Section VIII

Electrical Instructions Standard

ELECTRICAL WIRING AND CONNECTIONS

1.1 All electrical work must be done by a licensed electrician in accordance with all local building and electrical codes. A schematic wiring diagram is provided (located in the rear of this "Electrical Wiring and Connections" section). A copy of the wiring schematic is also located on the inside door of the AC Tech controller. **IMPORTANT NOTE: It is extremely important that the proper voltage be present. A voltage of 230V is ideal. If your voltage reading is less than 208V, it is possible that the electrical equipment will not function properly. If your voltage is 208V or lower, SwimEx highly recommends a transformer be installed to raise the line voltage to 230V. However, if raised, this line voltage cannot be over 245V. In-line "buck-booster" transformers are relatively inexpensive and work very well.**

The paddlewheel electric motor is started, stopped, and speed-controlled by an electronic AC controller built into an enclosure and hereafter referred to as the AC Tech controller. **This controller converts 240V single phase to 3 phases in order to power the paddlewheel motor. For future needs, if warranted, save the box and inside packing material that the AC Tech controller was shipped in.** The swimmer controls (fast, slow, stop, start) are connected to the AC Tech controller (or Current Monitor Sub box if this option is selected) with four 1/8" diameter air hoses. (See **2.1** and **2.2** of this section).

1.2 Wire the heater to a 240 Volt AC, 60-Hz-single phase power using a 30 amp, 2 pole GFI breaker. For gas units, use a 15 amp, 2 pole GFI breaker. Wire the pump to a 120 Volt AC, 60 Hz-single phase power using a 15 amp, 1 pole GFI breaker. This unit must be properly grounded. Refer to manufacturer's instructions included with this unit. (See Plumbing Section)
NOTE: For convenience, "on-off" switches can be installed for the heater and pump.

1.3 If the Ozonator option is installed, it is plugged into a 120 volt, 15 Amp GFI service in accordance with the manufacturer's instructions.

Refer to the electrical diagrams for other requirements. All bonding, electrical and important safety instruction grounding connections must be wired according to local electrical and building codes.

1.4 All metal equipment, or accessible metal hardware must be bonded to the "bonding lug" of the heater, pump, & filter units (supplied & installed), as this is the dedicated connector (grounding buss). Use bonding lugs to bond each separate metal hardware or piece of equipment. The front and rear grille and grate require 1 bonding lug each using 1/4" Burndy. The ladder must be bonded at both (2) side rails using 1/2"

Burndy, and each hand rail (front and/or side rails) must be bonded in at least one place with 1/4" Burndy. The wiring and bonding of all electrical equipment and metal hardware must be done by a licensed electrician and to the acceptability of the local inspection authority. This ground buss must be permanent ground that is acceptable to the local inspection authority. See Diagrams for the electrical wiring, grounding and bonding schematics.

CONNECTING PNEUMATIC (AIR) CONTROLS

2.1 Make all connections between the AC Tech controller and the pneumatic swimmer controls (buttons) on the pool using the 100 feet of 1/8" air tubing supplied (cut this line into four lengths of 25').If the optional Current Monitor was purchased, connect the air tubes on the sub box of the monitor setup. These lines should run by the shortest practical route from swimmer controls to AC Tech controller with 25 feet being the maximum distance. Find the hose barb connection on the rear side of the swimmer control buttons which are located at the front of Section U4 and were installed in the Assembly Section. Push one end of the 1/8" hose over the barb on the START button. Route this hose to the bottom of the AC Tech controller or Current Monitor sub-box and cut it to the proper length. (Allow enough slack for later bundling and mounting out of the way.) Now push the end of the 1/8" hose over the hose barb on the switch labeled START on the underside of the AC tech controller. The FAST and SLOW hoses are run in the same manner, making certain to connect the FAST button to the FAST switch and the SLOW button to the SLOW switch.

2.2 The STOP button hose must be "Teed" together with the REAR STOP BAR hose. The 20' section of 1/8" hose for the Rear Stop Bar is shipped separately from the 100' described above. This Tee connection can be made anywhere between the swimmer control button and the AC Tech controller or Current Monitor sub-box. However, the total length of the hoses must be less than 35'. Try to locate the tee so the hose that runs from the tee to the REAR STOP BAR will be as short as possible. With the above in mind, connect one end of the hose from the STOP button to one leg of the tee. Run the 20' air tube through the "thru-hole" located next to the skimmer, and connect it to the hose barb on the top end of the REAR STOP BAR located on Section U1. Connect the other end of the hose to one of the remaining legs of the tee. (See Blueprints) Connect another hose to the remaining leg of the tee, and run it to the AC Tech controller or Current Monitor sub-box and connect it to the switch labeled STOP. Now that all the air lines are run, they should be strapped together forming one bundle and mounted out of the way. Be careful not to crimp, pinch, or impede the lines in any way.

AC TECH INSTALLATION & START-UP MANUAL

INSTALLATION GUIDE FOR MC SERIES AC TECH VARIABLE SPEED DRIVE

3.1 * Read this entire manual before starting any work.
* Follow and thoroughly complete the instructions detailed below.
* A licensed electrician must perform all of the electrical wiring and connections to our specifications. Failure to do so will void the warranty on the AC Tech controller and the paddlewheel motor.

3.2 Mount the AC Tech controller in a cool and dry indoor location where condensation does not occur and where the 25 ft. air hoses from the swimmer controls (located on the front inside wall of Section U4) can comfortably reach the AC Tech controller. Try to keep the controller as close to the paddlewheel motor as possible with a maximum wire distance of 10 feet. Keep the sides, top, bottom, and rear of the AC Tech controller enclosure clear of obstructions to permit free air circulation through the side heat sink. This heat sink must not touch any surface. Keep the box away from heating pipes that could cause the box to heat up abnormally.

WARNING: High voltages are present within the AC Tech controller, and therefore it must be mounted in a location where splashing does not occur, and where a wet swimmer cannot touch it.

3.3 Wire the controller to 240 Volt AC, 60 HZ single phase power using a 40 amp, 2 pole GFI breaker. (For the 7.5HP motor, a 60 amp GFI breaker must be used.) Although the AC Tech controller functions properly at a line voltage above 208V, SwimEx and AC Tech recommend a line voltage of at least 220V (ideal - 230V, but no greater than 245V.)

IMPORTANT NOTE: DO NOT DRILL ANY HOLES IN THE AC TECH CONTROL BOX - USE KNOCK-OUTS LOCATED IN BOTTOM OF BOX.

3.4 Wire the motor to the controller (Follow the guidelines and specifications in Section 3.5) using #8 copper wire (#6 for the optional 7.5 HP unit) run in rigid or liquid-tite flexible PVC (non-metallic) conduit. Be sure to wire the motor according to the low voltage diagram on the motor plate. (See Paddlewheel Motor Wiring Diagram located in the rear of this section.) **THE LOW VOLTAGE WIRING DIAGRAM MUST BE FOLLOWED OR SEVERE MOTOR DAMAGE WILL OCCUR.** **Note:** Some motors are already preset for 230V use only. At the terminal of the motor, there will be only three (3) wires, instead of nine (9). Each of the three hot leads coming from the AC Tech controller must be connected to one of the three wires in the motor terminal. The liquid-tite flexible conduit must be used near the

motor to permit free flexing as the motor moves slightly during operation. **DO NOT USE METAL CONDUIT BETWEEN THE CONTROLLER AND THE MOTOR.** The motor has three leads plus a ground. The motor should **never** be wired directly to a three phase supply, or the machine may be seriously damaged. **WARNING: A quick disconnect system must not be used between the GFI circuit breaker and the controller, or between the motor and controller. Motor thermal overload protectors must not be used either.** Such disconnection during operation will damage the electronic AC controller.

3.5 Guidelines for wiring the AC Tech controller to the paddlewheel motor using a GFI breaker:

** DO NOT DRILL HOLES IN THE AC TECH CONTROL BOX- USE THE "KNOCK-OUTS" LOCATED ON THE BOTTOM OF THE BOX- (THE WARRANTY WILL BE VOIDED IF HOLES ARE DRILLED IN BOX) **

A. Use liquid tite PVC conduit with an 18" flexible section at the motor connection - DO NOT USE METAL CONDUIT.

B. Run four (4) individual wires within the conduit - do not bundle wires or use an encased cable wire.

C. Place the AC Tech controller as close to the motor as possible, with a maximum wire length of 10 feet.

D. Use appropriate sized circuit breaker. For the standard 5HP drive system - 40 amp GFI. For the optional 7.5HP drive system - 60 amp GFI.

E. The controller must be mounted at least 5 feet away from the inside wall of the pool. (Measure around walls, floors, etc., as they are considered barriers.)

F. Wire Size - for the standard 5HP drive system - #8 AWG 75° C Wire, for the optional 7.5HP drive system - #6 AWG 75° C Wire.

Keep ground wire isolated -- do not bond anything to the motor or the controller other than the ground between the controller and motor.

3.6 Before energizing the AC Tech controller, check to ensure that the following has been done:

a) Licensed electrician has properly wired the 240V (single phase) to the "Power In" terminals located at the top right of the AC Tech control box. (See the AC Tech Controller diagram located in the rear of this section.)

b) Licensed electrician has properly connected the 3 phase wiring from the AC Tech unit (located at bottom right of control box labeled "Power Out") to the paddlewheel motor using the proper size wire and length. Make sure the electrician has followed the **LOW VOLTAGE** wiring diagram (located on the paddlewheel motor plate) when wiring the 3 phase, 240V to the paddlewheel motor.

c) All electrical equipment and all metal components have been properly grounded per electrical wiring diagrams and appropriate local codes.

d) All four (4) air tubes plus the rear stop bar are properly connected between the swimmer controls and the four (4) sensors located on the bottom lip of the AC Tech control box.

e) All plumbing connections, joints, etc. are secured and water tight.

f) The SwimEx pool is properly filled with water (see Plumbing Section) and that the filtration system is wired correctly and functioning properly.

g) You have familiarized yourself with the AC Tech controller diagram.

NOTE: Use the AC Tech Manufacturer's Manual for reference only. The information needed to wire the controller is contained in this manual.

IMPORTANT NOTES: DO NOT DRILL ANY HOLES IN THE AC TECH CONTROL BOX - USE KNOCK-OUTS LOCATED ON BOTTOM OF BOX. MAKE CERTAIN THAT THE STEPS OUTLINED IN SECTION 3.5 HAVE BEEN COMPLETELY FOLLOWED OR WARRANTY WILL BE VOIDED.

3.7 After all of the above items have been completed and checked, turn on the circuit breaker to the controller (60 Amp GFI for the 7.5HP system, or 40 Amp GFI for the 5HP system).

WARNING: IF YOUR VOLTAGE IS GREATER THAN 240V OR LESS THAN 208V - TURN OFF BREAKER IMMEDIATELY AND CALL SWIMEX. ALSO, SET YOUR VOLT METER ON THE LOWEST SCALE. TEST FOR ANY CURRENT LEAKAGE THROUGH THE GROUND WIRE AT THE AC-TECH INCOMING GROUND TERMINAL. NO CURRENT CAN BE PRESENT OR THE CONTROLLER WILL NOT FUNCTION PROPERLY. IF YOU HAVE CURRENT LEAKAGE ON THE GROUND, THIS MUST BE CORRECTED BEFORE YOU CAN CONTINUE.

**Once the drive is wired to the manufacturer's directions, the following must be completed to calibrate and set the drive. If the customer has purchased the Current Monitor, please refer to instructions in Section X to set up the drive prior to performing the calibration below. These steps will set the high frequency limit for the drive. Adjusting the drive to maximum frequency and then speeding up the drive to 100% load will do this. Once at 100% load we must note the frequency and re-enter the drive to readjust the frequency.

Depress button	**Drive reads (Highlighted shows blinking cursor)**
PROG. / RUN	Password 0000
↑	Password 0001
ENTER	Max Freq 52.00Hz
ENTER	Max. Freq 52.00Hz (Hold in ↑# will increase)
↑	Max Freq **60.00**Hz
ENTER	Max Freq 60.00 Hz
↑	Carrier Freq. 750/24x (Only if older breaker)
↑	SwimOMeter Disable (If using a swimometer please follow, if not skip this step by pressing ↑)
ENTER	SWIMOMETER DISABLE
↑	Swimometer Enable
ENTER	SwimOmeter Enable
PROG/ RUN	**Stop 5.0 Hz**
ENTER	**STOP 0% Load**

Using the air controls for the pool press **START**
Make sure that the shaft is rotating counter clockwise
If not press **STOP,** turn off all power and switch T1 and T2 within the AC TECH
Press **START**
Press **FAST** until drive reads close to **100% Load**On Drive
Press **ENTER** **200VAC**
Press **ENTER** ____**Hz** Write how many Hz at 100% Load.

On Pool Press **STOP** Button

RETURN TO DRIVE

Depress button	**Drive reads (Highlighted shows blinking cursor)**
PROG/RUN	Password 0000
↑	Password 0001
ENTER	Max Freq 60.00Hz
ENTER	Max Freq 60.00Hz
↑↓ to adjust to # which you wrote down.	
ENTER	Max Freq XX.XX Hz
PROG/RUN	**Stop** **5.00 Hz**

REVISIONS				
REV	DESCRIPTION	BY	APPR.	DATE

AC TECH CONTROLLER

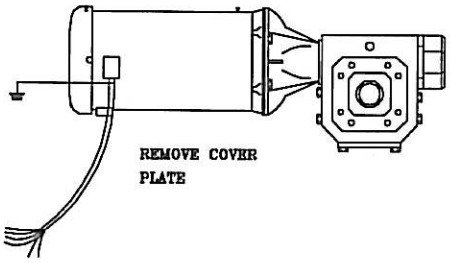
POWER OUT

3 HOT LEADS

GROUND

9 WIRES NUMERICALLY LABELED

PADDLEWHEEL MOTOR/GEARBOX



FOLLOW LOW VOLTAGE WIRE DIAGRAM – LOCATED ON THE MOTOR PLATE

CONTROLLER WIRES	PADDLEWHEEL MOTOR WIRES
"HOT"	8
	2
"HOT"	7
	1
"HOT"	9
	3
GROUND	GROUND NUT LOCATED IN MOTOR HOUSING

TIE THE THREE WIRES TOGETHER AND SEAL WITH A WIRE NUT

4
5
6

NO.	PART NO.	DESCRIPTION	QTY

PARTS LIST

NEXT ASSY	USED ON
APPLICATION	

SWIMEX, INC.

848 Airport Rd. Fall River, MA 02720
TEL. (508) 646-1600 FAX (508) 675-0525

.XX	.XXX	ANGLES
±.01	±.005	±.5°

UNLESS OTHERWISE SPECIFIED:
MACHINED SURFACE FINISHES 125
MACHINED FILLET RADII .015-.030

ALL DIMENSIONS IN INCHES

THIRD ANGLE

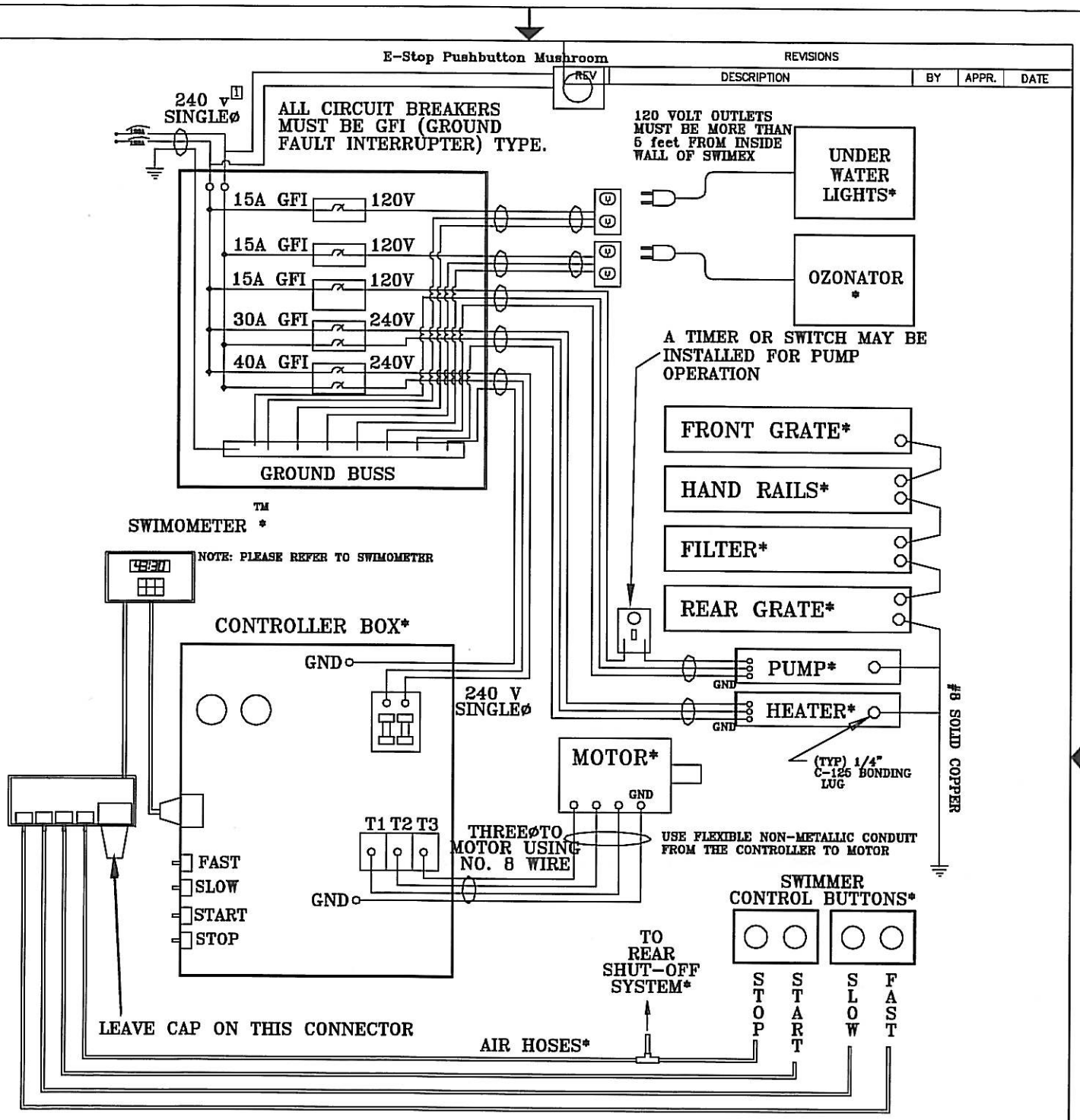
PROJECT: MOTOR WIRE DIAGRAM

TITLE: SWIMEX SYSTEMS 5HP & 7.5HP SCHEMATIC

SIZE: A | DWG NO.: MTRELEC | REV: A

DWG NO. MTRELEC

TPI PART #: N/A	DR BY: M.P.F.	CHK'D BY:	APP'D BY:
FILE: OWNMAN	DATE: 2/09	SCALE:	SHT: 1 OF 1



– GAS HEATER USES 15 AMP GFI BREAKER

* – ITEMS SUPPLIED BY SWIMEX.

[1] IMPORTANT NOTE: INCOMING VOLTAGE MUST BE BETWEEN 230V–240V
(SEE SECT. 1.1 OF ELECTRICAL SECTION IN THE ASSEMBLY MANUAL)

NO.	PART NO.	DESCRIPTION	QTY

PARTS LIST

NEXT ASSY	USED ON
APPLICATION	

SWIMEX, INC.
848 Airport Rd. Fall River, MA 02720
TEL. (508) 646-1600 FAX (508) 675-0525

.XX	.XXX	ANGLES

UNLESS OTHERWISE SPECIFIED:
MACHINED SURFACE FINISHES 125
MACHINED FILLET RADII .015-.030
ALL DIMENSIONS IN
THIRD ANGLE

PROJECT: SWIMEX ELECTRICAL SCHEMATIC

TITLE: 5 HP PADDLEWHEEL SYSTEM W/ DYNAMO PUMP

SIZE	DWG NO.	REV
A	ELEC5HPT	

TPI PART #	DR BY:	CHK'D BY:	APP'D BY:
FILE:	DATE:	SCALE:	SHT: 1

DWG NO. ELEC5HPT