



AQUATIC ECO-SYSTEMS®

2 HP PADDLE WHEEL AERATOR

(Part Nos. PW21, PW23)



ASSEMBLY MANUAL

IMPORTANT SAFETY INSTRUCTIONS
READ AND FOLLOW ALL INSTRUCTIONS
SAVE THESE INSTRUCTIONS

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1.0 SAFETY MESSAGES

Safety is important to us. We have included safety messages throughout this manual and for your protection. Please read and follow all directions.



A safety message has a safety alert symbol followed by an explanation of what the hazard is, what can happen and what you should do to avoid injury. This is the safety alert symbol:

The safety alert symbol and "WARNING" or "CAUTION" will precede all safety messages:



You will be killed or seriously injured if you don't follow instructions.



You can be killed or seriously injured if you don't follow instructions.

DAMAGE PREVENTION MESSAGES

A damage prevention message has "ATTENTION" with an explanation of what the equipment hazard is and what you should do to avoid damaging your aerator:

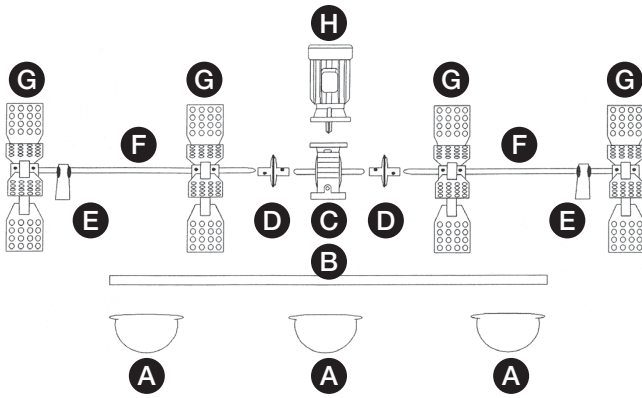
ATTENTION

Your equipment may be damaged if you don't follow instructions.

ELECTRICAL SHOCK HAZARD

This product must be properly grounded. A qualified electrician should check the condition of the power supply wiring before operating this aerator. Do not permanently connect this product to wiring that is not in good condition or is inadequate for the requirements of this product. Failure to follow these instructions can result in death, fire or electrical shock.

2.0 PARTS AND MATERIALS



- A. Pontoons (3)
- B. Frame
- C. Gear Reducer
- D. Coupling Set (2)
- E. Pillow Block (2)
- F. Axle (2)
- G. Paddle (4)
- H. Motor

3.0 NUTS, BOLTS AND WASHERS

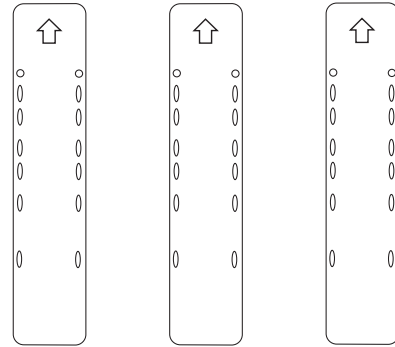
Piece	Qty	Required Wrench
7/16" x 1 1/4" Bolt	8	11/16"
3/8" x 1" Bolt	16	9/16"
3/8" x 1 1/2" Bolt	12	9/16"
3/8" Nut	20	9/16"
7/16" Nut	8	11/16"
Flat Washer	44	

4.0 MOTOR SPECIFICATIONS

	PW21	PW23
Power:	2 hp, 1-phase	2 hp, 3-phase
Volts:	230	460
Hertz:	60	60
Amps:	13	6/3
Rpm:	1,710	1,710

5.0 ASSEMBLY

Direction of Water Flow



5.1 Step One

On a flat, stable surface, lay the three pontoons side by side. The direction of water flow is indicated on the end of each pontoon. Be sure to place them all in the same direction.

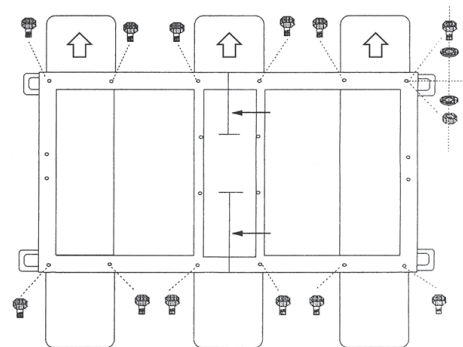
Before going on to the next step, note that there are several sets of holes on each pontoon but not all the holes will be used. One set, on the end with the water direction indicated, is round. All other holes are slotted.



Frame has unfinished edges. To avoid injury, handle with care.

5.2 Step Two

Direction of Water Flow



On each long side of the frame, measure from the outer edge of the frame to the first hole encountered on the center crossbars. On one side the hole will be approximately 10" from the edge, and on the other side the hole will be approximately 12" from the edge.

5.0 ASSEMBLY

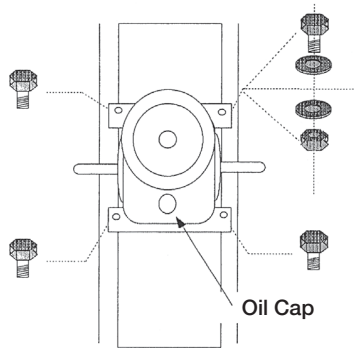
The short side (10") should be on the same end as the water flow as indicated by the pontoons.

Lay the frame on the pontoons as shown. The frame will have six holes on each long side (twelve total) for attaching the frame to the pontoons. Align the holes on the 10" side of the frame with the round holes on the pontoons and attach with six $\frac{3}{8}$ " x 1" bolts, six $\frac{3}{8}$ " nuts and twelve washers.

The holes on the frame should now be lined up with the corresponding slotted holes on the pontoons. Complete the frame mount using six $\frac{3}{8}$ " x 1" bolts, $\frac{3}{8}$ " nuts and twelve washers.

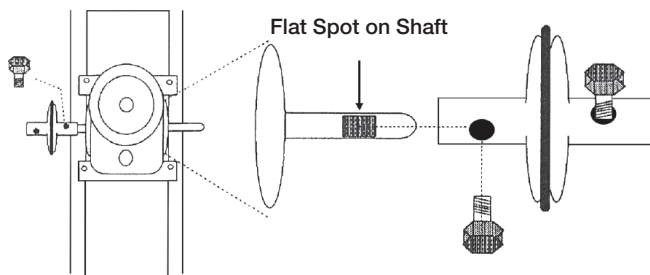
5.3 Step Three

Mount the gear reducer to the frame with four $\frac{3}{8}$ " x $1\frac{1}{2}$ " bolts, four $\frac{3}{8}$ " nuts and eight washers. Make sure to mount the gear reducer so that the oil cap is facing the opposite direction from the water flow as indicated by the pontoons.



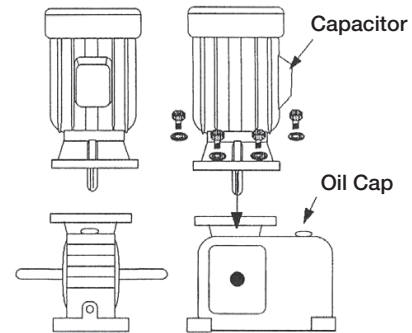
5.4 Step Four

Place the couplings on the shafts. Make sure the holes on the couplings and the flat spots on the shafts are aligned properly. The bolts required for securing couplings to shafts are already attached to the couplings. Tighten securely using a $\frac{3}{4}$ " wrench.



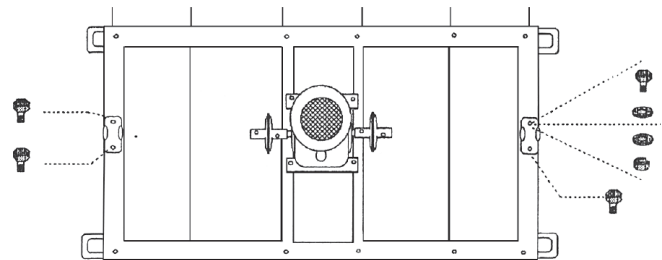
5.5 Step Five

Using four $\frac{3}{8}$ " x 1" bolts and four washers attach the motor to the gear reducer. The capacitor on the motor should be facing the same direction as the oil cap on the gear reducer. Failure to orient the motor this way will prevent the motor cover from fitting properly.

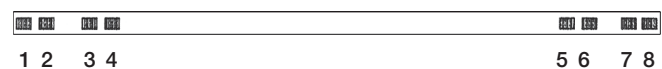


5.6 Step Six

Attach one pillow block to one side of the frame as indicated below using two $\frac{3}{8}$ " x $1\frac{1}{2}$ " bolts, two $\frac{3}{8}$ " nuts and four washers. Repeat this step to attach the other pillow block.



Before moving on to the next step, examine the paddle wheel axles. Several notches are taken out of the axle for securing the paddles to the axle and connecting the axle to the couplers. Not all of them will be used. The notches are not numbered on the axle itself but for illustration they are numbered as shown below. The notches are numbered from the inside of the paddle wheel out.

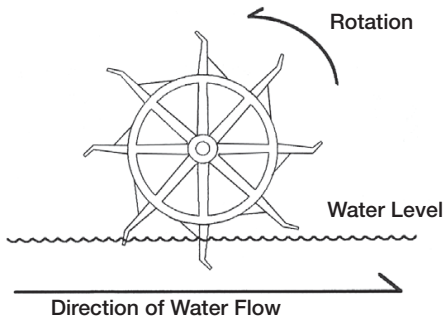


5.0 ASSEMBLY

5.7 Step Seven

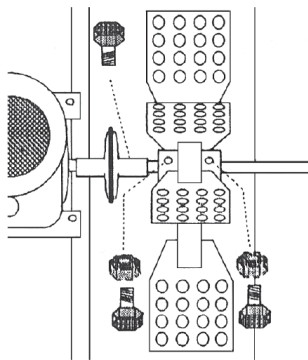
Insert one axle through the pillow block and through one paddle. Make sure the paddle is facing the correct direction as indicated by the water flow on the pontoons and the axle rotation as indicated on the gear reducer.

With correct placement, the paddles should “scoop” into the water when operational.



5.8 Step Eight

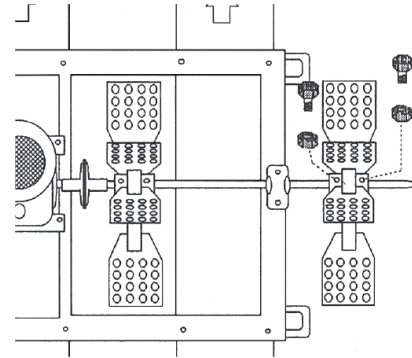
Slide the axle into the coupling. Line up notch number 1 on the axle with the bolt supplied with the coupling and tighten the coupling bolt to attach the axle. Line up notches 3 and 4 on the axle with the holes on the paddle. Use two $\frac{7}{16}$ " x $1\frac{1}{4}$ " bolts and two $\frac{7}{16}$ " nuts to secure the paddle to the axle. Use the nut as a lock nut by first tightening the bolt and then tightening the nut to lock the bolt in place. Repeat this step for the other axle.



5.9 Step Nine

Place an outside paddle on the axle and line up the holes on the paddle with notches 5 and 6. Remember to position them as outlined in step seven. Using two $\frac{7}{16}$ " x $1\frac{1}{4}$ " bolts and two $\frac{7}{16}$ " nuts attach outside paddle to one axle. Tighten the bolt securely and then tighten nut. Repeat step for the other outside paddle.

After proper attachment of the outer paddles there will be about 6 inches of the axle sticking out (notch numbers 7 and 8 are not used). It is not necessary to remove the extra length of axle.

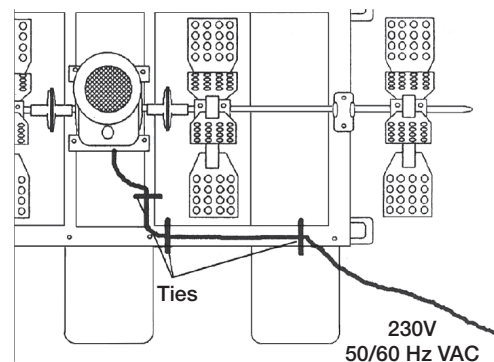


CAUTION

We highly recommend that a qualified electrician install the power cord (sold separately) in accordance with all federal, state and local guidelines. Failure to do so could result in electrocution.

5.10 Step Ten

After having a qualified electrician install the power cord, attach the cord to the frame to eliminate the possibility of the cord getting caught in the paddles during operation.

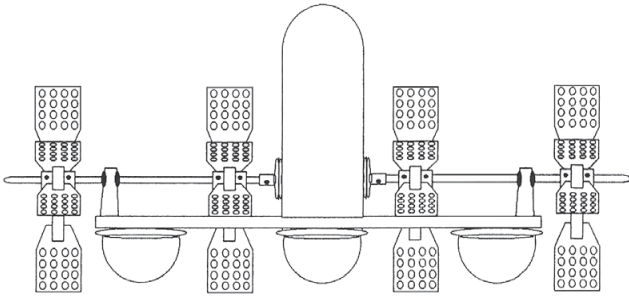


Attaching the cord tightly will also help reduce the possibility of the cord being pulled out of the motor in the event that the paddle wheel is pulled out of position. We suggest black plastic ties or strong waterproof tape.

5.0 ASSEMBLY

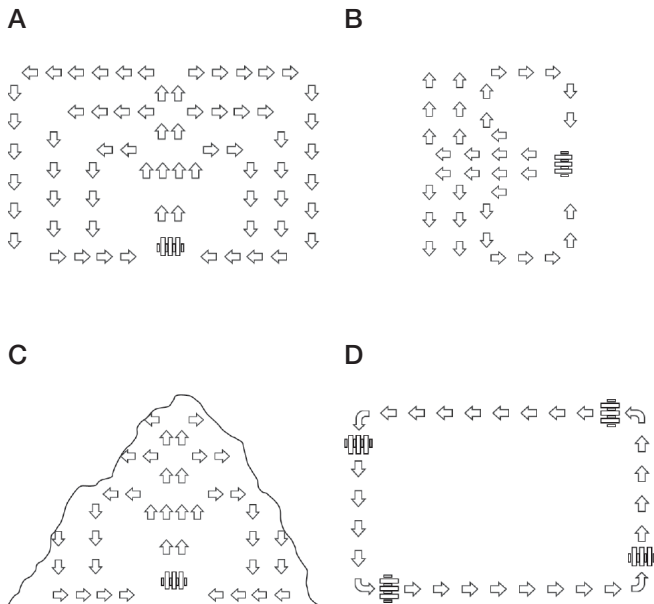
5.11 Step Eleven

Place motor cover over motor. Assembly is now complete.



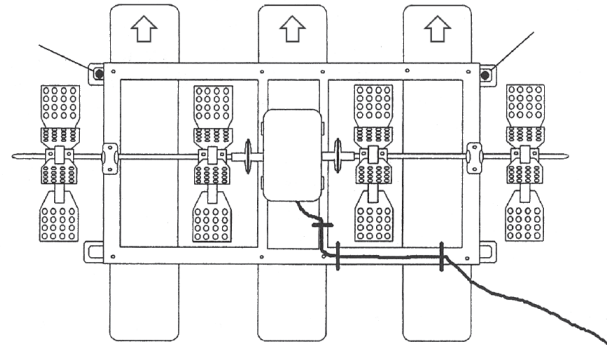
6.0 PLACEMENT

Flow patterns created by paddle wheels are used most efficiently by placing the paddle wheel on the long axis of a rectangular pond with the flow directed out perpendicularly from the pond bank (Figure A). Placing the paddle wheel on a short side of a rectangular pond restricts the flow pattern and reduces aeration efficiency (Figure B).



Be aware of the currents being generated by your paddle wheel. In some installations, particularly in shallow water, it is possible for the paddle wheel to cause bank erosion with prolonged use. Redeployment of the unit may be necessary if erosion is noted.

Under normal operation the paddle wheel exerts such a force back toward the shoreline it is necessary to tie or stake it down in place. Stakes are provided with each paddle wheel. They should be placed through the metal loops on the water outflow side of the frame.



Stakes should be placed as straight up and down as possible so the paddle wheel is able to rise and fall with changing water levels. If extra staking is needed, do not use stakes with a rough surface that could catch the metal loops of the frame and prevent the water level adjustment.



To avoid injury, do not attempt to move the paddle wheel without disconnecting it from its power source.

7.0 MAINTENANCE OF GEAR REDUCER

The gear reducer must be filled with 1.8 liters of SAE 90 gear oil before running (gear oil should already be in unit at delivery). First oil change should be performed at 250 hours of operation; subsequent changes should occur every 2,500 hours or 6 months.

8.0 LIMITED WARRANTY

Pentair Aquatic Eco-Systems, Inc. (PAES) warrants that its products shall, at the time of delivery and for a period of twelve (12) months thereafter, except for filters, be free from defects in materials and workmanship; and, if any such product shall prove to be defective in material or workmanship under normal intended usage and maintenance during the warranty period, upon examination by PAES or its authorized representative, then PAES shall repair or replace, at its sole option, such defective products at its own expense; provided, however, that the Purchaser shall be required to ship each such defective product, freight prepaid, to PAES' designated facility. The warranty on products and/or components not manufactured by PAES, is limited to the warranty, if any, provided by the original manufacturer of said product or component. PAES sole warranty in regard to any components or products that are not manufactured by it shall be limited to the repair or replacement of the product, as set forth herein, with the condition that the Purchaser first return such defective item, freight prepaid, to PAES' designated facility. After PAES has made an inspection of the product, and has confirmed that there is a defect in the manufacture of the product, a credit will be issued to Purchaser's account. PAES HAS MADE NO AFFIRMATION OF FACT AND HAS

MADE NO PROMISE RELATING TO THE GOODS BEING SOLD THAT HAS CREATED OR AMOUNTED TO AN EXPRESS WARRANTY OR THAT THE GOODS CONFORM TO ANY AFFIRMATION OR PROMISE. PAES DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS. PAES SHALL NOT BE RESPONSIBLE FOR ANY CONSEQUENTIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

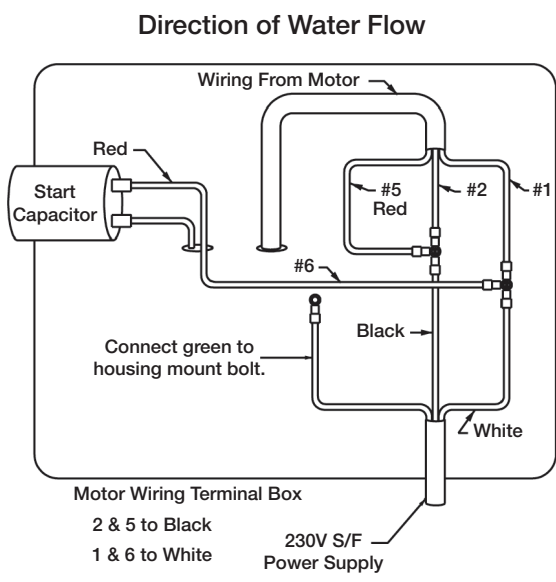
This Warranty does not extend to any Equipment that have been subjected to:

1. Damage caused by careless handling, improper repackaging, or shipping.
2. Damage due to misapplication, misuse, abuse or failure to properly operate equipment.
3. Damage caused by improper installation or storage.
4. Damage due to unauthorized product modifications or repairs.
5. Damage caused by negligence, or failure to properly maintain products.
6. Accidental damage, fire, acts of God, or other circumstances outside the control of PAES.

9.0 PW21 MOTOR WIRING DIAGRAM

Use of electrical tape is required on all terminal connections.

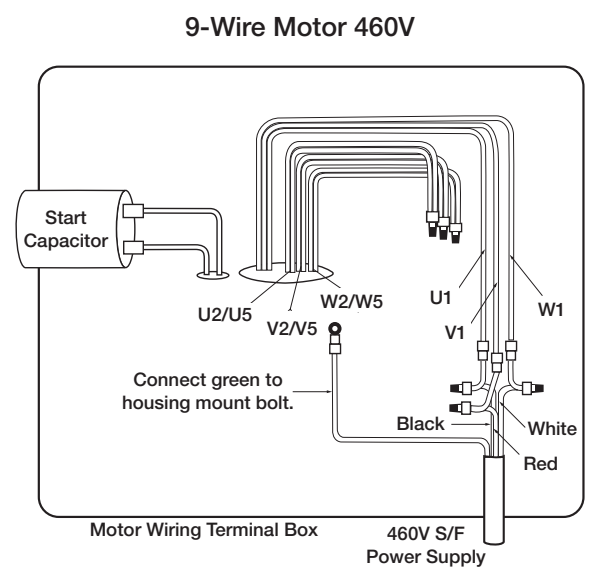
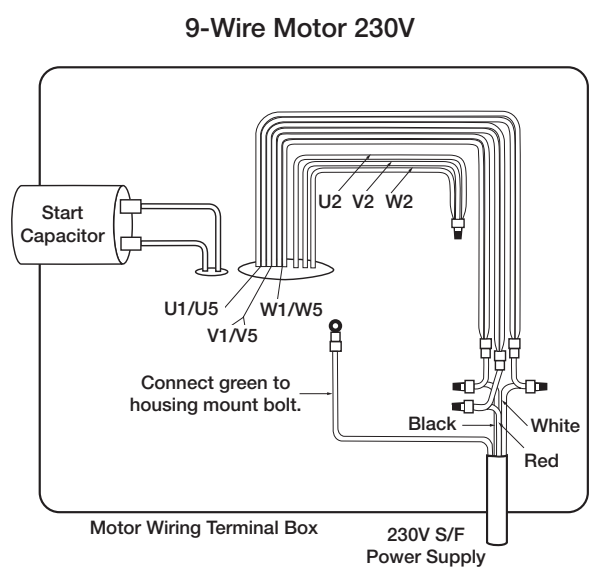
Have a licensed electrician check connections before starting motor.



10.0 PW23 MOTOR WIRING DIAGRAM

Use of electrical tape is required on all terminal connections.

Have a licensed electrician check connections before starting motor.



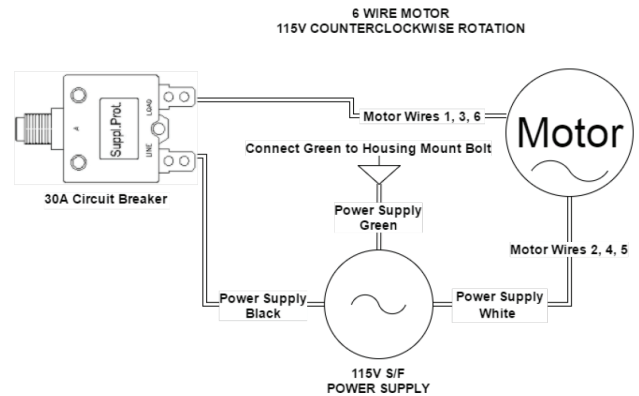
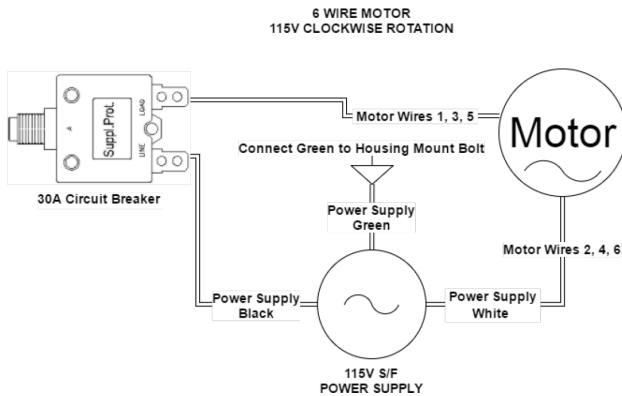
Note: To change the rotation from clockwise to counterclockwise, interchange two of the three power leads.

11.0 PW21 6-WIRE MOTOR WIRING DIAGRAM

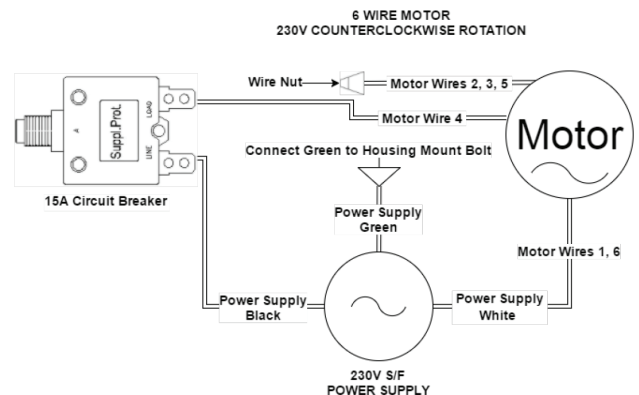
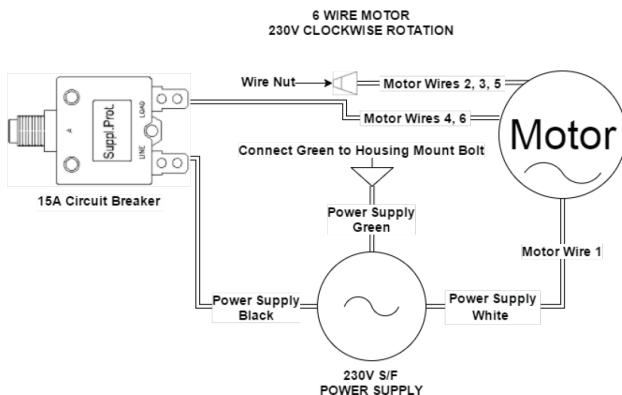
USE OF ELECTRICIANS TAPE IS REQUIRED ON ALL TERMINAL CONNECTIONS.

HAVE A LICENSED ELECTRICIAN CHECK CONNECTIONS BEFORE STARTING MOTOR.

230V Installations require replacing the preinstalled 30 Amp circuit breaker with the 15 Amp circuit breaker provided in the motor conduit box.



FOR 230V INSTALL THE 15A CIRCUIT BREAKER FOUND IN MOTOR CONDUIT BOX.





AQUATIC ECO-SYSTEMS

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