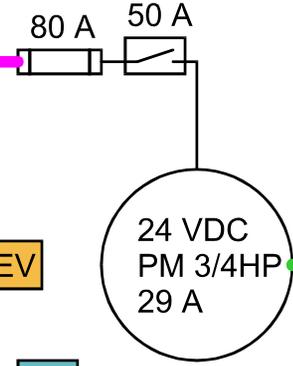
ELECTRIC BOAT

12 VDC



12 VDC

THE RELAY ELECTRICAL SYSTEM  
DIAGRAM, FOR ENGINEERS &  
SCIENTISTS



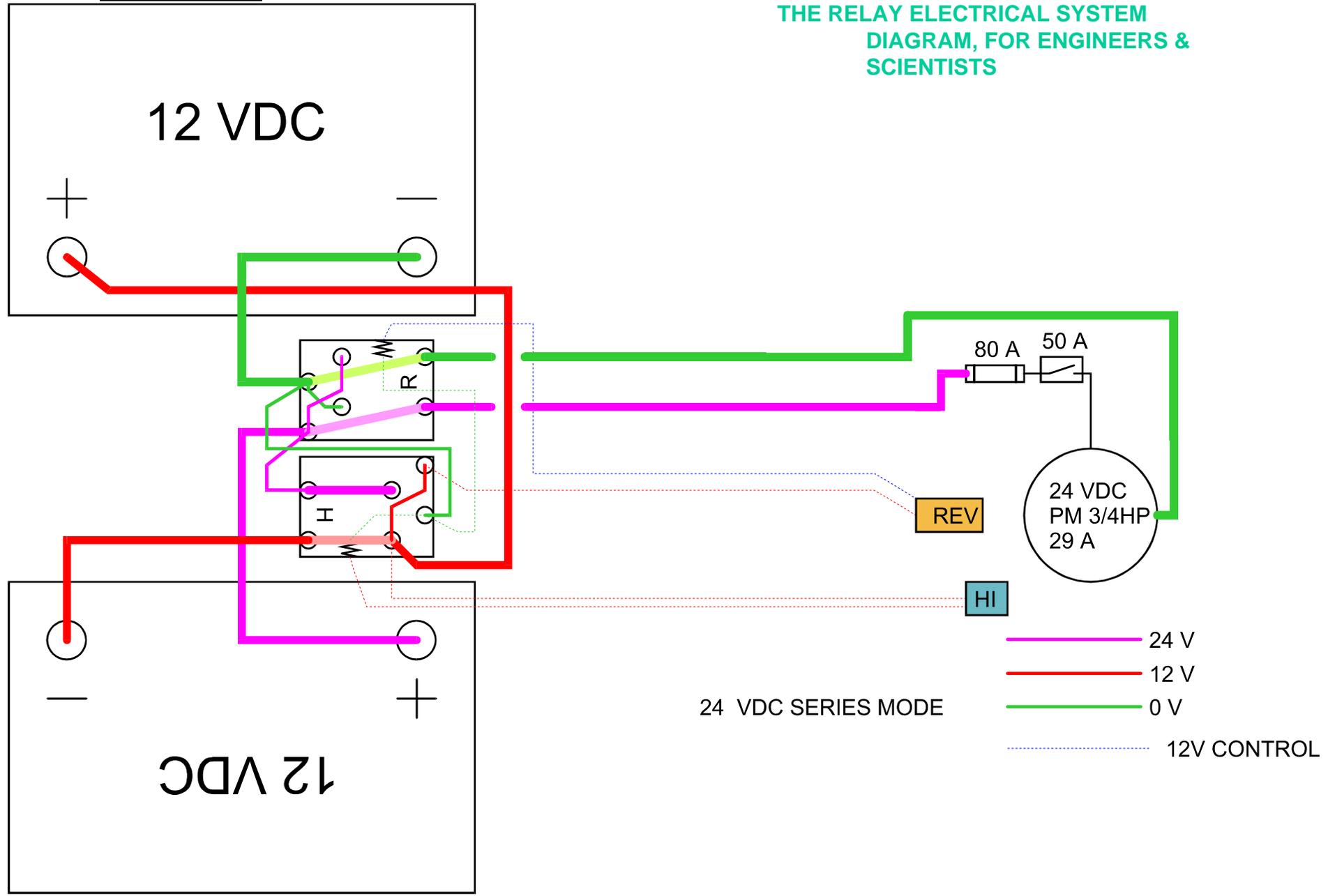
REV

HI

24 VDC SERIES MODE

- 24 V
- 12 V
- 0 V

12V CONTROL





## ELECTRIC BOAT

### **THE POLICE**

THERE ARE MANY LAKES AND RIVERS WHICH DO NOT ALLOW GASOLINE/DIESEL INBOARD OR OUTBOARD MOTORBOATS. ONLY ROWING, SAILBOATS AND ELECTRICS ARE ALLOWED.

THE EXPECTATION IS THAT THE ELECTRICS WILL BE BASIC "TROLLING" MOTORS, WHICH HAVE LITTLE POWER AND ARE NOT TOO EFFICIENT, USING SMALL PROPS WITH HIGH RPM.

EVERY TIME I HAVE USED THIS ELECTRIC BOAT ON SUCH LAKES AND RIVERS, THE POLICE COME AFTER ME, THINKING I HAVE LAUNCHED A GASOLINE POWERED INBOARD BOAT.

THEY ARE OK WITH IT AFTER THEY LOOK OVER THE ELECTRIC SETUP, BUT BE ADVISED NOT TO CARRY ANY CONTRABAND, AS THE POLICE WILL PROBABLY VISIT THE INBOARD ELECTRIC.