

Phone Number: **Read Troubleshooting Section First!**
 Email: info@gemremotes.com WWW.GEMREMOTES.COM

Warning, DON'T CONNECT WIRES COLOR TO COLOR INSIDE THE MOTOR
Read All Directions Prior To Installation!

Customer user instructions are printed on yellow face card inside the GEM box make sure they read them before use!
Use of other wiring directions could result in damage to your GEM unit and/or the motor.

We have **25** years of experience. We recommend that you read and use the Step by Step Wiring Procedures before starting the installation. It could save you time and money.

Step by Step Wiring Procedures:

To ensure proper installation of your GEM Controller, use our new directions in lieu of all others.

Tools: Philip's #2 and a flat head screwdriver, wire strippers, volt meter and wire cutters and wire nuts.

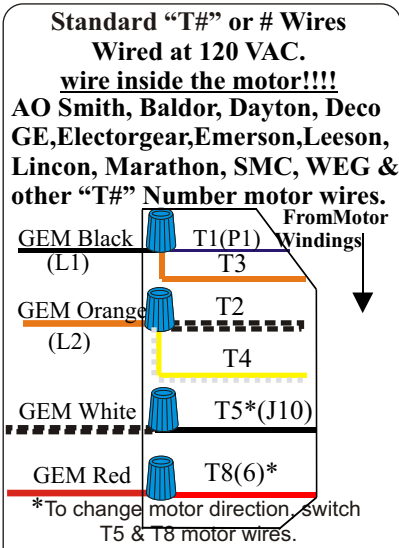
- Turn off power at the circuit breaker.** Overload protection is not provided inside the GEM unit. Use properly sized circuit breaker and wire size based on horsepower of motors. See wire chart below. **Check that you have no voltage with a volt meter.**
- Remove face card screws, open slowly (be careful of the tail on the back side) if necessary remove tail by pulling on black plastic.
- Cut off drum (hand) switches, GEM units are not designed to be used in conjunction with hand switches. Strip main feed and motor wires inside the GEM unit. If your drum switch had a corded GFI, you can use one as the main feed wire(120VAC only). Although we recommend that you hook up your unit at 240VAC Figure 1A (page 2), **if 120vac then see drawing figure 1B (page 4).**
- Main feed black to the Lug on bottom left side of the contactor marked L1 the other main feed 120vac(white) or 240vac(red) goes to Lug L2. If wiring at 240vac with a neutral(120vac) it goes to **Motor white bar on the right side of the box. If a GFI unit, do not hook up the main feed white wire to the Motor white bar. You must hook up your Neutral (120vac) to the GEM supplied white main feed wire. Do not tie motor wires to main feed wires.** If wiring at 120 the GEM supplied white wire goes to L2 use the spare yellow crimp on L2 (GFI units will be pre wired do not touch transformer wires). **Do not attache the GEM supplied white wire to L2 if powered at 240VAC.** If your unit is a GR4 or a special order 240VAC only then you will not have white wires or a motor white bar.**
- Connect Motor #1 wires to Lugs on bottom right side of the contactor as labeled: **Motor #1 Red(top), Motor#1 Black(middle), Motor #1 Org(bottom).** Motor #2 wires if a 2 motor system attach, wires color to color inside the GEM unit using wire nuts. **(Not color to color inside the motor!)** **If your lift has 1 motor and you where sold a Gr2 then don't use Motor 2 wires.**
- Connect green or bare wires to Green wire on transformer. Green or bare wires must only be used as a ground. **It is unsafe to use a ground as a neutral. When wiring at 120 VAC Connect Motor white wires to GEM motor neutral bar (Not used for 240VAC).... Do not hook motor wire to main feed white wire!**

| Recommended Wire Size for Installation of your GEM Controller-1 Phase,75C Copper Wire | | | | | | | | | | | | | | | |
|---|----------|-----------------------|--------------|---------|----------|----------|----------|----------|-----------------------|--------------|---------|----------|----------|----------|----------|
| # of Motors | Motor HP | 120 Volt AC Main Feed | | | | | | | 240 Volt AC Main Feed | | | | | | |
| | | Amps to run | Breaker Size | 50 Feet | 100 Feet | 200 Feet | 300 Feet | 400 Feet | Amps to run | Breaker Size | 50 Feet | 100 Feet | 200 Feet | 300 Feet | 400 Feet |
| 1 | 1/2 | 8.8 | 10 Amps | 12 | 10 | 6 | 4 | 4 | 4.4 | 5 Amps | 14 | 14 | 12 | 10 | 10 |
| 1 | 3/4 | 10.8 | 15 | 12 | 8 | 6 | 4 | 3 | 5.4 | 10 | 14 | 14 | 12 | 12 | 10 |
| 1 | 1 | 12.8 | 15 | 10 | 8 | 6 | 4 | 3 | 6.4 | 10 | 14 | 14 | 12 | 12 | 10 |
| 1 | 1 1/2 | 17.0 | 20 | 10 | 6 | 4 | 2 | 1 | 8.5 | 10 | 14 | 14 | 10 | 10 | 8 |
| 2 | 1/2 | 17.6 | 20 | 10 | 6 | 4 | 2 | 1 | 8.8 | 10 | 12 | 12 | 10 | 8 | 6 |
| 2 | 3/4 | 21.6 | 25 | 8 | 6 | 3 | 1 | ---- | 10.8 | 15 | 12 | 12 | 10 | 8 | 6 |
| 2 | 1 | 25.6 | 30 | 8 | 4 | 2 | 1 | ---- | 12.8 | 15 | 12 | 10 | 8 | 6 | 4 |
| 2 | 1 1/2 | 34.0 | 35 | 6 | 4 | 1 | 2/0 | ---- | 17.0 | 20 | 12 | 10 | 8 | 4 | 2 |
| 4 | 1/2 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 17.6 | 20 | 12 | 10 | 6 | 4 | 4 |
| 4 | 3/4 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 21.3 | 25 | 12 | 8 | 6 | 4 | 3 |
| 4 | 1 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 26.0 | 30 | 10 | 8 | 4 | 3 | 2 |
| 4 | 1 1/2 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 36 | 35 | 10 | 6 | 4 | 2 | 1 |
| 4 | 2 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 44.8 | 45 | 8 | 6 | 3 | 1 | 1/0 |

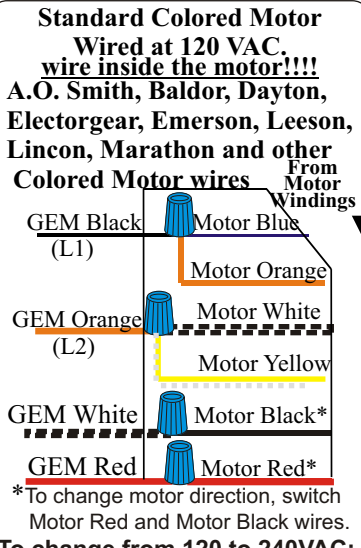
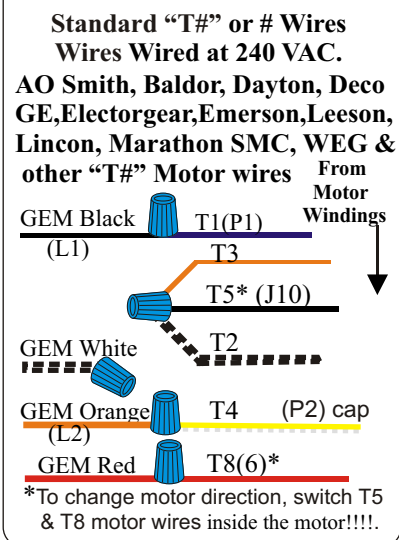
Breakers size is our recommendation. Please use motor label for proper size and code compliance.

- Open motor covers and configure motor wires as shown below. **Inspect wires inside each motor to ensure proper wire connections.** Failure to do so could damage your motors. **You may have to move wires inside the motor even though the drum switches worked.(AO Smith motor)** To reverse motor starting direction, swap wires **inside the motor!** Some motors have circuit protection and output wires from these might have different color wires. Also, some motor manufacturers pre-wire their motors with wires that don't match GEM wires. Some use blue as a ground, and yellow for white wires as a substitutes. If your motor has terminals inside, check for that motor diagram on the next page otherwise use the Standard T Numbered Wire motor chart or the Standard color motor wire chart below. **AO Smith 120/240 vac wired with terminals is below on the right, AO Smith 120 vac only motors is on next page.**
- If your unit is an Auto-Stop unit read those directions. Your GR_A_ will not work without the limit switch wires hooked up. **Check that your lift stops in both the up and the down direction! An Auto-Stop unit must be hooked up to a GEM limit switch. Failure to do so could result in damage to your lift and/or the boat and is against code and not insured.** Notice the auto stop LED on the top of the unit. When the LED is lit then the unit is in Auto Run mode, if flashing fast the lift is at the up limit and if slow then the lift is at the down limit. **To toggle in and out of this mode press the Auto-Stop(run) button.**
- Attach the new face card electronic tail to the receiver board, pin #1 goes on the left, replace face card screws.
- To level the lift, turn off the Auto mode(if **equipped**). Hold the level switch in the off position. This will turn power to motor #2. While holding it down raise or lower one side. **Do not let go of the level switch until the motor #1 side is stopped.**
- Turn off the unit when not in use. Make sure the owner reads operating instructions printed inside the GEM box on the yellow face card. Test the GFI** (if equipped) once every month and before each use. GEM's GFI Needs a Neutral (120vac) to work. Emergency override hole disables GFI protection and if bussing the GFI can be damaged. This units has a 3 second delay before switching directions. This ensures that the motors turn in the right direction. **Main Feed Connections**
- A replacement transmitter (#7240) or a spare can be bought online at www.gemremotes.com. Loss of **240VAC WIRING** range or unit hiccups check battery, 2: 3 volt (Cr2032). Old #6230 will not work with this unit

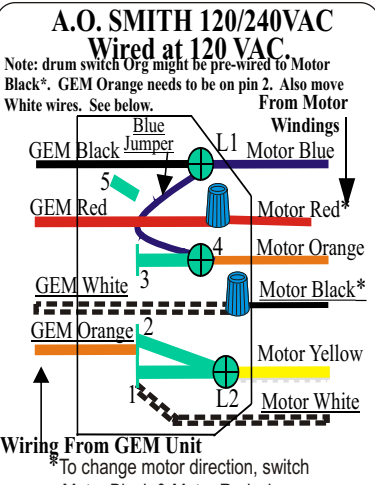
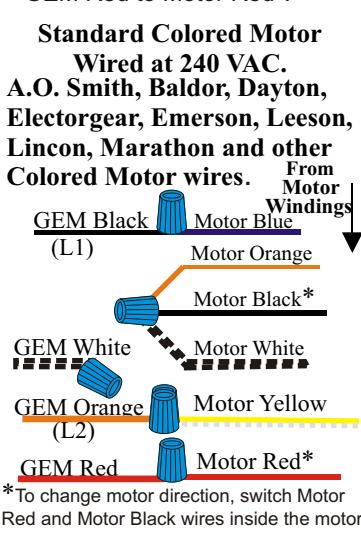
Note: drum switch wire Org might be pre-wired to Motor Blk(T5)*. GEM Org needs to be attached to Pin2 or Motor Yel/T4.



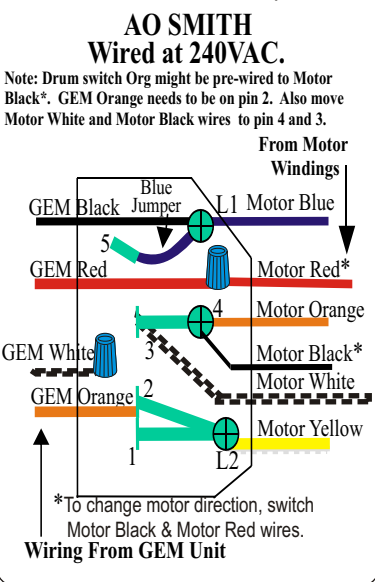
To change from 120 to 240VAC:
1. Cap GEM White wire (not used).
2. Attach 3 motor wires together T3, T5* and T2.
3. FYI: GEM Blk to T1(P1), GEM Org to T4, GEM Red to T8(6)*.



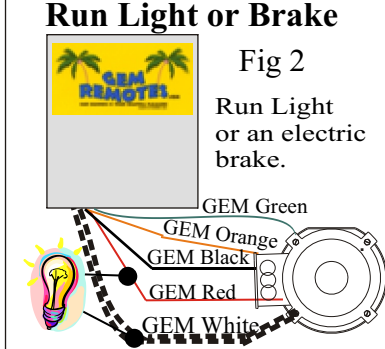
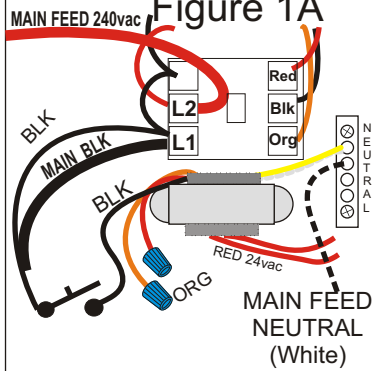
To change from 120 to 240VAC:
1. Cap GEM White wire (not used).
2. Attach 3 motor wires together M Org, M Blk* and M White.
3. FYI: GEM Black to Motor Blue, GEM Orange to Motor Yellow, GEM Red to Motor Red*.



To change from 120 to 240VAC:
1. Cap GEM White wire (not used).
2. Place Motor Black on pin 4.
3. Move Motor Blue jumper from pin 4 to pin 5.
4. **GEM Orange is on pin 2!!!!!!**
5. Move Motor White from pin 1 to 3.

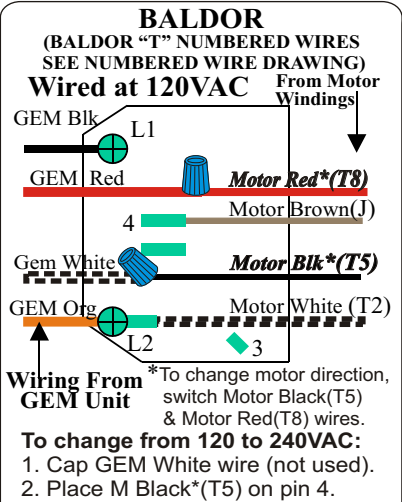


Hook your Main feed white wire to motor white bar. If you don't have a Neutral (120vac) rewire transformer see page 4 line 13.



Attach the run light to the GEM Red & GEM White for 120VAC or 240 VAC systems that has a 120VAC neutral.

To run a 120VAC brake attach wires to GEM Orange and GEM Black when main feed is at 120VAC. If 240VAC brake is used, use GEM Orange and Blk. If you have 240VAC system and you only have a 120VAC brake then you must use GEM White & GEM Red. (The GEM white wire will be used at 240VAC).

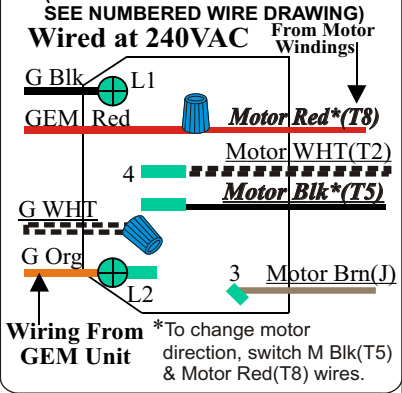


Wiring From GEM Unit

*To change motor direction, switch Motor Black(T5) & Motor Red(T8) wires.

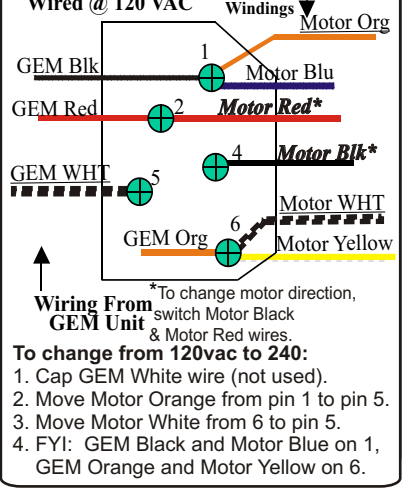
To change from 120 to 240VAC:

1. Cap GEM White wire (not used).
2. Place M Blk*(T5) on pin 4.
3. Move M Brn(J) from pin 4 to pin 3.
4. Move M WHT(T2) from L2 to pin 4.



Wiring From GEM Unit

*To change motor direction, switch M Blk(T5) & Motor Red(T8) wires.

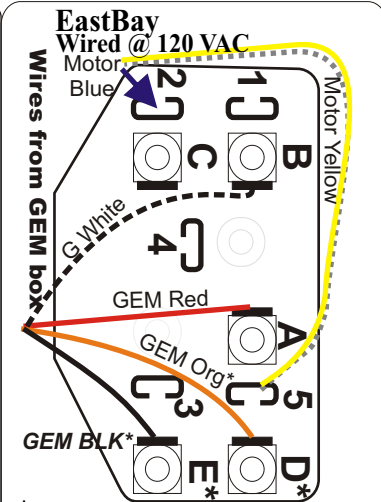


Wiring From GEM Unit

*To change motor direction, switch Motor Black & Motor Red wires.

To change from 120vac to 240:

1. Cap GEM White wire (not used).
2. Move Motor Orange from pin 1 to pin 5.
3. Move Motor White from 6 to pin 5.
4. FYI: GEM Black and Motor Blue on 1, GEM Orange and Motor Yellow on 6.

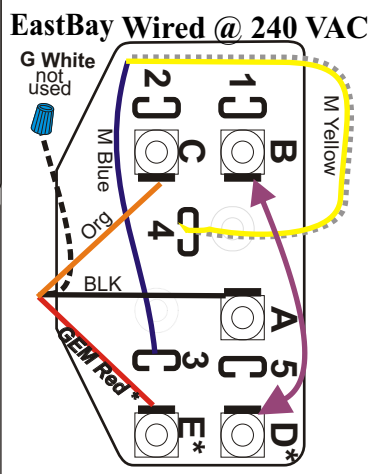


Wires from GEM box

*To change motor direction, switch wires on D&E(GEM Org & GEM Black)

To change from 120vac to 240:

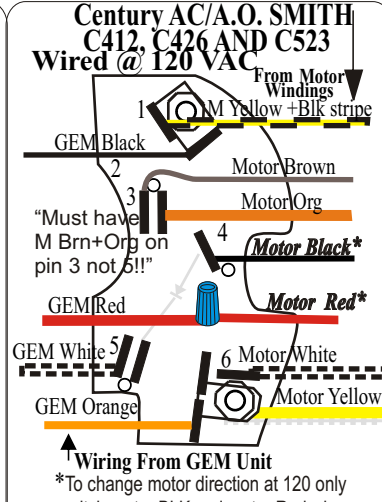
1. Cap GEM White wire (not used).
2. Move Motor Blue from 2 to 3.
3. Move Motor Yellow from 5 to 4.
4. Move GEM Org from D* to C.
5. Move GEM Blk from E* to A.
6. Move GEM Red from A to E*.
7. Make a Jumper wire and place on pin B and Pin D*.



Make a JUMPER WIRE and go between B & D Terminals

*To change motor direction, reverse wires on D & E (Jumper wire and red).

EastBay 2 cap. Motors, cap start and cap run are compatible with GEM units.

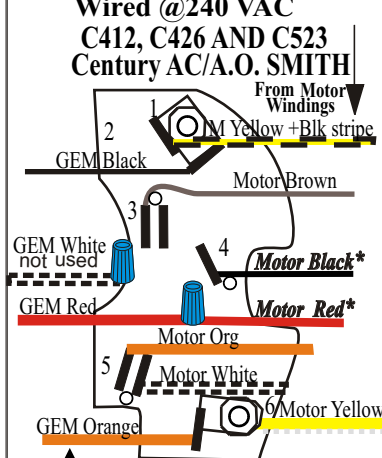


Wiring From GEM Unit

*To change motor direction at 120 only switch motor Blk and motor Red wires.

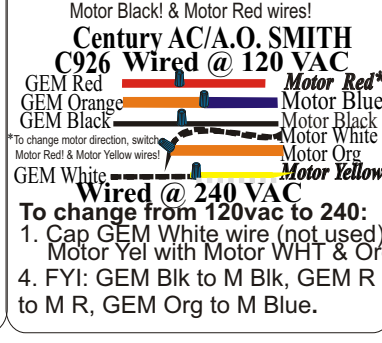
To change from 120vac to 240:

1. Cap GEM White wire (not used). Motor black on 4.
2. Move Motor Org from 3 to 5.
3. Attach M Whit & M Org on pin 5.
4. FYI: GEM Org & M Yellow on 6.



Wiring From GEM Unit

*To change motor direction, switch Motor Black! & Motor Red wires!

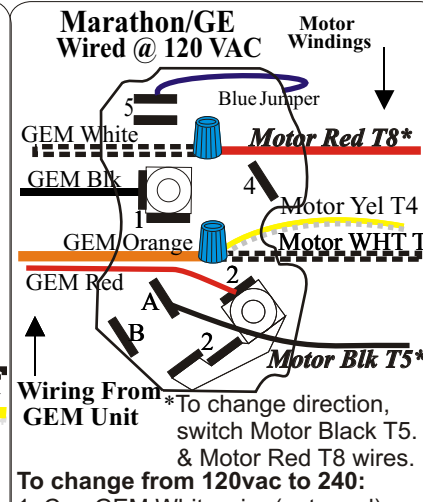


Wiring From GEM Unit

*To change motor direction, switch Motor Blk and Motor Red wires.

To change from 120vac to 240:

1. Cap GEM White wire (not used). Motor Yel with Motor WHT & Org.
4. FYI: GEM Blk to M Blk, GEM R to M R, GEM Org to M Blue.

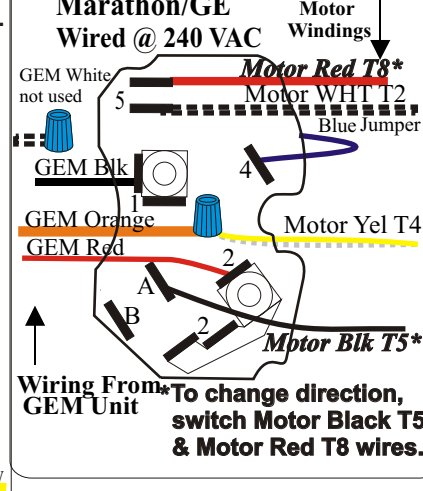


Wiring From GEM Unit

*To change direction, switch Motor Black T5. & Motor Red T8 wires.

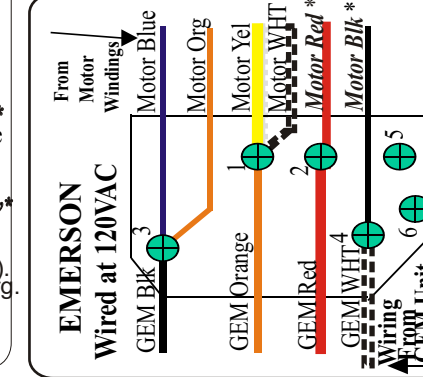
To change from 120vac to 240:

1. Cap GEM White wire (not used).
2. Move Blue Jumper from 5 to 4.
3. Attach MWht & MRed*(T8) on pin 5.
4. FYI: GEM Org & M Yellow together.



Wiring From GEM Unit

*To change direction, switch Motor Black T5. & Motor Red T8 wires.

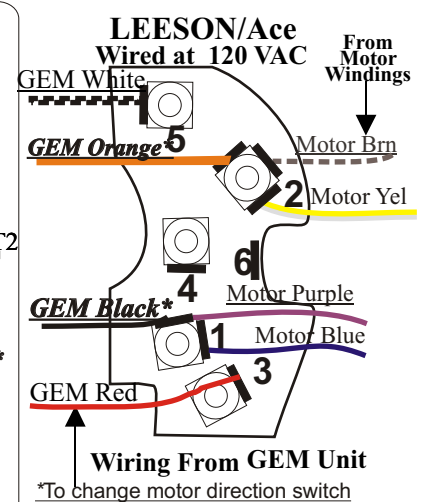


Wiring From GEM Unit

*To change motor direction, switch Motor Blk and Motor Red wires.

To change from 120vac to 240:

1. Cap GEM White wire.
2. Attach 3 m wires on 4 M WHT, M Blk* & M Org.
3. FYI: GEM Blk & Motor Blue on 3, GEM Org & Motor Yellow on 1 GEM Red & Motor Red* on 2.

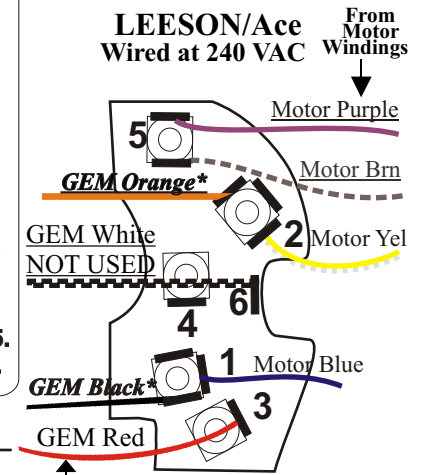


Wiring From GEM Unit

*To change motor direction switch GEM Org & GEM Blk wires

To change from 120vac to 240:

1. Move GEM White from pin 5 to 6.
2. Move motor Purple wire from 1 to 5.
3. Move motor Brown wire from 2 to 5.
4. *To change direction of the motor switch GEM Org & GEM Black wires.



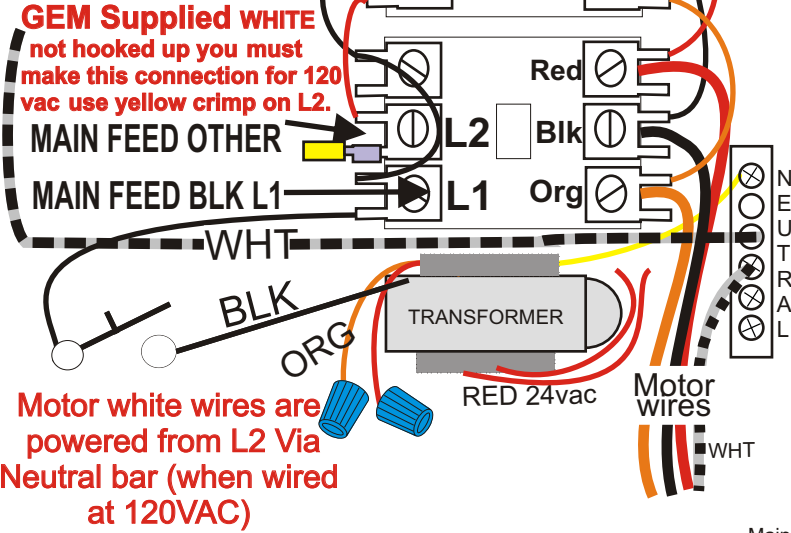
Wiring From GEM Unit

*To change motor direction switch GEM Org & GEM Blk wires

To change from 120vac to 240:

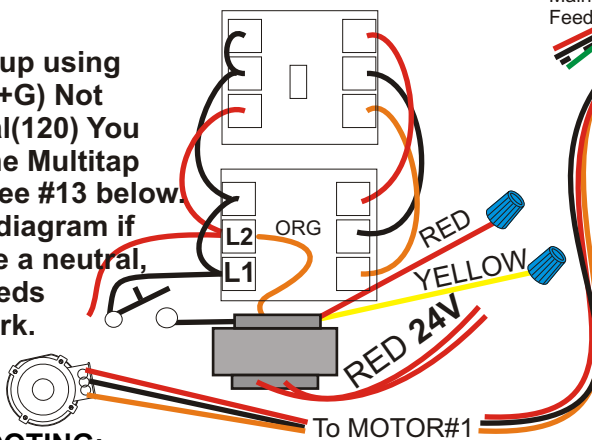
1. Cap GEM White wire.
2. Attach 3 m wires on 4 M WHT, M Blk* & M Org.
3. FYI: GEM Blk & Motor Blue on 3, GEM Org & Motor Yellow on 1 GEM Red & Motor Red* on 2.

Figure 1B
Wired at 120VAC
(2wires+ground)
MAIN FEED 120vac



Motor white wires are powered from L2 Via Neutral bar (when wired at 120VAC)

240 Volt hook up using only 3 wires(2+G) Not using a neutral(120) You must rewire the Multitap Transformer see #13 below. Only use this diagram if you don't have a neutral, GEM GFI's Needs 120VAC to Work.



TROUBLESHOOTING:

1. If your remote works but you membrane switch buttons don't work you need to plug in the M/S tail to the receiver board.
 2. You must **cut off drum switches**: They worked, but the GEM unit only works in 1 direction; You need to rewire inside motors, Note GEM Org wire.
 3. **1 or 2 motors turn in the wrong direction**: Switch **motor wires**, wires inside the motor, check motor name plate.
 4. **Chatter or grumble in the contactor**: Check for low voltage, when system is running (override by pushing in contactor). Check wire size vs. run length all the way from the motors to the breaker at the house. Example 2 3/4hp motors wired at 120vac 180' would need a #3 wire to the GEM unit. The motor wire size would come from the #1 motor chart. Use total distance from the motor to the breaker. 1 3/4hp motor wired at 120vac 200' would = # 6
 5. **Motor not working**: Color-to-Color wiring inside the motor is incorrect. You must use GEM's motor wire diagrams. **A.O. Smith motors, move GEM Orange wire to pin 2.** GEM units works with 120/240VAC 1 phase, cap. start, induction run motors. Three phase motors require special order. 1 1/2 horsepower motors and larger can have a cap. start and a cap. run. The run cap. might not reverse or the run cap. can explode. It must be removed, this will increase the run amps that the motor will draw by 3 amps (Eastbay motors, 2 cap systems are compatible).
 6. A transmitter **does not work** a 3-second delay when switching direction, or check that LED on transmitter lights and check learn button LED lights when receiving from the transmitter. Relearn the transmitter, press the learn button 1 time and then push the Stop button the Learn LED should flash.
 7. **Short range or lift hiccups**: If the red LED on the transmitter flickers, **replace the batteries 2: 3Volt CR2032.** Do not change the length of the antenna wire. This will not help the range. Metal hurts the range, you should have line of sight for the unit to have a 300-foot range.
 8. If the GEM unit is dead check that the LED flash on powered up. If no flash then check your power you can also press in the middle of bottom contactor if the lift runs, you have main power but your 24 VAC transformer is not working (check neutral). **Auto-Stop units must be hooked up to a limit switch.** A fast flash on the LED means that the up limit is reached a slow flash is for the down limit. If the led is flashing fast then slow then both limits are open check to see if it hooked up. **It is against code and not covered by insurance to be used without a GEM limit switch.**
 10. **Clearing the memory**: Press and hold the Learn/Clear button for 7 seconds (LED will light) when the LED flashes stop pressing and transmitter memory will be cleared. Press the learn button the LED will light up, then press the Stop button on the transmitter the Learn LED will flash 2 times.
 11. **TROUBLESHOOTING: GFI needs a neutral. 2004 GFI will not reset if it has a fault or is not getting 120VAC.** Disconnect all motor wires, check to see if the GFI resets, press up and down note contactor pulling in, then hook up 1 motor at a time to find the fault. Problems are normally the far motor.
 12. **TROUBLESHOOTING: Wiring at 110-120VAC: Motor Hum: Connect the neutral bar/motor white to the main feed red (L2).** See figure 1B. Use Gem supplied white wire and attach to **main feed red (L2)**. Over sizing the circuit breaker can damage your lift, motors and/or the boat. Use the correct size circuit and wire size. Use wire chart on page 1.
 13. **TROUBLESHOOTING: Wiring at 220VAC-240VAC 50 to 60hz:** 4 motor or special order **240V only** do not have a **Neutral bar unless a GFI unit.**
 1. Unless the GEM unit is specifically ordered for 240VAC, 3+ground wire main feed is required. If you don't have 3+G then you will need to rewire the system for 240VAC only (2+Ground). **A GFI unit needs 120 to work so don't rewire transformer.** Read the label, on top of the transformer BLK-ORG = 240 VAC. Remove yellow wire from Neutral bar and cap it off. Find ORG transformer wire, it should be hiding around the base of the contactor it has a red wire taped to it. Attach the Org transformer wire to the main feed red on L2. The red wire taped to this wire is used for 208 connections.
 14. **TROUBLESHOOTING: Wiring at 208VAC:** Rewire the transformer. Read label on transformer BLK-RED =208 Remove yellow wire from neutral bar and cap it off. Find ORG transformer wire, it should be hiding around the base of the contactor it has a red wire taped to it. Attach Red transformer wire to main feed Red. The ORG wire that it is taped to is for 220 connections. GFI units need a 120 to work make sure you have 120.
- Need more help?** Call 239-642-0873 M-F 8:30-4:30 EST. The web page also has more information for after hours help.

This exploded view is inside the inspection panel of an A.O. SMITH motor wired at 120VAC to a GEM GR2A. GEM ORANGE WIRE IS ON PIN 2!!! See previous pages for more motor wire diagrams.

