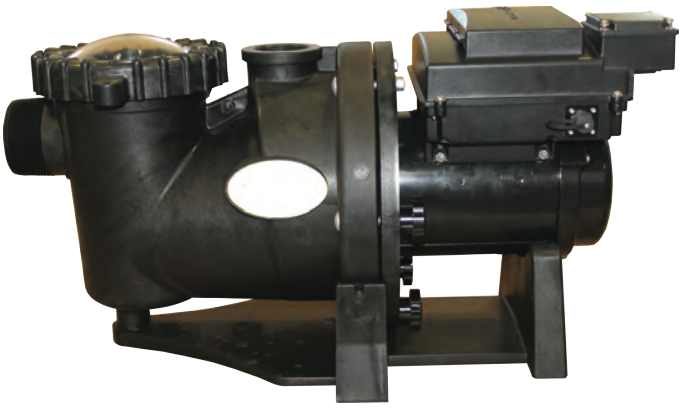
SWIMMING POOL PUMP FOR POOLS AND SPAS

OWNER'S MANUAL

PUMP MOTOR MANUAL

REMOTE INTERFACE GUIDE



MODEL# SUNVS4, ITEM# 59926-XXXX

877.278.2797 fax 888.610.3839

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

IMPORTANT SAFETY INSTRUCTIONS READ AND FOLLOW ALL INSTRUCTIONS

⚠ WARNING ***To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.***

⚠ WARNING ***Risk of Electric shock. Connect only to a branch circuit protected by a ground-fault circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the receptacle is protected by a GFCI.***

The unit must be connected only to a supply circuit that is protected by a ground-fault circuit-interrupter (GFCI). Such a GFCI should be provided by the installer and should be tested on a routine basis. To test the GFCI, push the test button. The GFCI should interrupt power. Push the reset button. Power should be restored. If the GFCI fails to operate in this manner, the GFCI is defective. If the GFCI interrupts power to the pump without the test button being pushed, a ground current is flowing, indicating the possibility of an electric shock. Do not use this pump. Disconnect the pump and have the problem corrected by a qualified service representative before using.

⚠ CAUTION ***This pump is for use with permanently-installed pools and may also be used with hot tubs and spas if so marked. Do not use with storable pools. A permanently-installed pool is constructed in or on the ground or in a building such that it cannot be readily disassembled for storage. A storable pool is constructed so that it is capable of being readily disassembled for storage and reassembled to its original integrity. Do not install within an outer enclosure or beneath the skirt of a hot tub or spa.***

SAVE THESE INSTRUCTIONS.

Contents

Description

The self priming pool pump is designed for high efficiency, and easy maintenance, with an oversized strainer basket. It is constructed of durable thermoplastic for years of trouble free service. This swimming pool pump is designed for use with permanently installed swimming pools and spas only. Do not use with storable pools.

Unpacking

After unpacking the unit, carefully inspect for any damage that may have occurred during transit. Check for loose, missing or damaged parts.

Safety Guidelines

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols.

Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING ***Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.***

⚠ CAUTION ***Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.***

NOTICE ***Notice indicates important information, that if not followed, may cause damage to equipment.***

NOTE: Information that requires special attention.

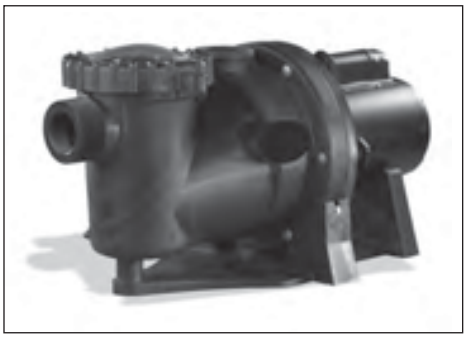


Figure 1 - Swimming Pool Pump

General Safety Information

As a user, you are important to us. Thus, one copy of the Operating Instructions and Parts Manual is included with each pump shipped from our factory. This manual contains important sections relative to user safety, use, maintenance, warranty, etc. It is a good idea to ask for extra copies for other installers/users. Extra copies, free of charge, are available.

CALIFORNIA PROPOSITION 65

⚠ WARNING ***This product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.***

GENERAL SAFETY

Do not use pump for any purpose other than pool/spa application. Components have not been designed for other applications. Severe pump failure, may result. Any unapproved use will void warranty.

REMINDER: Keep your dated proof of purchase for warranty purposes! Attach it to this manual or file it for safekeeping.

General Safety Information (Cont.)

Always follow basic safety precautions with this equipment, including:

- Provide sufficient ventilation to maintain air temperature below the maximum ambient temperature rating shown on the motor nameplate. Pump house must allow adequate ventilation to assure the ambient temperature remains below the motor rating when the pump is operating.
- Locate pump on a non combustible surface. The surface should be hard, level, dry, well ventilated, out of direct sunlight. The surrounding area should provide protection from the elements and allow sufficient space for maintenance and service. Ensure the drainage will flow away from the pump. To reduce vibration and pipe stress, use anchor bolts to secure pump base to surface. Support the suction and discharge piping.
- Design the piping system to allow the pump suction inlet height to be as close to water level as possible. Mount pump below water level for easy priming. If the pump must be located above the filled water level, keep the vertical distance to a minimum. Use short, direct piping to the suction this will minimize friction loss.

⚠ WARNING ***Fire and burn hazard. Motors run at high temperatures. Do not allow leaves, debris, or foreign matter to collect around the pump motor. Keep ventilation holes open. Allow motor to cool before handling. Keep flammable liquids away.***

- If the thermal overload protection in the motor trips or if the GFCI trips determine the reason and correct the problem before re-starting pump.
- Use rigid or flexible PVC pipe. Ensure pipe ends are clean and free of any flash caused by cutting. Use the proper glue for the type of pipe selected.

NOTE: Use a supplier recommended primer to ensure glued joints are secure. Many local codes require primer with a purple tracer to verify primer use.

- Consider climatic conditions when applying adhesives. Atmospheric conditions with high humidity will make the adhesive action of certain glues less effective. Follow the manufacturer's instructions.

Pool Safety Guidelines

RESPONSIBLE ADULT SUPERVISION

Constant and responsible adult supervision is mandatory in the pool or spa environment. Always supervise children around pools and spas. Never allow a child to play in a way that could permit the child's hair to come near the drain cover.

DRAINS, SUCTION FITTINGS, AND JETS

Keep hair and clothing away from the suction fitting drain cover. Wear a bathing cap or pin hair up if you have long hair. Current grates and covers help prevent body or hair entrapment. Make sure that drain covers meet the ANSI/ASME A112.19.8 standard. Safety doors should be installed in all pool cleaner wall suction lines. Pools or spas with drain covers that are broken, missing, or not adequately secured should not be used until the proper replacement has been installed.

ELECTRICAL HAZARDS

A licensed electrician, experienced in swimming pools and spas, should inspect your equipment to make sure everything is properly grounded, bonded, and protected by proper GFCI circuits according to Article 680 of the National Electric Code.

DROWNING PREVENTION

Install and routinely inspect fences, self-closing and latching gates, baby barrier fences, and alarms. Eliminate incidental routes to pool including machinery or equipment that provides a route over fencing into pool area.

INDOOR INSTALLATIONS

Pools and spas located indoors must comply with ANSI/ASHRAE (American Society of Heating, Refrigeration and Air-Conditioning Engineers) standard 62-2001 to ensure adequate ventilation and safe use.

WARNING SIGNS

Protect your family and guests. Make sure that all warning signs provided by the manufacturer, builder, or installer are displayed according to the manufacturer's specifications.

Installation

⚠ DANGER ***Shock Hazard! Only qualified, licensed personnel should install pump and wiring.***

⚠ WARNING ***A professional trained and familiar with pool pump installation must perform pressure tests.***

The pump mount must be located away from corrosive or flammable chemicals.

Do not connect the pump to a municipal

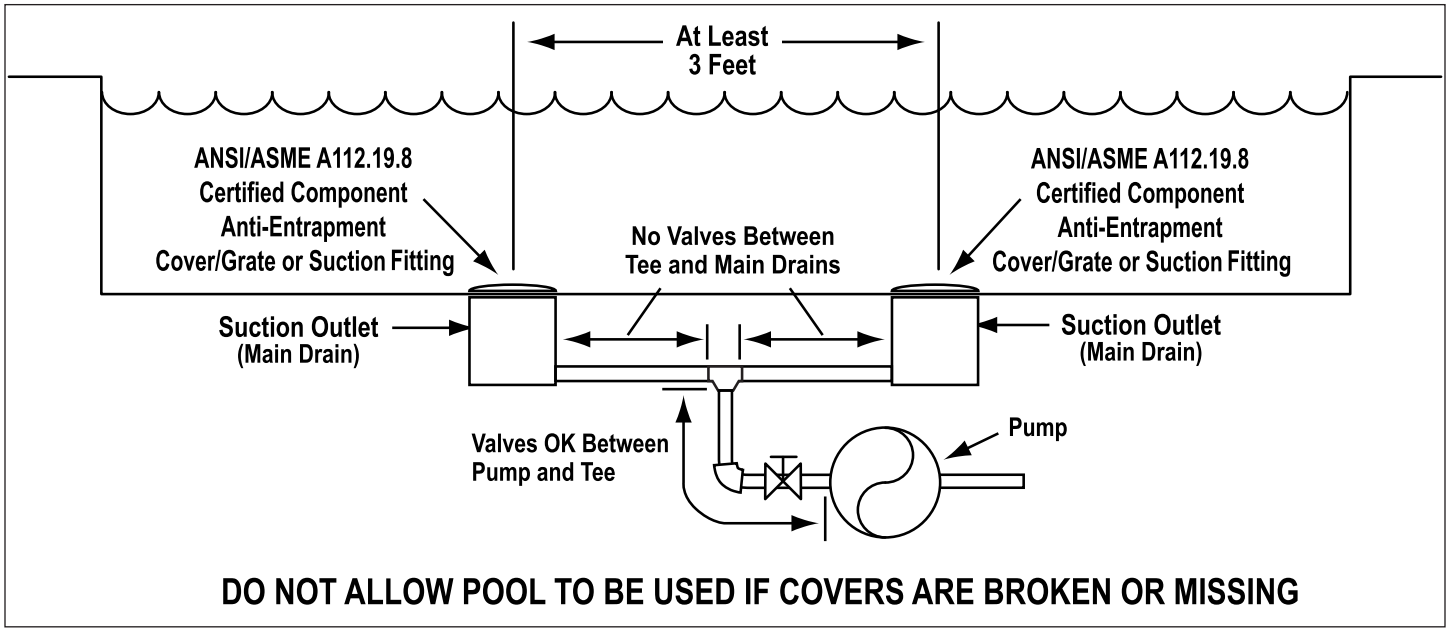


Figure 2

Installation (Cont.)

water system. The pump is only designed for pool or spa installation. The pump must be installed with at a minimum of 2 main drains equipped with certified anti-entrapment covers that comply with ASME/ANSI A112.19.8B standard (see Figure 2). All air must be removed from piping system before operating or testing equipment (see filter manual).

THREADED CONNECTIONS

Use only Plumber's Seal tape or equivalent on threaded plumbing connections. Other pipe compounds may damage threads. Do not use silicone or petroleum based compounds.

PUMP PLUMBING

Suction pipe should be as large as or larger than discharge pipe. Avoid using a suction pipe smaller than pump connection. The pump is designed to accept either 2 or 3 inch suction piping. Larger diameter pipes reduce noise and improve performance.

1. Keep the piping as straight and short as possible, and of suitable size.
2. Avoid connecting an elbow directly into the pump inlet. A length of straight pipe will allow proper entry of the water to the pump.
3. Slope horizontal runs upward to the pump to prevent trapping air.
4. Use independent piping supports to reduce strain on the pump.
5. Keep as much of the suction line as possible below the water level to reduce priming time.
6. Install valves and unions in the pump suction and return lines to facilitate servicing. Valves are also essential for pump maintenance if the system is installed below pool water level.
7. Keep all valves fully open during operation. Partially closed valves waste energy!

Use Plumber's Seal tape for making threaded connections to the pump. Do not use pipe dope.

PLUMBER'S SEAL TAPING INSTRUCTIONS

Use only new or clean PVC pipe fittings. Wrap male pipe threads with one to two layers of Plumber's Seal tape. Cover entire threaded portion. Do not over tighten. If leaks occur, remove pipe, clean off old tape, rewrap with one to two additional layers of tape and remake the connection.

NOTICE

Internal - 2 in. NPT are available for direct connection to pipe. The suction line is also designed to accept 3 in. NPT external threaded connection. For best results use the larger diameter suction line.

FITTINGS

Fittings restrict flow; for best efficiency use fewest possible fittings. Avoid fittings which could cause an air trap. Pool fittings must conform to International Association of Plumbing and Mechanical Officials (IAPMO) standards. Use only non-entrapping suction fitting or double suction.

PRIOR TO PRESSURE TESTING

- Securely tighten knobs, drain fittings, lid, and system accessories
- Air may collect at the highest point in the plumbing system. Normally an air purge valve is provided with the pool filter. Consult pool filter instruction manual for air purging instructions.
- Basket lid must be rotated and locked into position as indicated in Figure 3.
- Test system at a water pressure of 25 psi or less

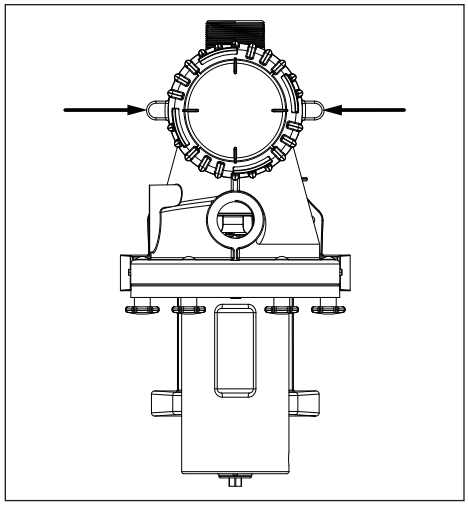


Figure 3 - Clamp rings

- Water Temperature for test must be less than 100° F
- After 24 hours visually check system for leaks.

POOL PUMP SUCTION REQUIREMENTS

⚠ DANGER ***Pump suction is hazardous and can trap, drown or disembowel bathers. Do not use or operate swimming pools or spas if a suction outlet cover is missing, broken, or loose. Follow the guidelines below for a pump installation which minimizes risk to users of pools and spas.***

⚠ DANGER ***Ground the motor before connecting to electrical power supply. Failure to ground the motor may cause severe or fatal electrical shock hazard.***

ENTRAPMENT PROTECTION

The pump suction must be designed to eliminate the possibility of suction entrapment or hair entrapment/entanglement.

SUCTION COVERS

All suction inlet covers must be maintained and replaced if cracked, broken, or missing. See Figure 2 for outlet cover certification requirements.

TESTING AND CERTIFICATION

All suction inlet covers must comply with ASME/ANSI A112.19.8B specifications for suction fittings for use in swimming pools, spas and whirlpool bathtub applications. The product must be tested for compliance with the standards and the certification must be included with the components.

Single or Multiple Pump Circulation Systems must be provided with a minimum of 2 (two) suction inlets of the approved type.

Do not install multiple pumps in one hydraulic circuit. The pump is not designed to accept output flow from another pump. Do not allow water to back flow through the pump. Water flowing in the discharge and out the suction during an upset condition can cause the motor to rotate backwards. Never attempt to start pump if shaft is rotating due to a hydraulic turbine action, this could cause pump to operate in reverse and damage internal components.

⚠ DANGER ***Any pool or spa should immediately be closed if the cover or grate is damaged or missing.***

OUTLETS PER PUMP

Provide at least two hydraulically balanced main drains, with covers for each swimming pool pump suction line. The centers of the main drains suction fitting must be at least three feet apart (see Figure 2). The system must be built so that it cannot operate with the pump drawing water from only one main drain. Two main drains must be connected to the pump whenever it is running. If two main drains run into a single suction line, the single suction line can be equipped with a single valve that shuts off both main drains from the pump. **A valve in each suction line is not allowed**.

Electrical

A Ground Fault Circuit Interrupter (GFCI) is required in the circuit. For size of GFCI required see manufacturer's instructions.

- Never ground to a gas supply line.
- To avoid dangerous or fatal electrical shock: turn OFF, disconnect the power at its source, lock out power to motor, and place a tag on the dedicated GFCI circuit breaker indicating the power is to remain OFF before working on electrical connections.

Ground Fault Circuit Interrupter (GFCI) tripping indicates an electrical problem. If GFCI trips, determine the reason for tripping. If you are uncertain, have a qualified electrician inspect and repair the electrical system.

Verify supply voltage matches the nameplate voltage. Incorrect voltage can cause fire or seriously damage motor and voids warranty.

VOLTAGE

Voltage at motor must be within 10% of the motor nameplate rated voltage or motor may overheat, causing overload tripping and reduced component life. Verify voltage is correct before applying power. If voltage does not fall within the specified range during operation consult the power company.

The pumps are shipped with motors wired for 208-230 volt operation. The 3/4, 1 and 1-1/2 HP models are equipped with a voltage change device for 115/208-230 operation. Refer to the motor nameplate for 115 Volt hook-up.

GROUNDING/BONDING

Install, ground, bond and wire motor according to local or National Electrical Code requirements. Permanently ground the motor. Use ground terminal provided in the terminal box on the back of the motor. Use size and type wire required by local codes. Connect motor ground terminal to electrical service ground.

Bond motor to pool structure. Use a solid copper conductor, size No. 6 AWG or larger. Run wire from external bonding lug to reinforcing rod or mesh.

Use solid copper bonding conductor not smaller than 6 AWG (13 mm^2) from the accessible wire connector on the motor to all metal parts of the swimming pool or spa structure and to all electrical equipment, metal conduit, and metal piping within 5 feet (1-1/2 m) of the inside walls of the swimming pool or spa.

WIRING

Follow all national and local wiring codes. If unsure of code requirements consult a professional electrician. Pump must be permanently connected to a dedicated circuit. If unsure consult a licensed electrician.

NOTE: All electrical wiring and components must be selected and installed in conformance with the latest NEC requirements and local codes. If you are unsure about the requirements consult a licensed electrician familiar with the requirements.

Operation

Do not run pump dry. Fill pump with water before starting motor.

Before removing trap cover:

1. CLOSE GATE VALVES in suction and discharge pipes
2. RELEASE ALL PRESSURE from pump and piping system

If pump is being pressure tested, be sure pressure has been released before removing trap cover.

Do not block pump suction. To do so with body may cause severe or fatal injury. Small children using pool must ALWAYS have close adult supervision.

⚠ WARNING ***Fire and burn hazard. Motor runs at high temperatures, to reduce the risk of fire, do not allow debris, or foreign matter to collect around the pump motor. Allow motor to cool prior to handling or performing maintenance.***

The motor is equipped with an internal thermal protection circuit to guard against overheating. The maximum ambient temperature for motor operation must not exceed rating on motor model plate.

PRIMING PUMP

Release all pressure from filter, pump, and piping system; see the filter owner's manual. In a flooded suction system (water source higher than pump), pump will prime automatically when suction and discharge valves are opened. If pump is located above the normal pool water level remove ring and cover assembly and slowly fill basket and pump with water. Clean and inspect o-ring; reinstall on trap. Replace ring and cover assembly rotate clockwise to tighten cover (see Figure 3).

Clamp ring must engage with pump body. Push down and rotate until internal stops are felt. Properly aligned tabs shown above in Figure 3, assure lid is securely clamped. Failure to tighten clamp ring as indicated will reduce product strength, resulting in failure of components, and bodily injury.

NOTICE ***Pump prime time will depend on vertical distance and length of suction line. If pump does not prime, make sure that all valves are open, suction pipe is submerged. Verify there are no leaks in suction lines. See Troubleshooting Guide for further assistance.***

Maintenance

All of our pumps are shipped from the factory with DANGER and/or WARNING labels already on the pump. These labels contain a series of basic, yet extremely important safety messages for the user and bystander. Regardless of how well these labels are attached or how scratch resistant or wear-resistant they may be, it is possible that, in time, the wording may become illegible with normal use. Whenever you are repairing the pump, performing routine maintenance, or have the opportunity to inspect the pump, make sure the label is readable. If the label is not legible, replace the label with an adhesive version that is available at no charge by calling 1-877-278-2797. The unit must be connected only to a supply circuit that is protected by a ground-fault circuit-interrupter(GFCI). Such a GFCI should be provided by the installer and should be tested on a routine basis. To test the GFCI, push the test button. The GFCI should interrupt power. Push the reset button. Power should be restored. If the GFCI fails to operate in this manner, the GFCI is defective. If the GFCI interrupts power to the pump without the test button being pushed, a ground current is flowing, indicating the possibility of an electric shock. Do not use this pump. Disconnect the pump and have the problem corrected by a qualified service representative before using.

Use only parts supplied by manufacturer. Similar looking parts may not have sufficient strength for safe operation.

The only routine maintenance needed is inspection/cleaning of strainer basket. Debris or trash that collects in basket will choke off water flow through the pump.

Before attempting to clean basket:

A. Stop pump, disconnect power at its source, lock out power, place tag on the dedicated GFCI circuit breaker indicating the power is to remain OFF, close valves in suction and discharge, and release pressure from system.

Maintenance (Cont.)

⚠ DANGER ***Hazardous suction can trap hair or body parts, causing severe injury or death. Do not block suction.***

B. Remove ring and cover assembly by turning counterclockwise. If necessary, tap handles gently with a rubber mallet.

C. Remove basket and clean. Inspect holes in basket for blockage. Clean basket with water and replace in basket housing. Do not hit basket to clean. Verify basket is oriented correctly in housing.

D. Clean and inspect lid o-ring; reinstall ring and cover assembly.

E. Prime pump (see priming instructions).

DRAINING PUMP

⚠ DANGER ***To avoid dangerous or fatal electrical shock hazard, turn OFF power to motor before draining pump. Disconnect power at its source, lock out the power, and place a tag on the dedicated GFCI circuit breaker indicating the power is to remain off.***

A. Close suction discharge valves to isolate pump.

B. Drain the basket housing and pump housing through the drain plugs.

C. Be sure motor is kept dry and covered.

STORAGE/WINTERIZING

⚠ DANGER ***Explosion hazard. Purging the system with compressed air can cause components to explode, with risk of severe injury or death to anyone nearby. Use only a low pressure (below 5 psi), high volume blower for purging the pump, filter, or piping.***

NOTICE ***Allowing pump to freeze will damage pump and void warranty!***

NOTICE ***Use only non-toxic anti-freeze. Do not use automotive antifreeze. It is highly toxic and may damage plastic components in the system.***

PUMP SERVICE

If the pump mechanical seal (reference numbers 8a and 8b on page 9) starts leaking replace it immediately to avoid damage to motor or other components. Pump should only be serviced by qualified personnel. Use only our factory parts.

BEFORE REMOVING CLAMP ON BASKET HOUSING:

- STOP PUMP ELECTRICALLY: Disconnect the power at its source, lock out the power, and place a tage on the dedicated GFCI circuit breaker indicating the power is to remain OFF.
- CLOSE GATE VALVES in suction and discharge pipes.
- RELEASE ALL PRESSURE from pump and piping system. Refer to the filter manual for method.
- NEVER tighten or loosen clamp while pump is operating!

⚠ DANGER ***To avoid dangerous or fatal electrical shock hazard, turn OFF and lock out power to motor before working on pump or motor.***

REPAIR

DISASSEMBLY

1. Disconnect power at its source, lock out the power, and place a tag on the dedicated GFCI circuit breaker indicating the power is to remain OFF.
2. Drain pump by removing drain plugs on bottom of pump body and basket body.
3. Disconnect electrical connections at motor.
4. Remove six knobs holding seal plate to pump body.
5. Slide motor/seal plate assembly out of the back of the pump.
6. Remove three screws holding diffuser to seal plate.
7. Remove motor shaft cover on rear of motor on all models except 59923-XXXX as you can fit a screw driver in the hole without removing back cover. (see Figure 4). Use a wrench or a large screw driver to stop motor shaft rotation.

Figure 4

8. Remove screw from center of impeller. The threads are reversed. Turn clockwise to loosen screw (Figure 5).

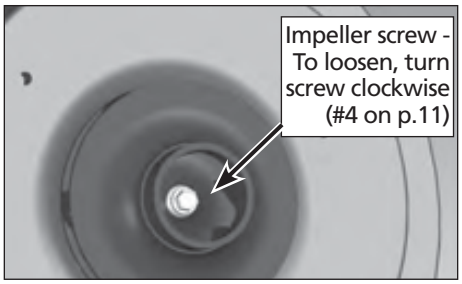


Figure 5

9. Then grasp impeller and rotate counter-clockwise to remove impeller from shaft.
10. Pull mechanical seal rotating assembly from motor shaft.

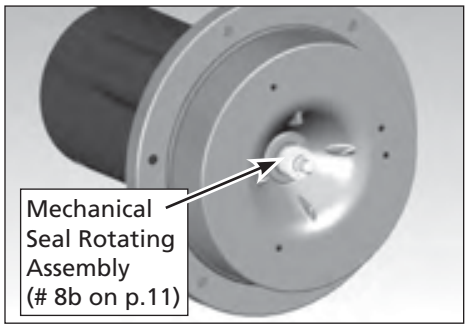


Figure 6

11. With a screw driver carefully pry old stationary seat from seal plate (see Figure 7). DO NOT SCRATCH SEAL BORE.

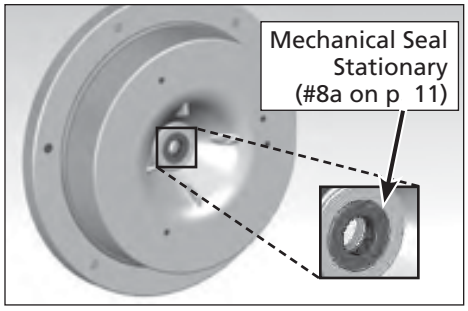


Figure 7

12. If shaft is corroded or dirty motor will need to be removed from seal plate so that the shaft can be effectively cleaned.
13. If necessary use a 9/16 socket with a 6 inch extension to remove four screws holding motor to seal plate. If seal has been leaking for a long time the motor bearing may be compromised, if excessive corrosion or shaft end play can be detected motor will need to be replaced.

REASSEMBLY

1. Obtain a new mechanical seal rotating assembly and seat (reference numbers 8a and 8b on page 11). Seal parts must be replaced as a set. Do not mix old and new parts. Lubricate seal stationary o-ring with a very small amount of dish soap. Do not allow soap, dirt, grease, or any contaminate on the polished seal face (see Figure 8). Install seal with 2 dimples toward motor or seal will fail.

Maintenance (Cont.)

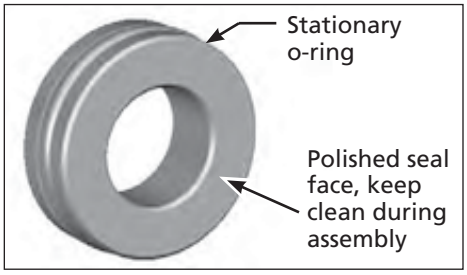


Figure 8

Clean bore for seal, then press seal stationary into bore. Cover seal face with cardboard or other suitable material to avoid touching polished seal face. Verify seal is fully seated in the bottom of the bore.

2. Reinstall motor if removed, lubricate clean motor shaft with a small amount of dish soap. Slide the new rotating seal assembly on to the motor shaft until it is even with the shaft sholder. Polished carbon face must mate with polished stationary face. Make certain seal is properly seated in housing.
3. Screw impeller on to motor shaft. Install left handed retaining screw and washer.
4. Install floating wear ring on impeller. Be careful to install with flange pointing out (see Figure 9).

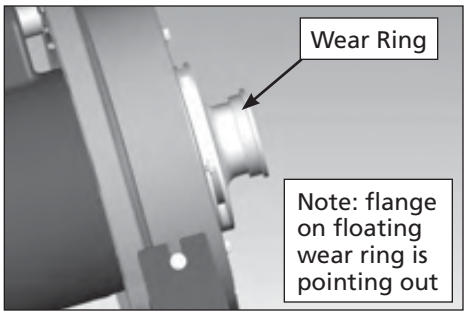


Figure 9

5. Replace diffuser o-ring (reference part #5 on page 11) if it is damaged. Clean o-ring groove before installing a new o-ring.
6. Install diffuser with 3 screws, coat o-ring with a small amount of dish soap to make assembly into pump body easier.
7. Replace main seal plate o-ring with a new one. Clean the surface before installing.
8. Slide rotating assembly back into pump housing.
9. Tighten six knobs in a staggered pattern so all screws are tightened evenly.
10. Pump is now ready to return to service.

⚠ DANGER ***Voltage can shock, burn, or cause death. Disconnect power before working on pump or motor. Disconnect power at its source, lock out the power, and place a tag on the dedicated GFCI circuit breaker indicating the power is to remain off.***

Troubleshooting Guide

Read and understand safety and operating instructions in this manual before doing any work on pump! Only qualified personnel should electrically test pump motor!

WATER LEAKING AROUND MOTOR:

A water leak in the area of the motor to pump connection indicates a mechanical seal failure and a shock hazard. Take pump out of service and replace seal immediately to avoid damage to other components and to reduce risk of electric shock. Refer to pump maintenance section.

FAILURE TO PUMP: REDUCED CAPACITY OR DISCHARGE PRESSURE

SUCTION LEAKS/LOST PRIME:

1. Pump must be primed; make sure that pump body and basket body are full of water. See priming instructions.
2. Make sure there are no leaks in suction piping.
3. Make sure suction inlet is well below the water level to prevent pump from sucking air.
4. Lower pump closer (vertically) to water source or install check valve in suction line.

⚠ WARNING ***Some safety vacuum release system (SVRS) devices are not compatible with installation of check valves. If the pool has an SVRS device, be sure to confirm that it will continue to safely operate when any check valves are installed.***

CLOGGED PIPE/TRAP/IMPELLER, WORN IMPELLER:

5. Make sure suction trap is not clogged; if it is, clean trap and strainer. See Maintenance section.
6. Make sure impeller is not clogged (follow steps 1 through 7 under "DISASSEMBLY", Page 6; check impeller for clogging; follow steps 7 through 10 under "REASSEMBLY", Pages 6 - 7, for reassembly).
7. Impeller and diffuser may be worn. If so, order replacement parts from "Repair Parts List", on pages 10 and 11.
8. Pump may be trying to push too high a column of water. If so, a "higher head" pump is needed. Call 1-877-278-2797.

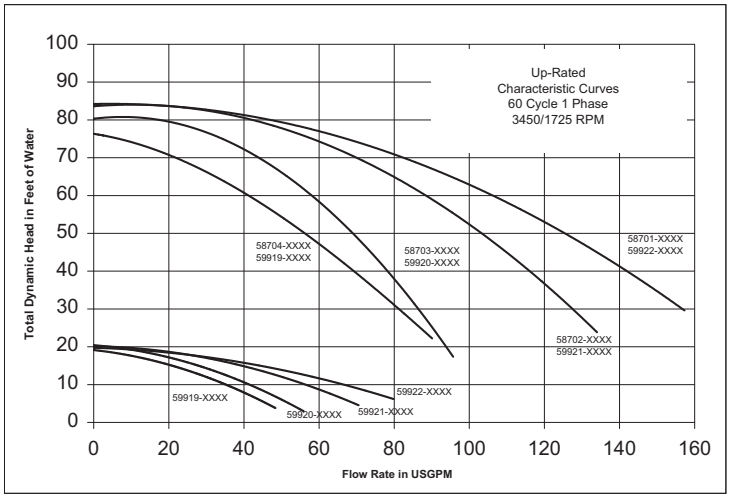
ELECTRICAL:

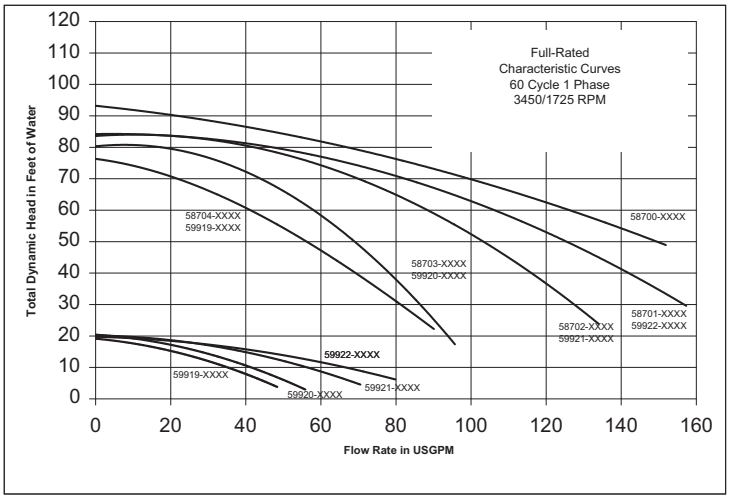
9. Pump may be running too slowly; check voltage at motor terminals and at meter while pump is running. If low, see wiring instructions or consult power company. Check for loose connections.
10. Pump may be too hot.
    A. Check line voltage; if less than 90% or more than 110% of rated voltage consult a licensed electrician.
    B. Increase ventilation.
    C. Reduce ambient temperature.
    D. Tighten any loose connections.

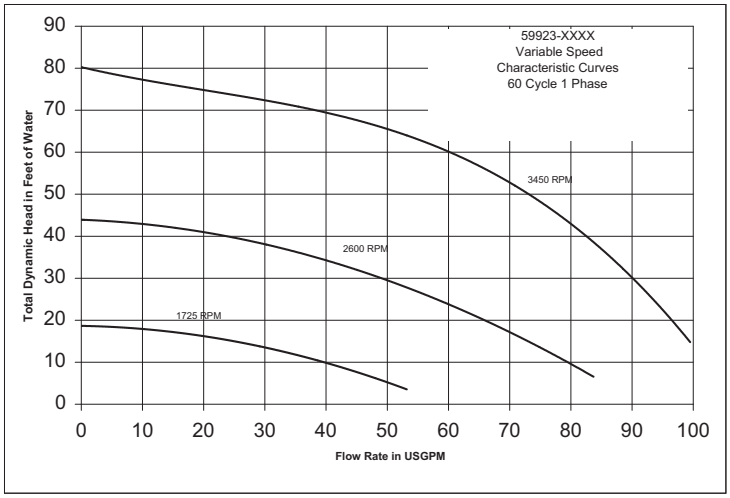
MECHANICAL TROUBLES AND NOISE

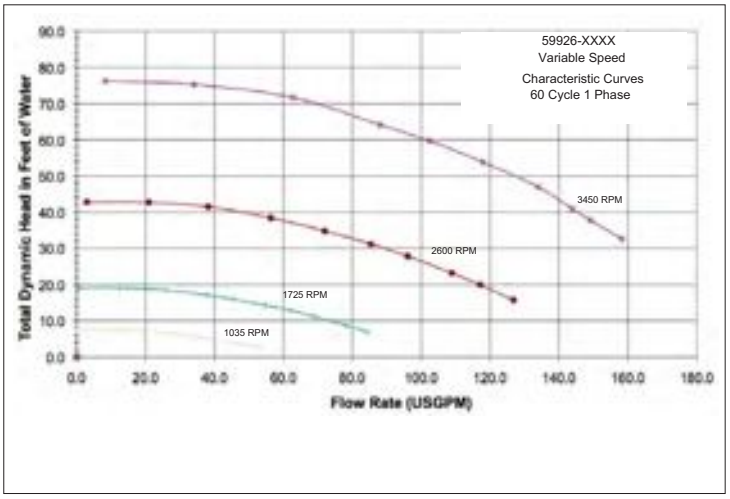
1. If suction and discharge piping are not adequately supported, pump assembly will be strained. See "Installation", Page 3 - 4.
2. Do not mount pump on a wooden platform! Securely mount on concrete platform for quietest performance. Use anchor holes provided in pump base.

Swimming Pool Pump Flow Rates





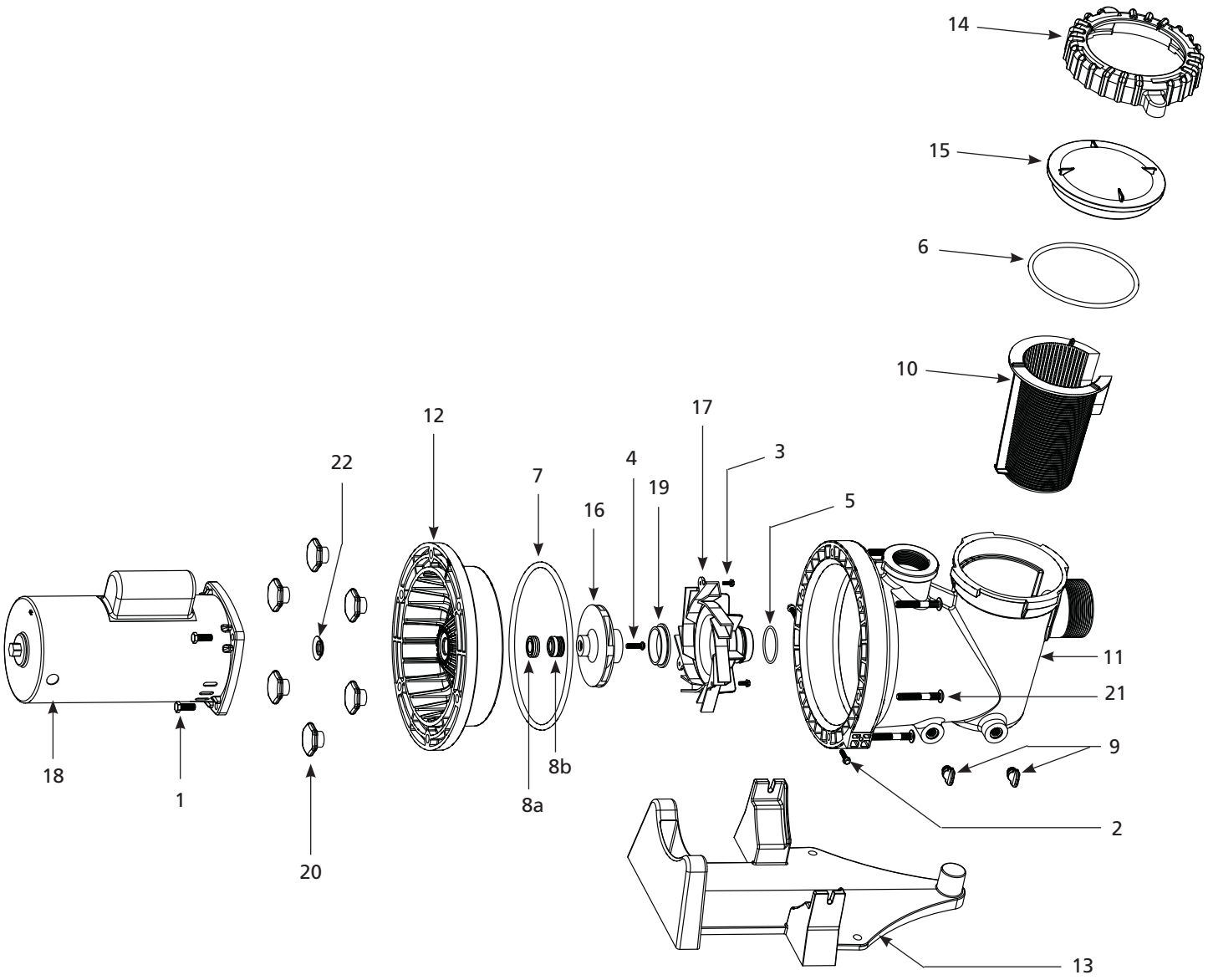




Notes

For replacement parts or technical assistance, call 1-877-278-2797

Please provide following information:
- Model number
- Serial number
- Part description and number as shown in parts list



Replacement Parts List

Ref. No.	Description	Part Number	Qty.
1	Machine Screw 3/8-16 x 1.00 UNC 2A	4383	4
2	Base Screw	4951	2
3	Machine Screw 10-32 x 1/2 UNC 2A	08831	3
4	Machine Screw 1/4-20 x 1 UNC 2A Left Handed	14052	1
5	Diffuser O-Ring	19014-001	1
6	Strainer Basket O-Ring	19084-001	1
7	Housing O-Ring	19087-002	1
8a	Seal Stationary	21212-001	1
8b	Bellows Assembly	21212-002	1
9	Drain Plug	14421	2
10	Filter Basket	28570-001	1
11	Pump Housing	28571-002	
12	Seal Plate	28572-001	
13	Pool Pump Base	28573-001	1
14	Locking Ring	29595-001	1
15	Clear Basket Cover	29596-001	1
16a	3/4 HP Impeller (58704-XXXX, 59919-XXXX, 59923-XXXX)	29860-001	1
16b	1 HP Impeller (58703-XXXX, 59920-XXXX)	29859-001	1
16c	1-1/2 HP Impeller (58702-XXXX, 59921-XXXX)	29861-001	1
16d	2 HP Impeller (58701-XXXX, 59922-XXXX)	29862-001	1
16e	3 HP Impeller (58700-XXXX)	29858-001	1
17a	Diffuser 5 Vane (58704-XXXX, 59919-XXXX, 59923-XXXX)	29864-001	1
17b	Diffuser 7 Vane (58703-XXXX, 58702-XXXX, 58701-XXXX, 59920-XXXX, 59921-XXXX, & 59922-XXXX)	29863-001	1
17c	Diffuser 3 HP (58700-XXXX)	29863-002	1
18a	3/4 HP Motor (58704-XXXX)	32166-001	1
18b	1 HP Motor (58703-XXXX)	32165-001	1
18c	1-1/2 HP Motor (58702-XXXX)	32164-001	1
18d	2 HP Motor (58701-XXXX)	32163-001	1
18e	3 HP Motor (58700-XXXX)	32162-001	1
18F	1 HP Variable Speed Motor	32198-001 (59923-XXXX)	1
18G	2 HP 2 Speed Motor	32197-001 (59922-XXXX)	1
18H	1.5 HP 2 Speed Motor	32196-001 (59921-XXXX)	1
18I	1 HP 2 Speed Motor	32195-001 (59920-XXXX)	1
18J	3/4HP 2 Speed Motor	32194-001 (59919-XXXX)	
18K	2.4 HP Variable Speed Motor	32200-001	
18L	3.4 HP Variable Speed Motor	32201-001	
19	Floating Wear Ring	46066-001	1
20	Knob	67121-001	6
21	Rib Neck Bolts	67122-001	6
22	Slinger	(Included with Motor, parts 18a-j)	1
REPLACEMENT PART KITS			
	Seal Kit	69013-001 (Parts 6 & 7)	
	Motor Kit		
	3/4 HP (58704-XXXX)	69014-001 (Parts 7, 8 & 18a)	
	1 HP (58703-XXXX)	69015-001 (Parts 7, 8 & 18b)	
	1-1/2 HP (58702-XXXX)	69016-001 (Parts 7, 8 & 18c)	
	2 HP (58701-XXXX)	69017-001 (Parts 7, 8 & 18d)	
	3 HP (58700-XXXX)	69018-001 (Parts 7, 8 & 18e)	
	3/4 HP 2 Speed (59919-XXXX)	66314-001 (Parts 7, 8 & 18J)	
	1 HP 2 Speed (59920-XXXX)	66315-001 (Parts 7, 8 & 18I)	
	1.5 HP 2 Speed (59921-XXXX)	66316-001 (Parts 7, 8 & 18H)	
	2 HP 2 Speed (59922-XXXX)	66317-001 (Parts 7, 8 & 18G)	
	1 HP Variable Speed (59923-XXXX)	66318-001 (Parts 7, 8 & 18F)	
	2.4 HP Variable Speed (59926-XXXX)	66319-001 (Parts 7, 8 & 18K)	
	3.45 HP Variable Speed (59925-XXXX)	66320-001 (Parts 7, 8 & 18L)	
	Impeller Kit		
	3/4 HP (58704-XXXX, 59919-XXXX, 59923-XXXX)	69019-001 (Parts 4, 7, 16a & 19)	
	1 HP (58703-XXXX, 59920-XXXX)	69020-001 (Parts 4, 7, 16b & 19)	
	1-1/2 HP (58702-XXXX, 59921-XXXX, 59926-XXXX)	69021-001 (Parts 4, 7, 16c & 19)	
	2 HP (58701-XXXX, 59922-XXXX, 59925-XXXXXX)	69022-001 (Parts 4, 7, 16d & 19)	
	3 HP (58700-XXXX)	69023-001 (Parts 4, 7, 16e & 19)	
	Diffuser Kit		
	3/4 HP (58704-XXXX, 59919-XXXX, 59923-XXXX)	69025-001 (Parts 5, 7 & 17a)	
	1, 1-1/2, 2 HP (58703-XXXX, 58702-XXXX, 58701-XXXX, 59920-XXXX, 59921-XXXX, & 59922-XXXX)	69024-001 (Parts 5, 7 & 17b)	
	3 HP (58700-XXXX)	69026-001 (Parts 5, 7 & 17c)	
	Wet End Kits		
	3/4 HP (58704-XXXX)	69133-001 (Parts 18a,16a,17a,1,3,4,5,7,8a,8b,12,19,22)	
	1 HP (58703-XXXX)	69132-001 (Parts 18b,16b,17b,1,3,4,5,7,8a,8b,12,19,22)	
	1-1/2 HP (58702-XXXX)	69131-001 (Parts 18c,16c,17b,1,3,4,5,7,8a,8b,12,19,22)	
	2 HP (58701-XXXX)	69130-001 (Parts 18d,16d,17b,1,3,4,5,7,8a,8b,12,19,22)	
	3 HP (58700-XXXX)	69129-001 (Parts 18e,16e,17c,1,3,4,5,7,8a,8b,12,19,22)	
	3/4HP 2 Speed (59919-XXXX)	66332-001 (Parts 18J, 16a, 17a, 1, 3, 4, 5, 7,8a, 8b, 12, 19 & 22)	
	1 HP 2 Speed (59920-XXXX)	66331-001 (Parts 18I, 16b, 17b, 1, 3, 4, 5, 7,8a, 8b, 12, 19 & 22)	
	1.5 HP 2 Speed (59921-XXXX)	66330-001 (Parts 18H, 16c, 17b, 1, 3, 4, 5, 7,8a, 8b, 12, 19 & 22)	
	2 HP 2 Speed (59922-XXXX)	66329-001 (Parts 18G, 16d, 17b, 1, 3, 4, 5, 7,8a, 8b, 12, 19 & 22)	
	1 HP Variable Speed (59923-XXXX)	66328-001 (Parts 18F, 16a, 17a, 1, 3, 4, 5, 7,8a, 8b, 12, 19 & 22)	
	2.4 HP Variable Speed (59926-XXXX)	66333-001 (Parts 18k,16c,17b,1,3,4,5,7,8a,8b,12,19,22)	
	3.4 HP Variable Speed (59925-XXXX)	66334-001 (Parts 18L,16d,17b,1,3,4,5,7,8a,8b,12,19,22)	
	Seal Plate Kit	69027-001 (Parts 7, 8 & 12)	

Limited Warranty

For three (3) years from the date of purchase, the manufacturer will repair or replace, at its option, for the original owner any parts of its pumps ("Product") which are found upon examination by the manufacturer to be defective in materials or workmanship.

Please call the manufacture at 1-877-278-2797 for instructions. Be prepared to provide a receipt, the model number and serial number when exercising this limited warranty.

Purchaser must pay all labor and transportation charges on Products or parts submitted for repair or replacement.

All non-warranty service charges are the responsibility of the original owner. Failure to pay for non-warranty service charges will void this Limited Warranty.

This Limited Warranty does not cover Products that have been damaged as a result of accident, freezing, abuse, misuse, neglect, improper installation, improper mainteenance or failure to operate in accordance with the manufacturer's written instructions. All maintenance and service must be performed by service agents approved by the manufacturer. Any unauthorized alteration or repairs will void this Limited Warranty.

THERE IS NO OTHER EXPRESS WARRANTY. IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO ONE (1) YEAR FROM THE DATE OF PURCHASE. THIS IS THE EXCLUSIVE REMEDY AND ANY LIABILITY FOR ANY AND ALL INDIRECT OR CONSEQUENTIAL DAMAGES OR EXPENSES WHATSOEVER IS EXCLUDED.

Some states do not allow limitations on how long an implied warranty lasts, or do not allow the exclusions or limitations of incidental or consequential damages, so the above limitations might not apply to you. This limited warranty gives you specific legal rights, and you may also have other legal rights which vary from state to state.

In no event, whether as a result of breach of contract warranty, tort (including negligence) or otherwise, shall the manufacturer or its suppliers be liable for any special, consequential, incidental or penal damages including, but not limited to loss of profit or revenues, loss of use of the products or any associated equipment, damage to associated equipment, cost of capital, cost of substitute products, facilities, services or replacement power, downtime costs, or claims of buyer's customers for such damages.

This Limited Warranty does not include freight charges for equipment or component parts, to and from the factory, services such as maintenance or inspection, repair or damage due to negligence such as freezing conditions, incorrect installation, nor acts of God. The liability of the manufacturer shall not exceed the repair or replacement of defective parts under this Limited Warranty. This Limited Warranty also does not include unnecessary service calls due to erroneous operational reports, external valve positions, or electrical service. If a non-warranty service call is made, and the homeowner is unwilling to pay for the service call, this Limited Warranty will be voided. This Limited Warranty is voided if the product is repaired or altered by any persons or agencies other than those authorized by the manufacturer. This Limited warranty applies only within the continental USA. For warranty outside the continental USA, contact the manufacturer.

You **MUST** retain your purchase receipt along with this form. In the event you need to exercise a warranty claim, you **MUST** present a **copy** of the purchase receipt at the time of service. Please call the manufacturer at 1-877-278-2797 for service or return authorization and instructions.

DO NOT MAIL THIS FORM TO THE MANUFACTURER. Use this form only to maintain your records.

MODEL NO. _____ SERIAL NO. _____ INSTALLATION DATE _____

ecotech EZ®

VARIABLE SPEED POOL PUMP MOTOR & CONTROL

INNOVATION MADE EZ®

INSTALLATION AND MAINTENANCE MANUAL

For Non-SVRS Models

Programmable Pool Pump Motor/Control

⚠WARNING This Product Does **NOT** Provide A Safety Vacuum Release System (SVRS).

Save this instruction manual for future reference.

c®US

US MOTORS®

M017898010000 REV: August 31, 2012

IMPORTANT SAFETY INSTRUCTIONS

ECOTECH EZ® Motor/Control Installation & Maintenance Manual

Save this Instruction Manual for future reference.

Table of Contents

For Technical Assistance or Questions related to your ECOTECH EZ® Motor/Control:

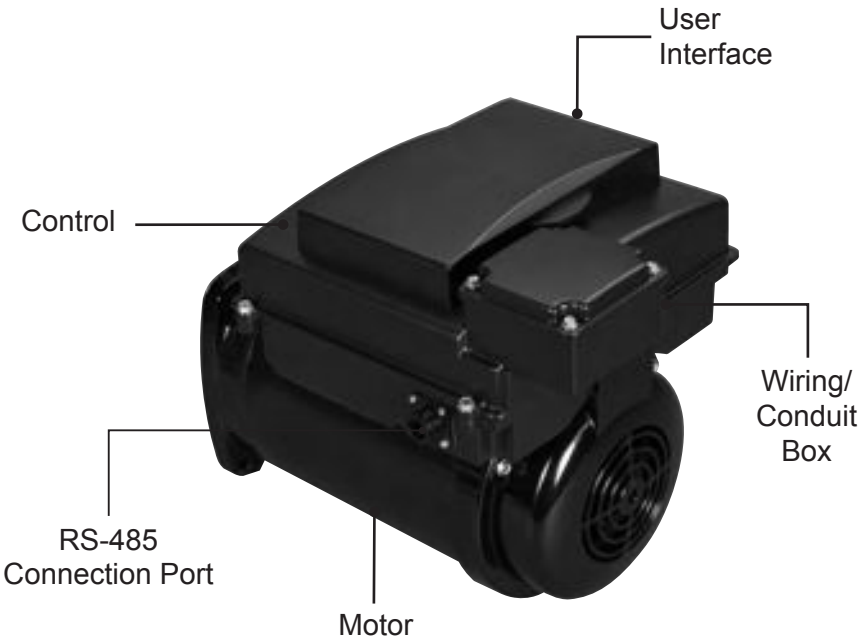
Call our Pool Motor Product Services Hotline:

1-800-566-1418

Or email questions to:
motorhelp@nidec-motor.com

Or visit our web site at:
www.nidec-motor.com/pool

About the ECOTECH EZ® Motor/Control



Catalog or Stock Numbers:

Catalog numbers EVSJ3-NS & EVSJ15-NS for 56J mounting & Catalog numbers EVSS3-NS & EVSS15-NS for Square Flange mounting (as pictured above)

About the ECOTECH EZ® Motor/Control

The ECOTECH EZ® motor/control is a high efficiency pool pump motor designed to be an easy drop-in replacement for your existing pool pump motor. There is no need for system control changes and this motor/control is designed to be wired with minimal modifications.

Designed with exclusive energy savings technologies, ECOTECH EZ® motor/control can be easily programmed to save significant utility dollars! The brushless permanent magnet motor, the control, and the user interface all work together providing the efficiency and ease-of-use benefit of an electronically controlled motor.

- High Efficiency – 90% Plus Motor Efficien
- Speeds in 5% increments from 30% of Minimum Flow to 100% of Maximum Flow
- Easy Drop-in Installation – No complex wiring
- Setup the motor/control to clean your pool with the press of one button
- Ability to program up to four “Custom Flows” for your pool’s specific needs; i.e., operating water feature

Features

- Brushless Permanent Magnet Motor
- Long-lasting Totally Enclosed Fan Cooled (TEFC) motor construction
- Built-In programmable user interface with a timer
- Potted, Environmentally Protected, Controller
- Meets California Title 20 legislation and other similar legislation required in other states
- High efficiency levels across the speed rang
- Freeze sensor
- Designed for quiet operation
- One size fits most pump rating
- Protection against corrosive environment
- Power Factor Corrected Input

Important Safety Instructions

⚠WARNING **Read and follow all instructions in the owner's manual and on the equipment. Failure to follow instructions could cause severe injury and/or death.**

High voltage and rotating parts could cause serious or fatal injury. Safe installation, operation and maintenance must be performed by qualified personnel. Familiarization with and adherence to the National Electric Code, NFPA (National Fire Protection Association) standards and local codes is required. It is important to observe safety precautions to protect personnel from possible injury. Personnel should be instructed for handling each of the following:

⚠CAUTION The motor shall only be used with the supplied control.

⚠CAUTION The ECOTECH EZ® motor/control user interface is intended for swimming pool pump applications only.

⚠ NOTICE When unpacking the unit, verify all motor, control, and user interface components are not damaged. Make sure there are no visible loose wires in the wiring/conduit box. Be careful lifting the motor/control from the box. Act with care and in accordance with prescribed procedures in handling and lifting this equipment. Inspect all components for damage. Should there be damaged components, please return the product to your place of purchase.

⚠ NOTICE There is a small time delay before the unit starts.

⚠WARNING The ECOTECH EZ® Motor/Control is controlled for an automatic start. Starting is controlled by your program schedule or via user input through the user interface mounted on top of the motor.

⚠WARNING In the case of a motor/control trip condition, the motor/control may restart without warning. See the Fault Condition section for details, Pages 24.

⚠WARNING Avoid contact with energized circuits or rotating parts.

⚠WARNING ***Always disconnect electrical power at the fuse box or circuit breaker before handling electrical connections. Double check to be sure Power is OFF, and that it cannot be turned on while you are working on the equipment.***

⚠WARNING Make sure the unit is electrically grounded and proper electrical installation wiring and controls are used consistent with local and national electric codes. Refer to "National Electrical Code Handbook" & NFPA No. 70. Employ qualified electricians. Insulate all connections carefully to prevent grounding or short circuits. Reinstall all conduit and terminal box covers.

⚠CAUTION To connect power to the motor/control unit, refer to the connection diagram on the nameplate. AC line power is connected via the motor/control conduit box terminal board only.

⚠WARNING Insulate all connections carefully to prevent grounding or short circuits. Reinstall all conduit and terminal box covers! Do not force connections into the conduit

⚠WARNING A poor electrical connection can overheat and cause terminal and/or terminal board failures. Because of this possibility, wiring harness quick-connect terminals should be regularly examined carefully for any signs of physical deterioration or loose fit to the terminals on the motor/control terminal board. If there is evidence of loose fit or deterioration, quick-connect terminals should be removed from the wiring harness and the harness wires then connected directly to the motor/control terminal board wiring terminals. Care shall be taken to ensure connections are made to the proper terminals and that adequate electrical clearances are maintained.

⚠ CAUTION Voltage to the motor/control shall be within plus or minus 10% of the nameplate voltage to avoid overheating and loss of performance.

a. All aspects of the installation shall conform to the applicable requirements of the NEC (National Electrical Code), including Article 430 (Motor Circuits and Controllers), as well as all local codes.

b. This motor/control should be powered from a separate circuit of adequate capacity to maintain sufficient voltage during starting and running conditions. Wire size shall be adequate to minimize voltage drop during starting and running. A qualified or licensed electrician should be used to properly size the motor/control supply circuit. Reference articles 310 and 400 of the NEC for further information on wire sizing. A #8 AWG or larger conductor must be wired to the motor/control ground/bonding lug. Use #6 AWG in Canada. Wiring, including flexible cords, should be as short as possible to minimize voltage drop. All electrical connections in this system must be secure to prevent voltage drop and localized heating. If AC power is supplied by a GFCI circuit breaker, use a dedicated circuit that has no other electrical loads. GFCI use shall be in accordance with NEC and all other applicable state,local and National electrical codes.

c. Permanent connection of “Hot” supply wires (power wires that supply voltage) should be from a 2-pole device (Circuit breaker, relay, timer, etc.) that open-circuits all hot supply wires when the motor control is “OFF”. Failure to use a 2-pole device will result in voltage being present at the motor/control and potential shock hazard.

d. All electrical connections should be made and maintained by a qualified or licensed electrician

⚠WARNING Although the ECOTECH EZ® motor/control is a totally enclosed product, rare circumstances, such as but not limited to; i.e., motor submersion due to flood or high pressure water stream aimed directly at motor, might allow water to infiltrate the motor/control. If this occurs, the unit shall be serviced by a qualified service person before operating or applying power. Wet internal components may cause a shock hazard

⚠ CAUTION To avoid accidents, make sure equipment is properly protected to prevent access by children or other unauthorized personnel.

⚠ CAUTION Make sure there are no unusual noises or vibrations when the motor/control is running. If noise and vibration are apparent, see the General Troubleshooting issues on page 26.

⚠WARNING Direct-coupled installations, (such as pool pump products), require a careful check of shaft and coupling alignment. Position the motor/control for proper alignment. Do not depend on a flexible coupling to compensate for misalignment. Do not strike the motor shaft with a hammer or other tool as this may damage the bearings.

⚠WARNING Provide proper safeguards for personnel against rotating parts.

⚠WARNING Become familiar with the equipment and read all instructions thoroughly before installing or working on the equipment.

⚠WARNING The control on top of the motor should NEVER be disassembled for any reason.

⚠ CAUTION The User Interface should NEVER be disassembled from the control for any reason.

⚠ NOTICE The ECOTECH EZ® Motor/Control is properly packaged for shipment and storage in a clean, dry indoor area.

⚠WARNING Safety glasses should be worn to inspect the equipment while it is running or while a mallet or hammer is used, especially if cover plates are removed.

⚠WARNING **This motor/control is not a substitute for properly installed and secured drain covers. An ANSI/ASME (American National Standards Institute/American Society of Mechanical Engineers) A112.19.8-2007 approved anti-entrapment drain cover shall be used for each drain. Pools and spas should use two drains per pump. If a drain cover becomes loose, broken or is missing, close the pool or spa immediately and shut off the pump until an approved anti-entrapment drain cover is properly installed with the manufacturer’s supplied screws.**

⚠WARNING **This product does NOT provide nor function as a safety vacuum release system (SVRS). If a SVRS is required, a product certified as a SVRS must be used.**

⚠WARNING The Association of Pool and Spa Professionals (APSP) recommends the following to keep your Pool, Spa, or Hot Tub Safe and Free from Entrapment Risk:

a. Have your pool inspected by a licensed industry professional during initial installation.

b. There is no backup for a broken, missing or inadequate cover. Replace any broken, missing or non- compliant covers with covers marked: VGB2008," "ASME/ANSI A112.19.8-2007," or covers showing the swimmer logo.

c. Pools or spas with a single main drain require additional protection. Options include:

- Eliminating the drain or reversing the flo
- Adding a second, properly spaced outlet
- Installing an SVRS (Safety Vacuum Release System)
- Installing an automatic pump shut-off system
- Installing a suction- limiting vent system
- Adding a gravity drainage system

d. Please check with your individual municipality to ensure proper compliance.

For additional information regarding the Virginia Graeme Baker (VGB) Pool and Spa Safety Act, consult the following web sites:

www.apsp.org
www.poolsafely.gov

⚠WARNING This unit should not be serviced in the field. Do not disassemble or reconnect components in the field; use authorized factory service onl .

⚠WARNING **Always disconnect power to the motor and ALWAYS disconnect any RS-485 communication cable before servicing.**

⚠WARNING Be careful when touching the exterior of an operating motor/control! The motor/control may be hot to the touch and cause injury. This condition is normal for most motors when operated at rated load and voltage. ***A properly functioning motor may be too hot to touch and can cause injury.***

General Installation Instructions

Follow these instructions to prolong the life of your swimming pool pump motor/control.

a. Install this product on a secure and level platform or base such as a concrete pad.

b. Protect against heat

- Shade the motor/control from the sun.
- Provide ample cross ventilation to Provide sufficient cross ventilatio
- Protect the motor/control from lint, etc., that can clog the ventilation openings.

c. Protect against Dirt

- Keep motor/control and surrounding area clean.
- Avoid sweeping or stirring dust near the motor/control while it is running.
- Avoid storing or spilling dry chemicals near the motor/control.

d. Protect against Moisture

- Provide protection from rain, snow, etc.
- Do not wrap motor/control with plastic or other air tight materials.
- Locate motor/control on a slight elevation so water will not run or puddle nearby.
- Avoid splashing water on or near the motor/control.
- Repair leaky pipe joints or pump seals promptly.

Basic Motor/Control Operation

Your ECOTECH EZ® Motor/Control has been functionally tested for pool pump use before shipment. It is also preprogrammed to be a drop-in replacement for a standard single or two-speed pool pump motor with only minor programming required. To operate the motor/control, the installer must first set the time of day and the day of the week. Please see related informations of this manual for more specific information.

Re-inspect the installation and make sure that guards and other protective devices are securely in place. All covers and gaskets must be re-installed prior to startup to minimize the entry of dirt and moisture.

Blocked pump indicates there is an obstruction. Basic startup instructions are under the lid of the user interface. Detailed motor/control startup instructions begin on page 9 of this manual. In addition to these motor installation procedures, please follow all Startup & Operation instructions in your pump manual.

The motor/control is designed to be operated on a 230 volt, 60 Hz nominal power supply. The suitable voltage range is 207-253 volts under rated load conditions.

“Hot” power connections should only be connected to the L1 and L2 terminals of the above pictured motor/control conduit box connection area and supply ground (Green or Green with Yellow insulated lead wire) to the ground screw provided in this same connection area. Permanent field wiring should be from a 2-pole device. See Important Safety Instructions Section, Items a through d (page 5)

If AC power is supplied by a GFCI circuit breaker, use a properly sized dedicated circuit that has no other electrical loads. Use of a GFCI circuit with electrical loads other than the ECOTECH EZ® motor/control could result in nuisance tripping. See Important Safety Instructions Section for more information.

Before performing any maintenance, disconnect the power and allow the motor to come to a complete stop then wait five(5) minutes before servicing

This motor has permanently lubricated bearings.

No further lubrication is recommended or required.

IMPORTANT NOTE: “FLOW” VS. “SPEED”

The motor/control is designed to operate at variable speed over a range of 1035 to 3450 RPM (revolutions per minute of the motor shaft). To make the product more understandable to use in pool pump applications, “FLOW” (versus “SPEED” in RPM) terminology is used to represent changes in pump water output in both the user manual instructions and on the user interface display. A motor operational speed of 1035 RPM displays as “30% FLOW”, 1725 RPM displays as “50% FLOW”, and 3450 RPM displays as “100% FLOW”. The Actual “% FLOW” rates will vary with the length of piping sections, use of fittings (elbows, tees, etc.), filters, heaters, and othe components that affect system friction and efficienc , therefore, the “% FLOW” reading should only be used as an estimate of the actual system operating flow rate. When designing or calculating water turnover/exchange, the use of a properly calibrated and sized flow gauge should be used to determine actual operating flow rate (GPM) at the various operational speeds of the motor/control.

General Warnings

1. Do not open the control enclosure. There is extremely hazardous voltage inside. Do not service.

2. Code requirements vary from state to state. Install equipment in accordance with the applicable codes, local ordinances, and in accordance with the National Electrical Code.

3. Always shut off the unit before performing maintenance. Always disconnect electrical power at the fuse box or circuit breaker before handling electrical connections to be sure Power is OFF, and that it cannot be turned on while you are working on the equipment.

   NOTE: The ECOTECH EZ® Motor/Control is programmed for an automatic start. Starting is controlled by your program schedule or via user input through the user interface mounted on top of the motor.

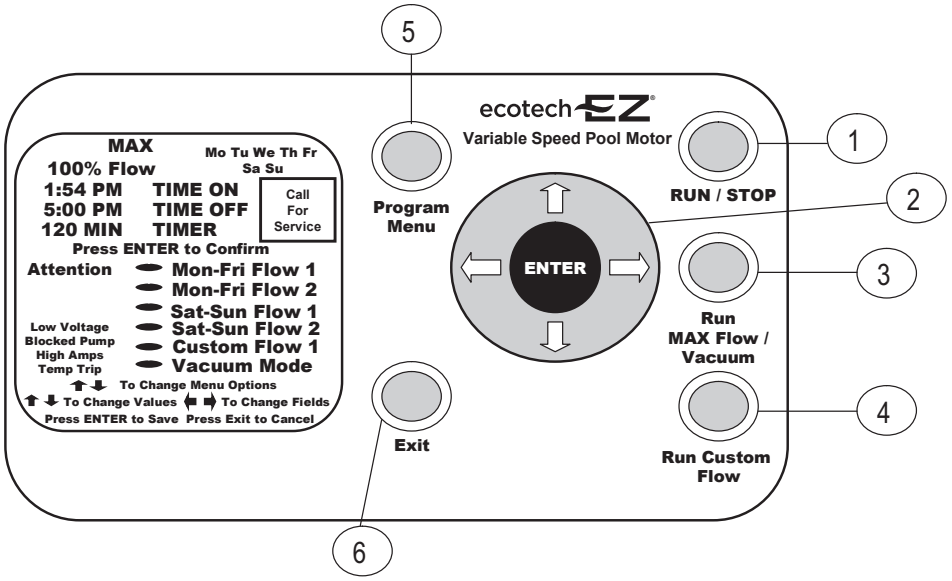
   NOTE: There is a small time delay before the unit starts.

4. Pump size and pump impeller size must match the existing hydraulic system of the pool. The ECOTECH EZ® motor/control has the capability to power pump ratings up to 3.5 total or service factor horsepower (SFHP/THP) at 3450 RPM (100% Max Flow) for catalog numbers EVSJ3-NS & EVSS3-NS and pump ratings up to 2.4 total or service factor horsepower (SFHP/THP) at 3450 RPM (100% Max Flow) for catalog numbers EVSJ15-NS & EVSS15-NS.

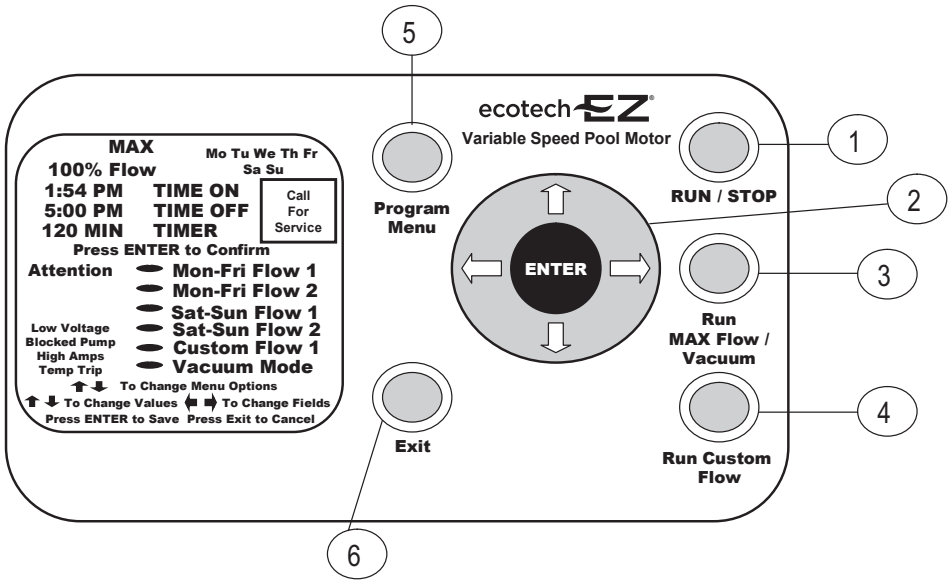
5. This motor/control is intended to be used only above ground. It is not a submersible pump motor/control.

ECOTECH EZ® Motor/Control User Interface Operation

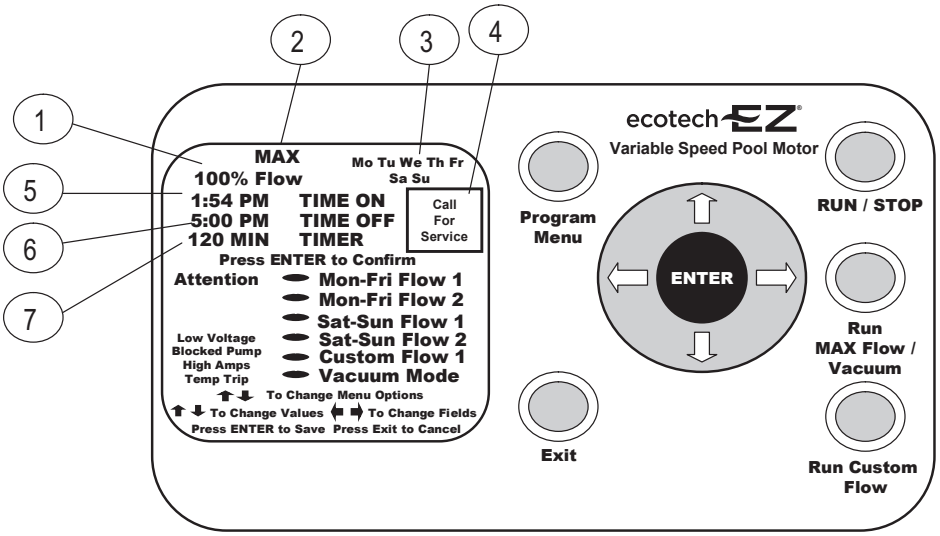
The User Interface (UI) is your communication means for controlling the operation of your pump. This section describes the ECOTECH EZ® Motor/Control operator controls and the LCD screen.



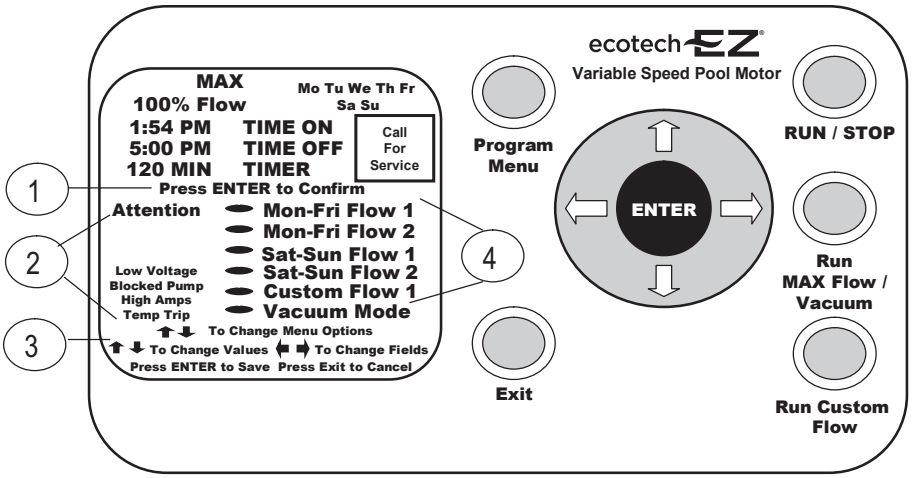
1. **RUN/STOP** button. This button is used to activate or stop the unit operation. The button will illuminate when in Run mode. This button does not disconnect power to the unit.
2. Press the **ENTER** button to confirm and save your selections. Use the arrow keys for menu navigation purposes and t change values. When the product is in the RUN mode, pressing the Up arrow increases the pump flow in 5% increments. Pressing the down arrow decreases the flow in 5% increments
3. Press the **Run MAX Flow/Vacuum** button for cleaning, vacuuming, & extra skimming purposes.
4. Press the **Run Custom Flow** button for running water features or other special flow requirements. Custom flo rates are set in the Program Menu.
5. Press the **Program Menu** button to enter the Program Menu for setting time, day of week and for setting or reviewing the current Program Schedule for Pump On and Off times along with flow rates. Custom Flow settings are also set in the Program Menu.
6. Press the **Exit** button to leave the Program Menu or to Escape the Program Menu without saving your data.



1. **RUN/STOP** button. This button is used to activate or stop the unit operation. The button will illuminate when in Run mode. This button does not disconnect power to the unit.
2. Press the **ENTER** button to confirm and save your selections. Use the arrow keys for menu navigation purposes and to change values. When the product is in the RUN mode, pressing the Up arrow increases the pump flow in 5% increments. Pressing the down arrow decreases the flow in 5% increments
3. Press the **Run MAX Flow/Vacuum** button for cleaning, vacuuming, & extra skimming purposes.
4. Press the **Run Custom Flow** button for running water features or other special flow requirements. Custom flo rates are set in the Program Menu.
5. Press the **Program Menu** button to enter the Program Menu for setting time, day of week and for setting or reviewing the current Program Schedule for Pump On and Off times along with flow rates. Custom Flow settings are also set in the Program Menu.
6. Press the **Exit** button to leave the Program Menu or to Escape the Program Menu without saving your data.



1. This is the current flow or speed of the motor which powers the pump. The flow range is between 30% and 100% in 5% increments.
2. The word “MAX” appears only when the motor speed is running at Maximum Speed or 100% of Flow. The MAX flashes when in Prime mode
3. Day of the week display.
4. The Call for Service icon will light when an issue with the unitrequires professional service. If this icon illuminates, please call your professional service representative.
5. The current Time of Day when in Run Mode or your Scheduled Time ON setting when in Program mode.
6. When in Program mode, this is the time the unit will turn off the scheduled program.
7. When in Program mode, this is the number of minutes the Custom Flow program will run. When running Custom Flow or MAX Flow/Vacuum mode, this field displays the remaining time of your chosen function



1. The "**Press ENTER to Confir** " icon illuminates when the unit requests you to confirm your selection

2. The **Attention** section displays important operating information regarding your unit. Detailed information on these items can be found in the Fault section of this manual – Pages 24-25.
   - **Low Voltage** indicates insufficient voltage is getting to the moto .
   - **Blocked pump** indicates there is an obstruction which does not allow the pump to properly operate.
   - **High Amps** is an indication of some type of overloaded condition.
   - **Temp Trip** indicates an overheat condition. If you are unsure how to resolve any of these issues, please call your pool professional.

3. Directions for operation. These directions will illuminate based upon your location in the Program menu. "**Press Exit to Cancel**" is an indicator to press the **Exit** button to leave the program menu or to press the **Exit** button as an Escape key should an error occur while programming.

4. These are your program menu selection options.

   Mon-Fri Flow 1 is the first On, O f and Flow percentage setting for Monday through Friday operation.

   Mon-Fri Flow 2 is a second On, Off, and Flow percentage available for Monday-Friday operation.

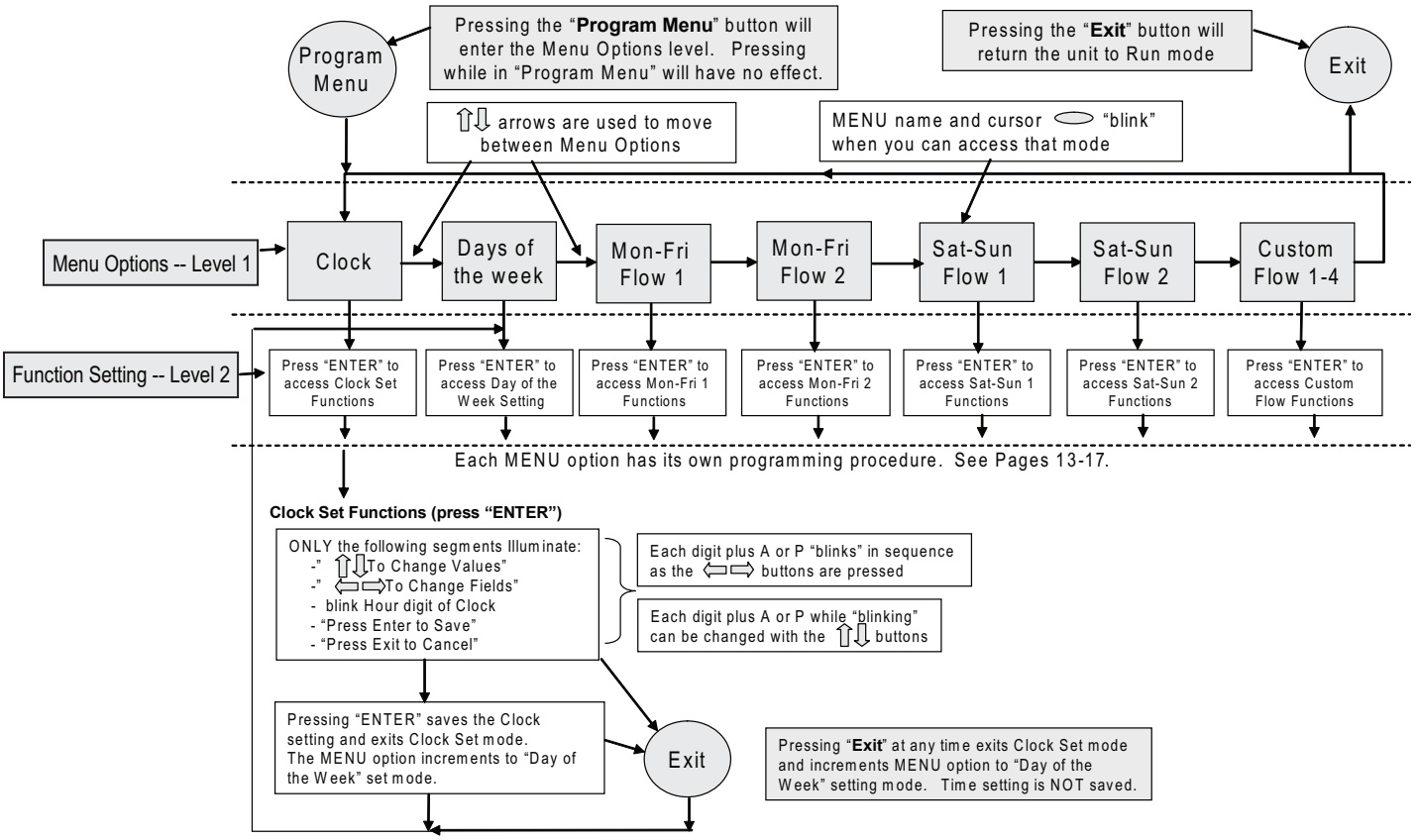
   Should you require different setting for weekend operation, **Sat-Sun Flow** settings are also available.

   Four **Custom Flow** settings are also available should special settings be required for water features, backwash, or party mode operation. **Vacuum Mode** is not programmable.

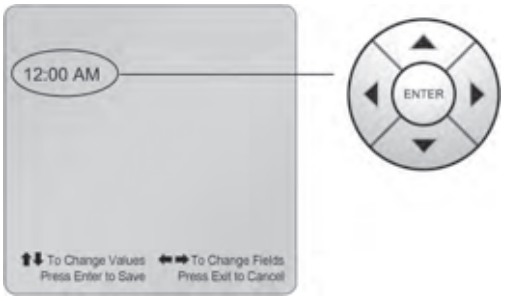
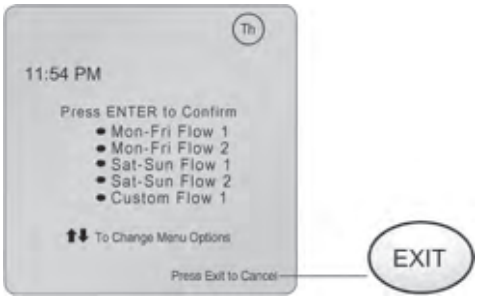
Programming Overview Flow Chart

Each Menu Option has its own programming procedure. See Pages 13-17.

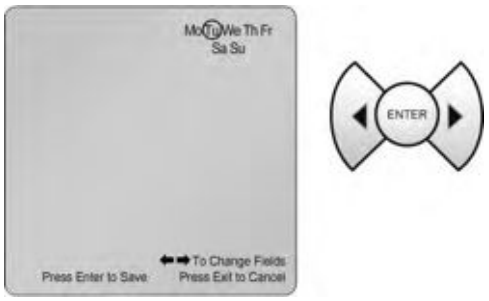
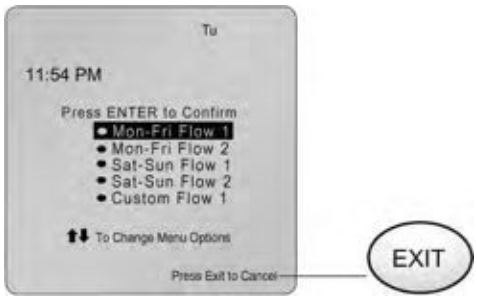
Unit must be in stop mode to access programming. If RUN/STOP button is lit press RUN/STOP to turn off light and put in stop mode.



How to Program Your ECOTECH EZ® Motor/Control

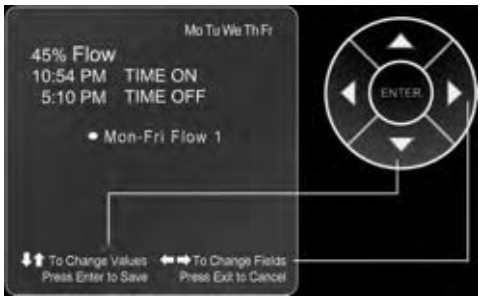
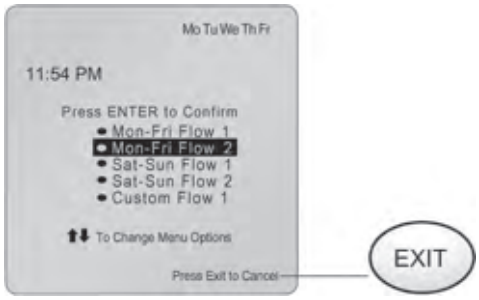
A) Setting the Clock		
1.	See page 12 for how to enter clock setting.	
2.	The hour digit(s) will be flashing. Use the (up arrow), (down arrow), (left arrow), (right arrow) to set the time and am/pm.	
3.	After you have set the correct time, press ENTER to save the time and return to the Menu Options mode. The Days of the Week will be flashing. If you want to change or set the day of the week, press the ENTER button and refer to Section B. If the correct day is already set, proceed to step 4 below.	
4.	Press Exit if finished programming, or press Enter to continue.	
5.	If finished programming, push RUN/S OP button to run program. (Note: RUN/STOP button should be lit)	

Please note: In the PROGRAM menu, if no button is pressed within 30 seconds, the unit will EXIT and return to the RUN mode.

B) Day of Week Programming		
1.	Use the (right arrow) and (left arrow) to move through the days of the week.	
2.	To save the day you have chosen, press Enter. You are now back to the Menu Options mode and the Mon-Fri Flow 1 icon will be flashing. If you would like to change or set the Mon-Fri Flow 1 program, press ENTER and refer to Section C. If not, proceed to # 3 below.	
3.	Press Exit if finished programming, or press Enter to continue.	
4.	If finished programming, push RUN/S OP button to run program. (Note: RUN/STOP button should be lit)	

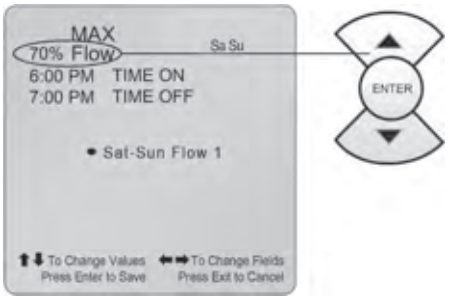
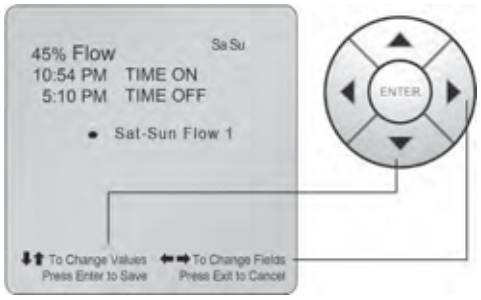
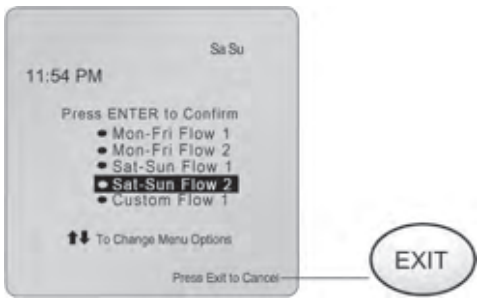
C) Mon-Fri Flow 1 Programming (Flow 2 Programming is similar)

NOTE: Flow 1 settings take precedence over Flow 2 settings if Start Times are the same.)
Setting on and off time the same is not recommended. For 24 hour operation, see page 21.

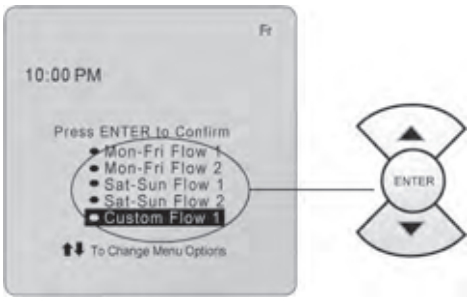
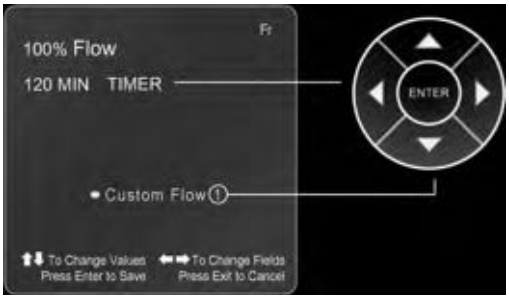
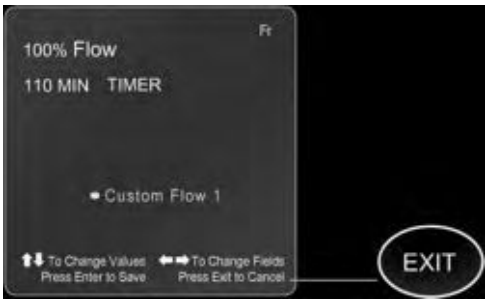
1.	Use (up arrow) and (down arrow) to set the desired % flow setting	
2.	Press the (right arrow). Use the instructions for Setting the Clock to set the Time On and Time Off on this screen.	
3.	Use the (left arrow) and (right arrow) to move through the time and flow setting process. Use (up arrow) and (down arrow) to increase or decrease Time and Flow.	
4.	Press Enter when you are finished setting the desired Flow 1 rate and times of operation. Repeat steps 1-3 to set a 2nd flow rate and time for Mon-Fri operation. If not, proceed to # 5 below.	
5.	Press Exit if finished programming or press Enter to continue.	
6.	If finished programming, push RUN/S OP button to run program. (Note: RUN/STOP button should be lit)	

D) Sat-Sun Flow 1 Programming (Flow 2 Programming is similar)

NOTE: Flow 1 settings take precedence over Flow 2 settings if Start Times are the same.)
Setting on and off time the same is not recommended. For 24 hour operation, see page 21.

1.	Use (up arrow) and (down arrow) to set the desired flow %	
2.	Press the (right arrow). Use the instructions for Setting the Clock to set the Time On and Time Off on this screen.	
3.	Use the (left arrow) and (right arrow) to move through the time and flow setting process. Use (up arrow) and (down arrow) to increase or decrease Time and Flow.	
4.	Press Enter when you are finished setting the desired Flow 1 rate and times of operation. Repeat steps 1-3 to set a 2nd flow rate and time for Sat-Sun operation. If not, proceed to # 5 below.	
5.	Press Exit if finished programming or press Enter to continue.	
6.	If finished programming, push RUN/S OP button to run program. (Note: RUN/STOP button should be lit)	

NOTE: In the PROGRAM menu, if no button is pressed within 30 seconds, the unit will EXIT but will not return to RUN mode.

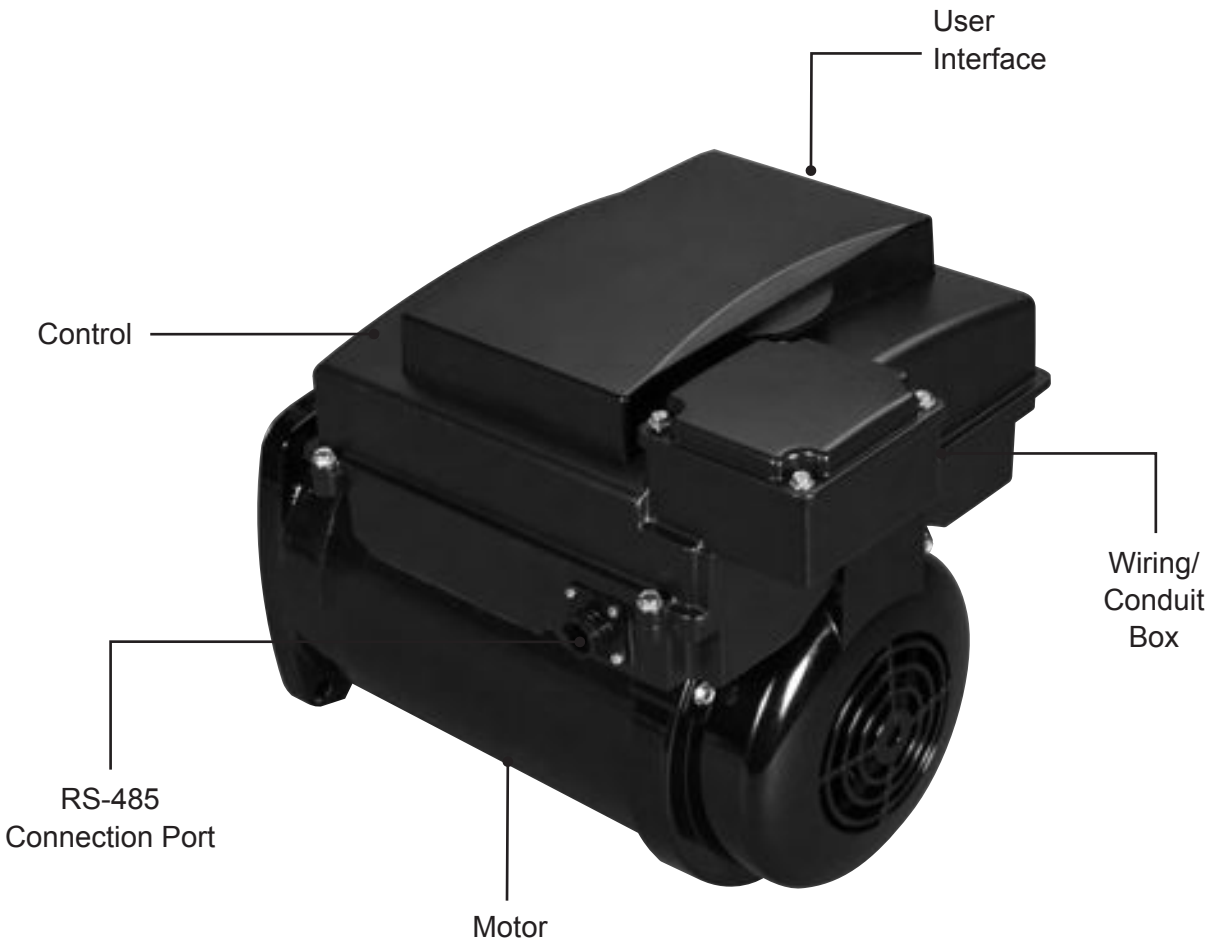
E) Custom Flow Programming *(NOTE: There can be up to 4 separate Custom Flow settings. All will be programmed as follows)*		
1.	Use (up arrow) and (down arrow) to move through the four flow settings	
2.	Use the (left arrow) and (right arrow) to move through the time and flow setting process. Use (up arrow) and (down arrow) to increase or decrease Time and Flow. Custom Flow 1, 2, 3, 4 % Flow Range: 0 – 100% Time Range: 10-249 minutes (Holding down the “Up” or “Down” arrows while setting the timer, will change the value rapidly)	
3.	After you have set the Custom Flows 1 through 4, press Enter to save. You are now returned to the Clock Set Programming if needed.	
4.	Press Enter when you are finished setting the desired Custom Flow, rate and times of operation. Repeat steps 1-3 to set Custom Flow rates 2-4.	
5.	Press Exit if finished programming or press Enter to continue.	
6.	If finished programming, push RUN/S OP button to run program. (Note: RUN/STOP button should be lit)	

Programming for Pump Priming (change from default setting)

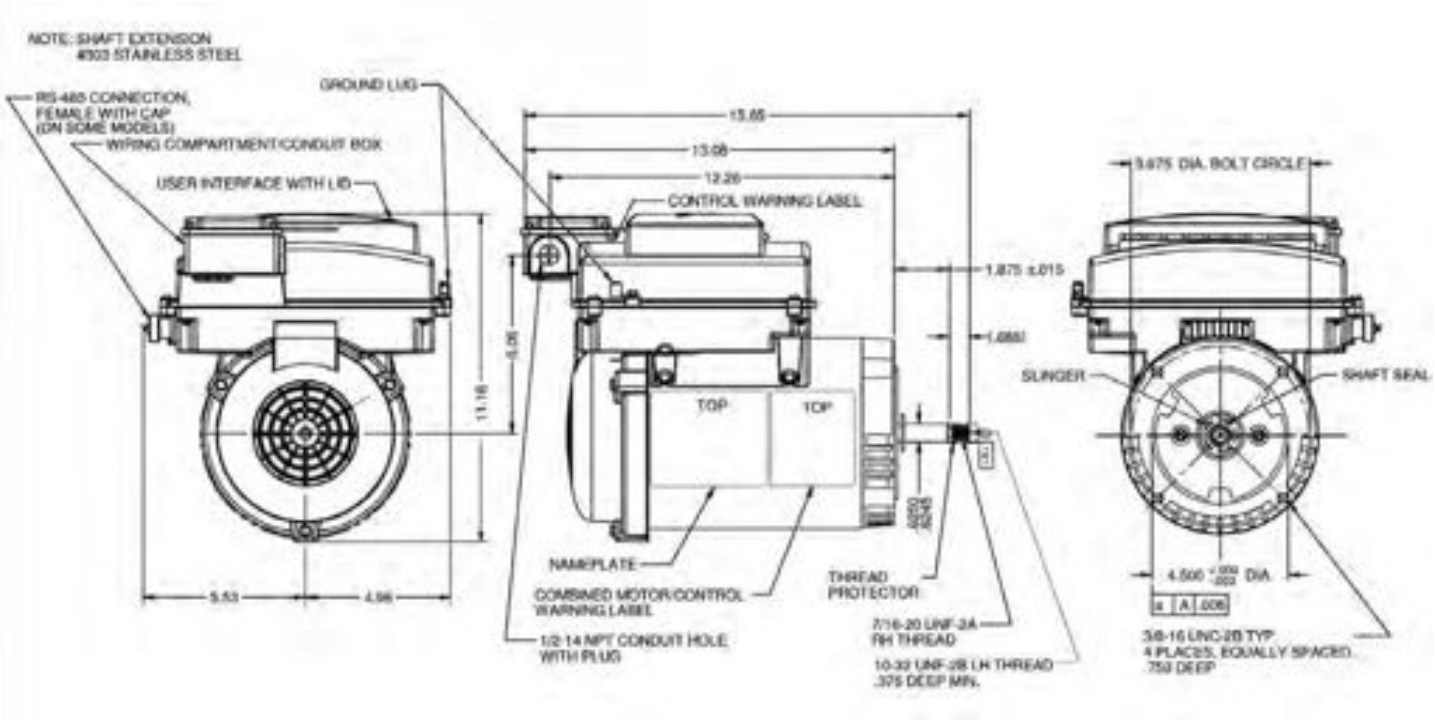
Unit must be in Stop mode to access programming. If RUN/STOP button is lit press RUN/STOP to turn off light and put in Stop mode.		
1.	Press the right arrow and EXIT button at the same time for 2 seconds (Note: the unit must not be running “STOP” condition, before setting program).	
2.	Use the (left arrow) and (right arrow) to move through the time and flow setting process. Use (up arrow) and (down arrow) to increase or decrease Time and Flow. % Flow Range: 30 – 100% Time Range: 0-10 minutes (Note: Set time to 0 to disable priming)	
3.	After you have set the desired Pump Priming program, press ENTER to save. The example shown on the display is for a 2 minute priming time/duration at 75% Flow.	
4.	If finished programming, push RUN/S OP button to run program. (Note: RUN/STOP button should be lit)	

ECOTECH EZ® Motor/Control Operation Continued:

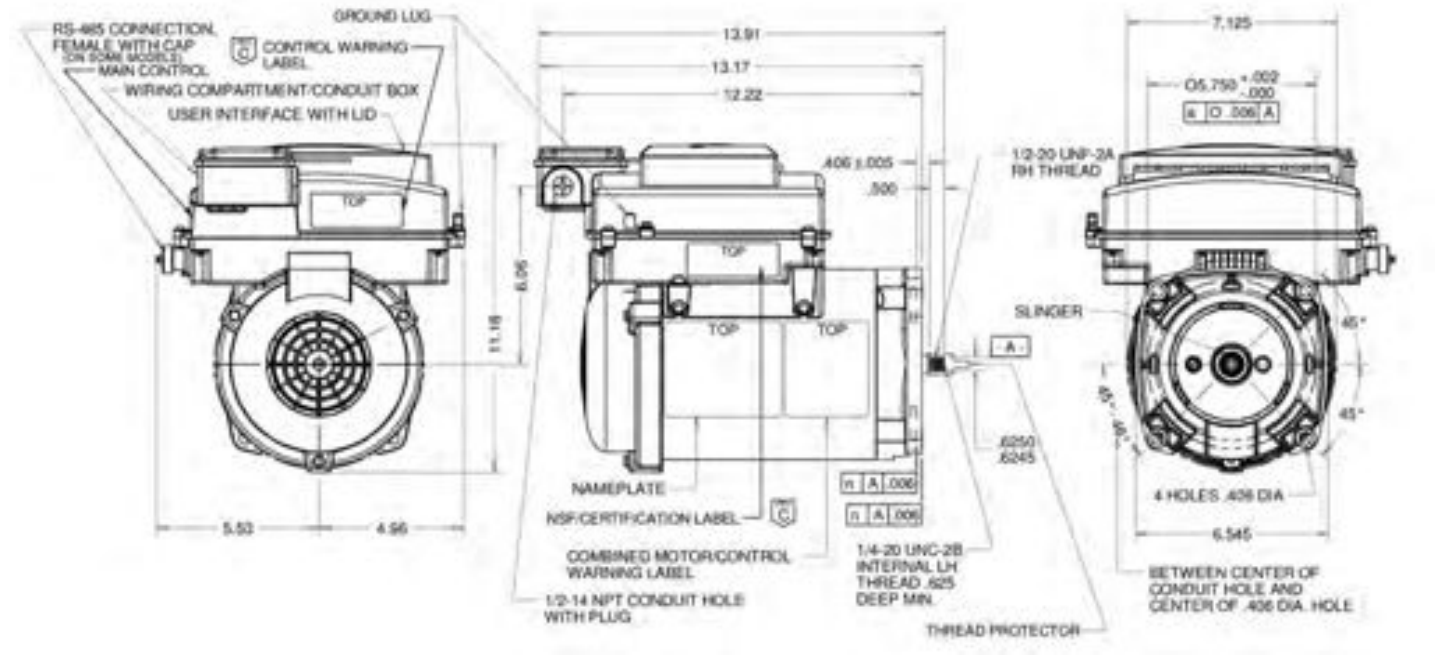
This section describes additional operations and features.



56J Mounting



Square Flange Mounting



Starting the Pump and Motor/Control

If the **RUN/STOP** button is illuminated, the motor is in the RUN mode. If the Clock is set and the time of day and day of week corresponds to a scheduled Program On time, the motor will automatically ramp up to speed within a few seconds. Be aware the unit will start in Prime mode running at full speed for four minutes. After the priming period has expired, the pump will operate at the flow percent demanded by the operating mode which caused the pump to start. When the unit is in Prime mode, the word “MAX” will flash above the percentage flow indicator.

Pressing the **Run Custom Flow** button followed by the **ENTER** button will start the pump in the current Custom Flow 1 setting. To start the pump in the Custom Flow # 2 setting, press **Run Custom Flow** twice before pressing **ENTER**; Press the **Run Custom Flow** button three (3) times then press **ENTER** to Run Custom Flow 3 and Press the **Run Custom Flow** button Four (4) times then press the **ENTER** button to start the pump in the Run Custom Flow 4 mode.

Stopping the Pump and Motor/Control

Press the RUN/STOP button to stop the pump.
The button will no longer be illuminated.

Running the ECOTECH EZ® Motor/Control per the Program Schedule

The **RUN/STOP** button must be illuminated. The motor/control will turn on and off automatically at the programmed start and stop times and it will operate at the programmed flow rates. The LCD screen will display the current operating flow rate in percentage of maximum format, the current time of day, the current day of the week, and the current or next Program Schedule that will run. The Program Schedule may be overridden by pressing the **Run Custom Flow** button or by pressing the **Run MAX Flow/Vacuum** button.

The user interface includes two programmable % Flow time periods for weekdays, Monday through Friday, and two programmable % Flow steps for weekends, Saturday and Sunday. These are the times at which the motor/control will turn on and operate at the programmed percentage flow until the time scheduled for Time Off.

The Default or preprogrammed settings are as follows:

Mon – Fri Flow 1: 7:30AM Time On and 4:00PM Time Off running at 50% Flow

Mon – Fri Flow 2: 4:00PM Time On and 6:00PM Time Off running at 70% Flow

Sat –Sun Flow 1: 7:30AM Time On and 4:00PM Time Off running at 50% Flow

Sat – Sun Flow 2: 4:00PM Time On and 6:00PM Time Off running at 70% Flow

Custom Flow 1	80%	120 min
Custom Flow 2	55%	240 min
Custom Flow 3	0%	10 min
Custom Flow 4	0%	10 min

You can also schedule the unit with overlapping program schedules. An example:

Mon – Fri Flow 1: 7:30AM Time On and 8:00PM Time Off running at 40% Flow

Mon – Fri Flow 2: 4:00PM Time On and 6:00PM Time Off running at 70% Flow

Sat – Sun Flow 1: 7:30AM Time On and 8:00PM Time Off running at 45% Flow

Sat – Sun Flow 2: 4:00PM Time On and 6:00PM Time Off running at 75% Flow

During the weekdays, the pump will run at 40% flow from 7:30AM until 4:00PM then run at 70% flow from 4:00PM to 6:00PM. At 6:00PM, the pump will revert back to the 40% Flow rate until 8:00PM. The same logic also applies to the above weekend program schedule. This feature could be used to save energy dollars by running the pump longer hours at slower flow rates while allowing for higher flow operation during cleaning or high traffic periods.

For 24 Hour Operation

Setting the same On and Off times may cause the unit not to run. An example:

Mon – Fri Flow 1: 6:00 AM Time On and 6:00 AM Time Off running at XX%.

The unit will turn on and off at the same time and will not run.

The recommended schedule for 24 hour operation is by using both Mon – Fri or Sat – Sun Flows. An example:

Mon – Fri Flow 1: 7:00AM Time On and 7:00PM Time Off running at 40% Flow

Mon – Fri Flow 2: 7:00PM Time On and 7:00AM Time Off running at 40% Flow

Sat – Sun Flow 1: 7:00AM Time On and 7:00PM Time Off running at 40% Flow

Sat – Sun Flow 2: 7:00PM Time On and 7:00AM Time Off running at 40% Flow

Priming the Pump

⚠ NOTICE Please follow all instructions from the pump manufacturer's product manual regarding the pump priming operation.

For the factory default setting, every time the pump starts from an Off condition (0% Flow), to ensure the pump is properly primed, the pump will ramp to full speed (100% Flow) for four minutes. When this occurs, the MAX icon will be flashing above the percentage flow indicat . After the priming time has expired, the pump will operate at the flow percent that is shown in the display. If it is less than 100%, the MAX icon will turn off.

The factory default setting can be changed to flows from 30% to 100% (in 5% increments), and time/duration from 0 to 10 minutes (in 1 minute increments), For NO PRIME, 0 minutes should be selected. During priming, the "% Flow" indicator flashes. See page 18 Section F "Programming for Pump Priming" for detailed instruction.

Run Max Flow / Vacuum Mode

To enter this mode, press the Run Max Flow / Vacuum button then press the Enter button. This mode provides an operation of 100% Max Flow for a duration of 30 minutes. These settings CANNOT be adjusted. While running in this mode, the Timer on the user interface will show the time remaining in the function and the percentage flow will show 100% Max Flow.

If additional time is needed to clean and vacuum the pool, or you would like to extend the time in this mode, pressing the Run Max Flow / Vacuum button again before the timer reaches zero minutes will reset the timer to 30 minutes.

After the completion of this mode, the unit will resume running per the program schedule.

The Run Max Flow / Vacuum mode may be stopped at any time by pressing the **Exit** button.

Manual Speed (Flow) Adjustment

While the pump is operating in any of the programmed flow modes, (Mon-Fri, Sat-Sun, or Custom Flows), the flo rate (speed) can be adjusted by pressing of the "Up" or "Down" arrows. Each press of the "Up" arrow will increase the % Flow by 5% increments until a maximum of 100% is reached. Additional pushes of the key will have no further effect. Each press of the "Down" arrow will decrease the % Flow by 5 % increments until a minimum of 30% is reached. Additional pushes of the key will have no further effect. When the % Flow is changed manually with the "Up" and "Down" arrow keys the setting is not stored, but will be maintained until a change in flow is called for by the program, or the operating mode is cancelled.

Run Custom Flow Mode

This function's purpose is to allow for regular or special objectives to be accomplished with a minimal amount of effort for the user. For example, the default value for Custom Flow 1 is as follows: programmed. For instructions on setting additional Custom Flow settings, see page 17.

To Run the Custom Flow operation:

Pressing the Run Custom Flow button followed by the ENTER button will start the pump in the current Custom ENTER.

Pressing the Up or Down arrow keys before pressing ENTER will cycle through the 4 Custom Flow settings. When running, the Timer on the user interface will show the time remaining in the program and the percentage flow will show the programmed percentage of Flow. The timer will count down the minutes remaining in your function.

The Run Custom Flow mode can be stopped at any time by pressing the Exit button.

Freeze Protection Feature

⚠ NOTICE This feature is for protection of the pump so water does not freeze inside the pump.

How it works: The user interface control will monitor the ambient temperature around the motor/control when the motor/control is turned off. If the ambient temperature falls below 40°F, the user interface will run the motor/control at minimum speed (30% Flow) for 30 minutes followed by 30 minutes of zero flow time. The freeze protection cycle will not override the time when the Program Schedule would normally operate the pump.

⚠ NOTICE This feature is not for winterizing or closing a pool in a colder climate.

Winterize

For colder climates where the pool is closed for the winter season, the electrical power should be shut off to the motor at the circuit breaker.

⚠ NOTICE Follow all pump manufacturer instructions regarding Winterizing the pump and system.

Reset to Factory Defaults

Resetting the factory defaults will return the programmable settings to the factory defaults. Activating the reset to factory default option is done by pressing the Left arrow button, the Exit button, and the Run/Stop button. When this button combination is pressed for more than two seconds the reset to factory defaults mode will activate. The following will be reset to the factory default settings:

The Program Schedule:

Mon – Fri Flow 1: 7:30AM Time On and 4:00PM Time Off running at 50% Flow

Mon – Fri Flow 2: 4:00PM Time On and 6:00PM Time Off running at 70% Flow

Sat –Sun Flow 1: 7:30AM Time On and 4:00PM Time Off running at 50% Flow

Sat – Sun Flow 2: 4:00PM Time On and 6:00PM Time Off running at 70% Flow

The Custom Flow 1 Setting:
80% Flow for a duration of 120 minutes

The Custom Flow 2 Setting:
55% Flow for a duration of 240 minutes

The Custom Flow 3 Setting:
0% Flow for a duration of 10 minutes

The Custom Flow 4 Setting:
0% Flow for a duration of 10 minutes

Backup Power Supply

In the event the power would go out and not supply your ECOTECH EZ® motor/control, the user interface will keep the current day of the week settings and the time of day settings for 12-16 hours without power to the motor. Your Program Schedule and your Custom Flow settings will remain intact in the event the power is out longer than 12-16 hours. Should the power outage extend longer than the backup power supply, reset your clock and day of the week to resume operations.

⚠ NOTICE These instructions can be found on page 13 of this guide.

Locking the Keypad

To prevent inadvertent or unauthorized changing of the program parameters, the keypad can be locked. To lock the keypad, use the following procedure:

1. Press the ENTER and the Exit buttons simultaneously and hold for 2 seconds. After 2 seconds the "Press ENTER to Confirm" icon in the display will start blinking.

2. Press Enter.
   The keypad is now locked, and the letters "LOC" will be shown in the display for 5 seconds.

   After 5 seconds, the letters "LOC" will go off, and the display will revert back to showing the Time, Day of Week, % Flow rate, operating mode the unit was running (i.e. Mon-Fri Flow 1, Custom Flow, or Vacuum). (If keypad lockout is activated while in Custom Flow or Vacuum mode, those modes will continue to operate and time out per the programmed times. When those operating modes are complete, the unit will either revert back to the appropriate Mon-Fri or Sat-Sun programmed modes or the motor will stop depending on which mode the unit was in prior to entering the Custom Flow or Vacuum mode)

   Pressing of any button on the keypad (other than the RUN/STOP button), while the keypad is locked will cause the display to completely blank except for the letters "LOC" which will be displayed for 5 seconds after the button is pressed. After 5 seconds, the display will revert back to what was being displayed prior to the button press.

   Pressing of the Run/Stop button while the keypad is locked, will either stop the motor if it was running and turn off the RUN/STOP LED, or start the motor in program mode if it was stopped and turn on the RUN/STOP LED.

   Note: If a power outage occurs while the keypad is locked, when power is restored the keypad will remain locked.

To exit the keypad lockout mode:

1. Press the ENTER and the Exit buttons simultaneously and hold for 2 seconds. For the first 2 seconds, the display will show the letters "LOC". After 2 seconds, "LOC" will go out and the "Press ENTER to Confirm" icon will start blinking.

2. Press Enter.
   The keypad is now unlocked and all of the buttons will function normally. The display will revert back to showing the Time, Day of Week, % Flow rate, the program mode the unit is running. (If the ENTER button is not pressed within 5 seconds, the keypad will stay locked, the “Press ENTER to Confirm” icon will go out, and the display will revert back to showing the Time, Day of Week, % Flow rate, and the program mode the unit is running).

Operating the ECOTECH EZ® Motor/Control via an External Controller (on some models)

There is an RS-485 port on the side of the motor/control available for connection to an external controller. If an external controller is connected to this product, the user interface is no longer in control of the unit.

The external controller takes precedence.

If an external controller is utilized, make sure the following conditions are met:

- 10 meter maximum line length from the controller to the motor
- This line must be an isolated, non-grounded connection
- Contact US Motors/Nidec Motor Company for the proper communication protocol
- Contact information can be found on page 2 of this manual

Operating the ECOTECH EZ® Variable Speed Pool Motor/Control with other Equipment Pad Items

Heaters:

If your pool heater has a time clock function, it is very important to ensure the pool filtration pump is running whenever the pool heater is running. The pool heater should not run during times when the filtration pump is off. The pool heater program timer setting should be set to start and stop during the program on and off times programmed on your ECOTECH EZ® variable speed pool motor/control. Be aware of the backup power supply feature on the ECOTECH EZ® motor/control as other time clocks may lose the correct time in the event of a power outage.

⚠ NOTICE It is good practice to check and/or reset the current time of day and day of week settings on your equipment pad time clocks in the event of a power outage or during spring or fall time changes.

Pool Cleaners with Booster Pumps:

It is recommended to start your pool sweep one hour or more after your filtration pump has started and stopping the pool sweep one hour or more before your filtration pump shuts off. If your pool cleaner operates on a time clock, it is very important to set your pool sweep on and off times per the above recommendation. Be aware of the backup power supply feature on the ECOTECH EZ® motor/control as other time clocks may lose the correct time in the event of a power outage. It is a good practice to check and perhaps reset the current time of day and day of week settings on your equipment pad time clocks in the event of a power outage or in the event of a spring or fall time change.

Refer to the manufacturer’s product manual for your pool cleaner for proper cleaning time durations.

Pool Cleaners without Booster Pumps:

After your ECOTECH EZ® Motor/Control is running and your pump is fully primed, refer to the pool sweep manufacturer’s startup procedures then follow the procedures for Run Max Flow / Vacuum mode found on page 16 of this manual.

If an item has a timer regulating its operation, it can be very important that the equipment pad item runs only when the ECOTECH EZ® Motor/Control is running. Check the item’s product manual to properly determine if the item should run only when the filtration pump is running. If this is the case, follow these instructions when synchronizing the timer operations of your various equipment pad items.

⚠ NOTICE It is a good practice to check and reset the current time of day and day of week settings on your equipment pad time clocks in the event of a power outage or in the event of a spring or fall time change.

⚠ NOTICE Please follow the operating instructions of these equipment pad items.

Fault Conditions

The user interface advises when certain fault conditions occur. These fault conditions may be resolved at the equipment pad.

Low Voltage Trip

The voltage to the motor/control conduit box terminals must be 230 volts AC (Alternating Current), +/- 10% or 207-253 volts AC, 60 Hertz. A sustained input voltage significantly below 207 volts AC will cause a Low Voltage Trip to occur. This trip will occur if 115 volts AC is applied to the conduit box terminals instead of the required 230 volts AC. When this Low Voltage Trip occurs, the Call for Service icon, the Attention icon and the Low Voltage icon will illuminate on the LCD screen. The pump will also shut down and automatically restart when operating conditions are within specifications. The pump will begin ramping up to speed slowly until reaching the percentage flow or speed for which the motor/control was running prior to the fault occurring. When this fault occurs, this could indicate a problem with the input line voltage or wiring to the unit.

⚠ NOTICE If this fault continues to occur even after verifying that the input line voltage is between 207-253 volts AC, then call your pool professional or a qualified electrician for service.

Blocked Pump Trip

The Blocked Pump fault is an indication of a mechanical obstruction causing the motor shaft not to turn. When this occurs, the Blocked Pump icon and the Attention icon will illuminate on the LCD screen. The pump will shut down. This is a self-resettable fault, meaning the motor/control will attempt to restart by ramping to the percentage flow for which the motor/control was running prior to the fault. This reset will occur up to five times after which the user must press the Exit button to recheck the system to determine if the Blocked Pump condition still exists. If not, the pump will begin ramping up to speed slowly until reaching the percentage flow or speed for which the motor/control was running prior to the fault occurring. If the condition still exists, the fault will occur again.

⚠ NOTICE If the Exit button is pressed a second time and the Blocked Pump condition still exists, the Call for Service icon will illuminate.

High Amps Trip

The High Amps Trip is an indication of a possible motor/control overload. When this occurs, the High Amps icon and the Attention icon will illuminate on the LCD screen. The pump will shut down. This is not a self-resettable fault and the user must press the Exit button to recheck the system to determine if the High Amps condition still exists. If not, the pump will begin ramping up to speed slowly until reaching the percentage flow or speed for which the motor control was running prior to the fault occurring. If the condition still exists, the fault will occur again.

⚠ NOTICE If the Exit button is pressed a second time and the High Amps condition still exists, the Call for Service icon will illuminate.

Temp Trip Fault

The Temp Trip is an indication of an excessive operating temperature that could damage the motor control. When this occurs, the Temp Trip and Attention icon will illuminate and the pump will shut down. After 5 minutes, the motor will restart automatically, and if the temperature has dropped to a safe value, will begin ramping up to speed slowly until reaching the percentage flow or speed the motor/control was running prior to the fault occurring. During restart, if the operating temperature is still excessive, the unit will shut down again for another 5 minutes. When this fault occurs, this could indicate inadequate ventilation around the product. Make sure there is proper ventilation around the product by removing any leaves or other items which may be restricting the air flow around the motor and control

⚠ NOTICE If it trip persists, call your pool professional or a qualified electrician for service

All Internal Faults

Internal faults are failure conditions that do not have an icon in the LCD display. These faults usually result in control failure, but may be cleared by cycling the main power. If the Attention and the Call for Service icons illuminate and the pump has stopped, turn off the power for 10 minutes at the main circuit breaker then turn the power back on to reset the system. If this step does not clear the fault, contact your pool professional for service.

General Troubleshooting

Also refer to Fault Conditions section on page 24. This chart recommends common answers to electric motor issues. Refer to your pump manual for hydraulic guidance. When repetitive issues occur, Nidec Motor Corporation recommends contacting your local pool and spa professional for technical assistance.

Symptom	Possible Causes	Corrective Action
Motor/Control Fails to Start	Blown Fuse or Tripped Circuit Breaker	Turn off motor/control. Replace fuses with time delay type or reset the breaker.
	Incorrect Voltage to Motor/Control	Verify motor/control voltage to the terminals match the nameplate voltage requirements. 207-253 Volts (60 Hertz) is the allowable voltage range for this product. Is there a timer, a controller, or a line switch? Are they in the ON position?
	Improper terminal connections	Turn off power. Verify connections are per the nameplate connection diagram.
	Blocked Pump or Shaft	Turn off power. Follow pump manufacturer's instructions for dislodging foreign matter inside the pump.
Motor/Control does not come up to full speed	Application issue	Call your pool service professional. The motor/control could be overloaded.
	Low Voltage	Verify motor/control voltage to the terminals matches the nameplate voltage requirements.
Motor/Control stalls during operation	Overloaded Motor/Control	Reduce the load or % Pump Flow.
	Low Voltage	Verify motor/control voltage to the conduit box connection terminals matches the nameplate voltage requirements.
Motor vibrates or is excessively noisy	Motor and Pump misalignment	Consult your pump manual for proper alignment instructions or call your pool service professional. Before taking any corrective actions, ensure the power is OFF.
	High Voltage	Verify motor/control voltage to the terminals matches the nameplate voltage requirements.

How to Lower Utility Costs with the ECOTECH EZ® Variable Speed Pool Motor/Control

Your electric bill is based on the number of Kilowatt's used in a typical billing cycle. Each Kilowatt is 1,000 watts. To calculate how much energy your current pool motor is using and to calculate your savings potential with the ECOTECH EZ® motor/control, visit **www.nidec-motor.com/pool** and use our energy calculator. The calculator will show you how many hours to run your pump each day along with the appropriate percentage flows for maximum energy savings. Contac your utility company to determine if there are times during the day when usage is prohibited, then program your ECOTECH EZ® motor/control to either not run or to run at a very low flow rate during these periods.

NOTE: By reducing your speed to 50% Flow, your horsepower requirement is reduced to 1/8th of the 100% or Max Flow Hp. The calculation is as follows: (50/100 * 50/100 * 50/100) = .125 or 12.5%. To run the pump at 30% flow: (30/100 * 30/100 * 30/100) = 0.027 or 2.7% of the previously used Max Flow Hp. This is a primary advantage of the ECOTECH EZ® Variable Speed Pool Pump and Motor/Control! See our energy calculator to determine your energy savings by reducing the motor/control speed while enabling the proper amount of daily flow to properly filte your pool.

Recommended Maintenance

⚠WARNING Before performing any maintenance, disconnect the power, allow the motor to come to a complete stop and wait five minutes. This will allow the control capacitors to safely discharge any residual voltage.

Periodically inspect the installation. Check for dirt accumulations, unusual noises or vibration, overheating, worn or loose couplings, high motor amps, poor wiring or overheated connections, and for loose mounting bolts or guards.

Remove dirt accumulation, particularly in and around the ventilation openings on the motor by vacuuming. Dirt accumulations can cause motor overheating and a fire hazard

Do not use any type of solvents! Some solvents may attack the motor insulation, finish or bearing lubricants. Solvents are also highly flammable

This motor contains ball bearings which are permanently lubricated. No maintenance is required.

LIMITED WARRANTY

Nidec Motor Corporation extends the following LIMITED WARRANTY to the purchaser and to its customers (collectively referred to as the "Purchaser") of the enclosed motor and components: the motor and components are free from defects in materials and workmanship under normal use, service and maintenance FOR A PERIOD OF 18 MONTHS FROM THE DATE OF ORIGINAL PURCHASE FROM NIDEC MOTOR CORPORATION OR THE NIDEC MOTOR CORPORATION DEALER/ RETAILER, NOT TO EXCEED 24 MONTHS FROM THE DATE OF MANUFACTURE BY NIDEC MOTOR CORPORATION. THE FOREGOING WARRANTY IS THE ONLY WARRANTY GIVEN AND NO OTHER WARRANTY IS PROVIDED, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Certain aspects or disclaimers are not applicable to consumer products, i.e., motors and components acquired by individuals and used for personal, family or household purposes (as distinguished from industrial or other purposes). Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

Certain repairs or services are the responsibility of the Purchaser and the Purchaser is expected to pay for them. This warranty does not extend to any losses or damages due to misuse, accident, abuse, neglect, negligence, unauthorized modification or alteration, use beyond rated capacity, or improper installation, maintenance, application or use, including, without limitation, use in a manner contrary to the accompanying instructions or applicable codes.

If within thirty (30) days after Purchaser's discovery of any warranty defects within the above stated warranty period, Purchaser notifies Nidec Motor Corporation or the dealer from whom the motor was purchased in writing, Nidec Motor Corporation shall, at its option and as Purchaser's sole and exclusive remedy, repair or replace or refund the purchase price for, that portion of the motor and components found by Nidec Motor Corporation to be defective. Failure by Purchaser to give such written notice within the applicable time period shall be deemed an absolute and unconditional waiver of Purchaser's claim for such defects. Purchaser must write or call the dealer from whom the motor was purchased for directions regarding the shipment of the motor, with freight pre- or call the dealer from whom the motor was purchased for directions regarding the shipment of the motor, with freight prepaid by the Purchaser, to an authorized service location for warranty service. If Purchaser is unable to contact the dealer to obtain sufficient instructions regarding the handling of the motor, Purchaser should write Nidec Motor Corporation at the address on the back cover of this manual, giving the model number, the dealer's name, address and number of dealer's invoice; and describing the nature of the alleged defect. Arrangements for warranty service will then be made by Nidec Motor Corporation. If the motor is damaged in transit, Purchaser should file a claim directly with the carrier.

IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT, INFRINGEMENT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE), SHALL NIDEC MOTOR CORPORATION'S LIABILITY TO PURCHASER OR ITS CUSTOMER EXCEED THE PRICE PAID BY PURCHASER FOR THE SPECIFIC MOTOR OR OTHER GOODS PROVIDED BY NIDEC MOTOR CORPORATION GIVING RISE TO THE CAUSE OF ACTION. IN NO EVENT SHALL NIDEC MOTOR CORPORATION'S LIABILITY TO PURCHASER OR ITS CUSTOMER EXTEND TO INCLUDE INCIDENTAL CONSEQUENTIAL OR PUNITIVE DAMAGES, WITH RESPECT TO CONSUMER PRODUCTS, SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Pool Motor Product Service Hotline: **1-800-566-1418**
www.nidec-motor.com/pool

NIDEC MOTOR CORPORATION

8050 W. Florissant Avenue | St. Louis, MO 63136
Phone: 888-637-7333 | Fax: 314-553-2087
www.nidec-motor.com | **www.usmotors.com**

Installation Manual

ecotech EZ®
Interface Adapter

www.nidec-motor.com/pool

ecotech EZ® Interface Adapter Kit includes

- ecotech EZ Interface Adapter

- RS-485 Cable

- RJ12 Power Tap

- Input/output Cables (22 AWG), qty. 5

- Interface Adapter Manual

⚠ CAUTION

To prevent electrical shock and/or equipment damage, disconnect electric power to system at main fuse or circuit breaker box until installation is complete.

⚠ ATTENTION

ecotech EZ® Interface Adapter is not serviceable.

Installation

ecotech EZ® Interface Adapter installation and all components of the control system shall conform to Class II circuits per the NEC code.

Interface Adapter must be mounted inside the low voltage compartment of most pool control systems. **If there is not an existing suitable enclosure for pool control system, a separate NEMA 4 enclosure is required.**

⚠WARNING Interface adapter wiring is all low voltage; choose a location away from all high voltage.

1. Use the double face mounting tape on back of interface adapter for mounting.

2. Recommended orientation is with input/output cables downward.

Wiring Connections

Refer to equipment manufacturer's instructions for all wiring other than interface adapter wiring. For wiring to the interface adapter, see BASIC CONFIGURATION section.

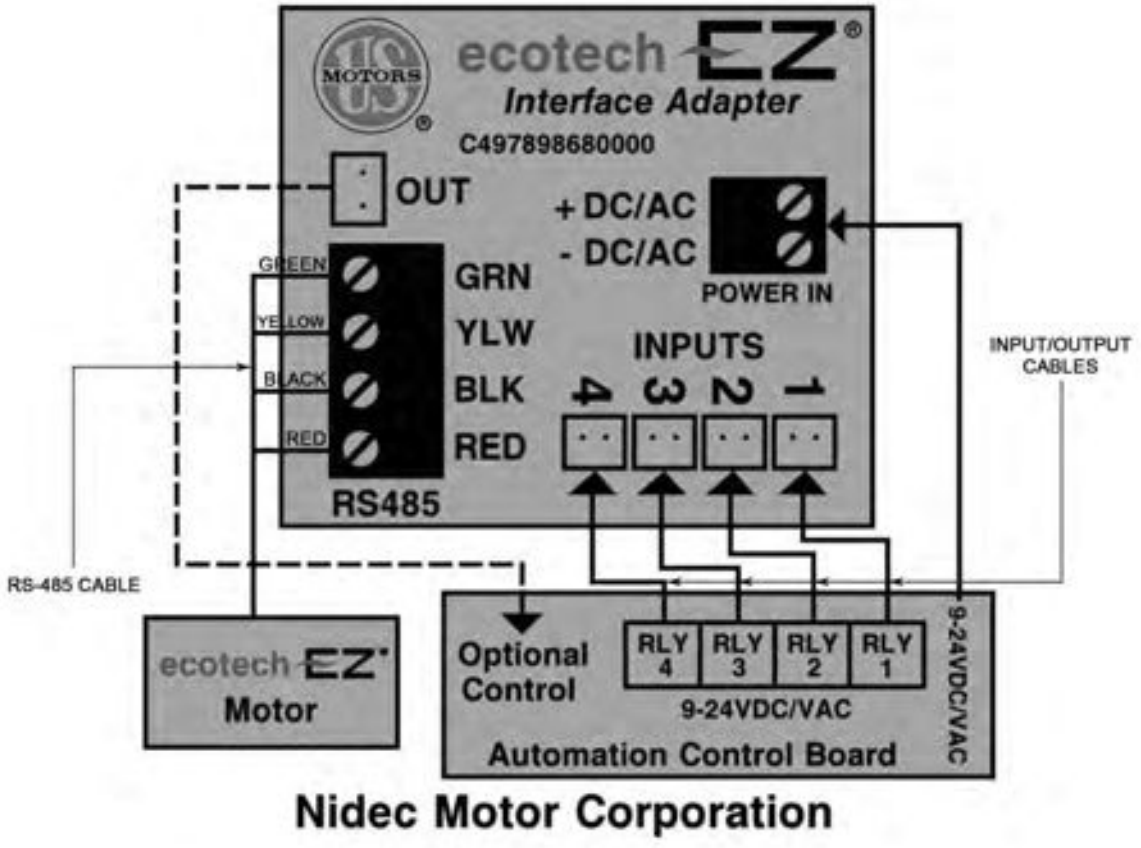
POWER (9-24 VAC/VDC)
+DC/AC……Positive for DC or AC
-DC/AC…….Negative for DC or AC
Note: Polarity only applicable for DC

RS485
GRN…… Green wire on RS485 cable
YLW…… Yellow wire on RS485 cable
BLK……. Black wire on RS485 cable
RED…… Red wire on RS485 cable

INPUTS 1-4 (9-24 VAC/VDC) – Connect to Relay coil or Valve control of Pool control system

OUTPUT (24 VAC/VDC), 200 mA Max – "ON" when ecotech EZ® motor speed is greater than 1600RPM

FIG. 1



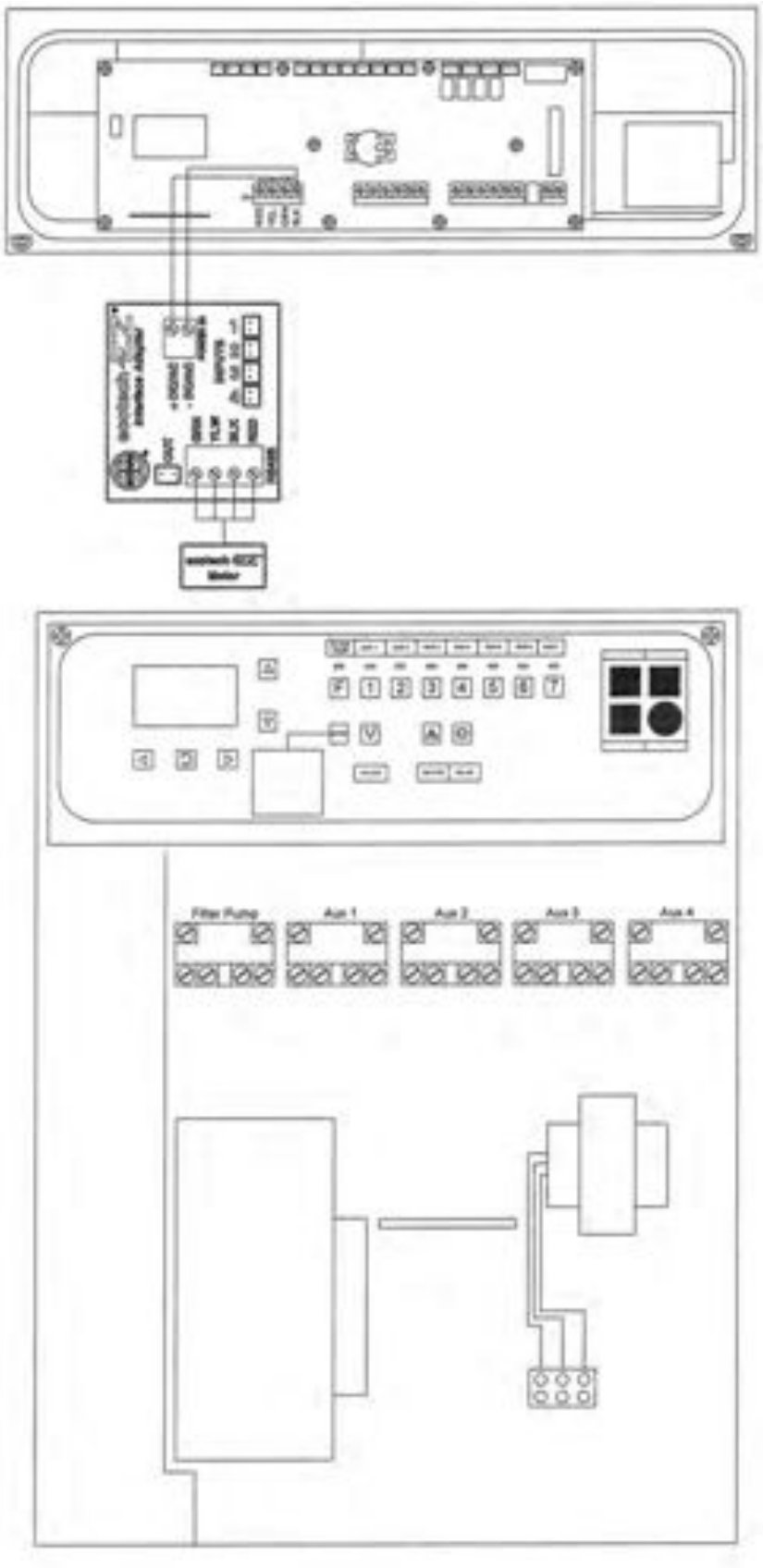
Basic Configuratio

This page provides a summary of the basic set-up of the **ecotech EZ® Interface Adapter** with the **ecotech EZ®** variable speed pool motor.

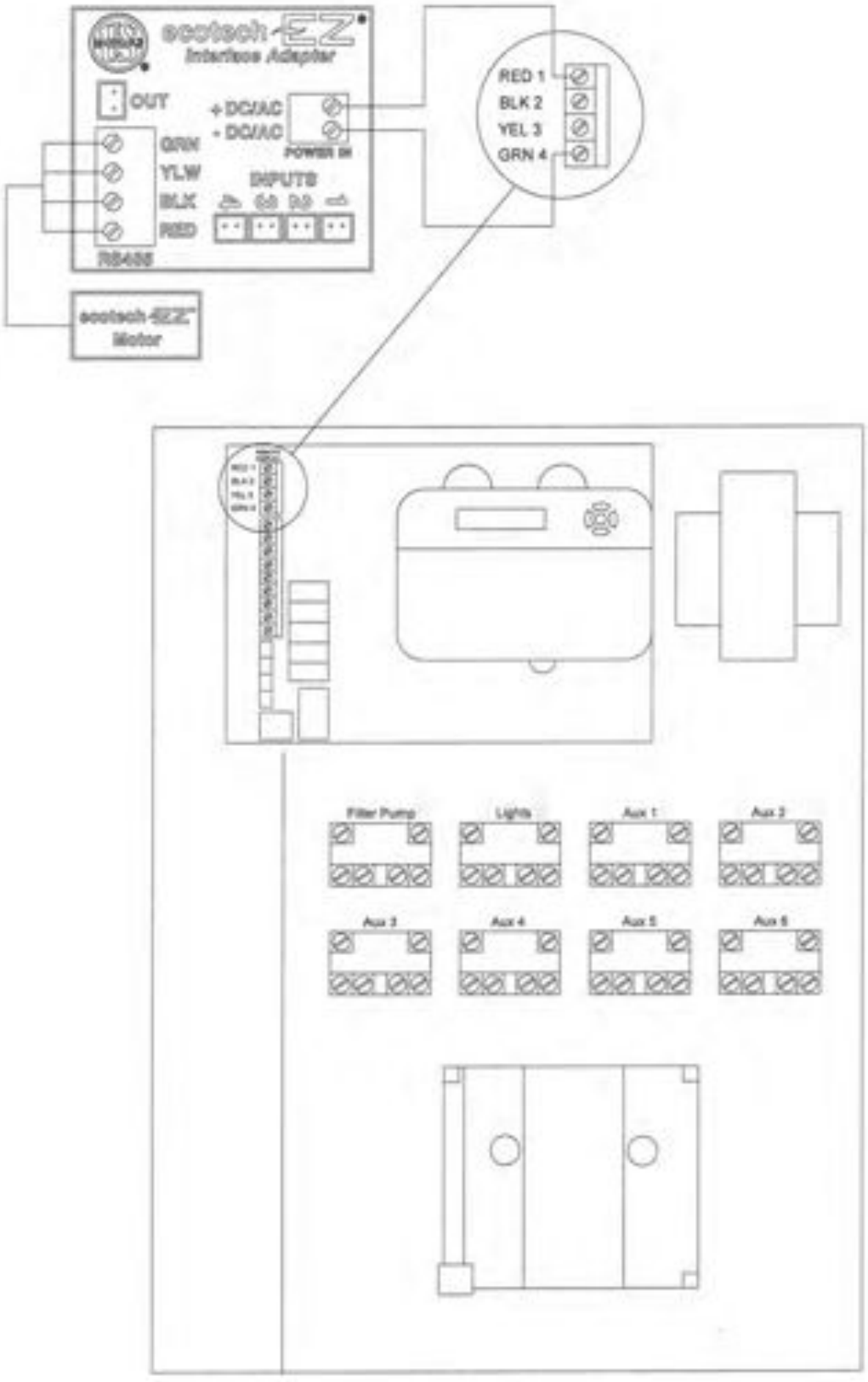
1. Connections for the interface adapter: **⚠WARNING DO NOT EXCEED 24V TO ANY TERMINALS**.
   - 9-24 VDC or VAC (200mA max) power source (+DC/AC and –DC/AC terminals) can be supplied from the automation control system circuit board or an AC power transformer (not supplied)
   - One to four relay inputs (INPUT 1 through 4)
   - RS485 communication cable (Red, Yellow, Green, Black)
   - Low Voltage Relay Output
2. Connect low voltage power terminals (+DC/AC, -DC/AC).
3. Determine appropriate connections between interface adapter and pool automation control board. If more than one interface adapter “Flow Setting” is activated, the highest flow number activated will have priority. Time and day function will still operate on the ecotech EZ® motor/control but the Pool Automation System will override when one of the flow rates is activated on the ecotech EZ® interface adapter.
4. Connect RS485 cable to ecotech EZ® RS485 connection port.
5. Inputs 1-4 corresponds to custom flow settings 1-4 of ecotech EZ® motor/control. See ecotech EZ® motor/control manual for specific setup instructions.
6. OUT Relay is available as required to signal an external control for auxiliary load (for example, relay to a booster pump). This relay does not provide power to the external load, only a signal for switching power in an external circuit (9-24VAC/VDC, 200 mA Max). This output is “ON” when the motor speed is above 1600 RPM.
7. When the LED near the “POWER IN” is blinking, the interface adapter is communicating with the ecotech EZ® motor/control.
   NOTE: Power should be “ON” to both interface adapter and motor/control.

See pages 6-8 for common control connections.
Verify voltages prior to making all connectioms.

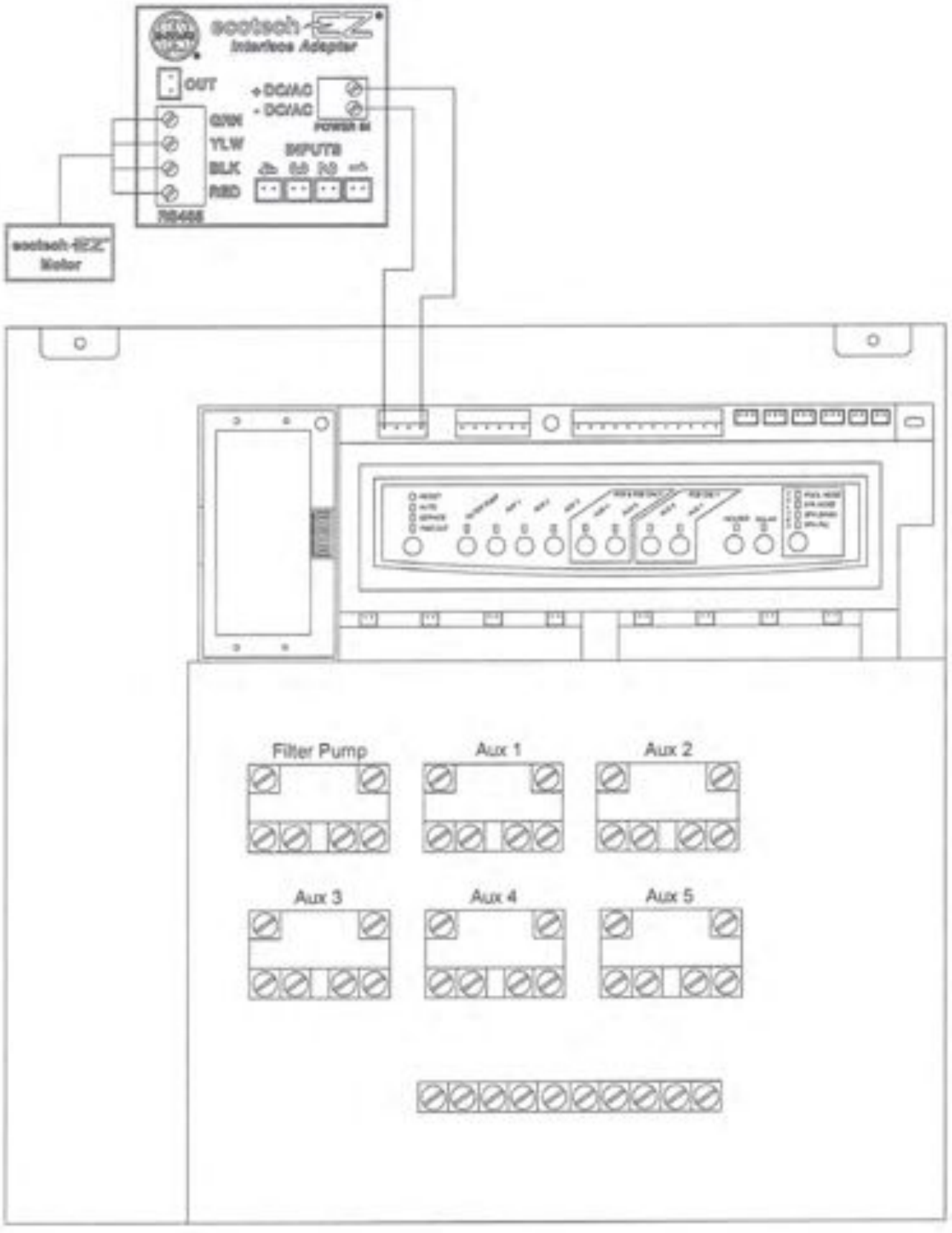
Pentair Pool® Control



Hayward Pool Products®
Goldline® Control



Aqualink® Control



General Connection Instructions

POWER: Within the low voltage area of the pool automation, system identify a source of 9-24 VAC or VDC for interface power and connect to +DC/AC and -DC/AC terminals. This should be a continuous source of voltage. This can usually be supplied from the pool automation system, but a dedicated supply may be needed in some installations.

INPUTS: Connect to desired relay coil voltages (NOT RELAY OUTPUTS!) to control speed as desired. Inputs are low voltage, 9-24 VAC or VDC.

OUTPUT: Low voltage output that is on when motor speed is greater than 1600 RPM. This can be used to drive a relay for line voltage loads. Use of this output is optional.

Interface Adapter Specifications

Size	3.75” x 2.5” x 1.0”
Supply Voltage	9-24 VDC or VAC, ±10%, 40 mA (typical)
Temperature Range:	
Operating	0ºC to 50ºC
Storage	-30ºC to +80ºC
Relative Humidity	5% to 85%

Inputs:

Auxiliary 1:	9-24 VDC or VAC, ±10%, 5 mA (typical)
Auxiliary 2:	9-24 VDC or VAC, ±10%, 5 mA (typical)
Auxiliary 3:	9-24 VDC or VAC, ±10%, 5 mA (typical)
Auxiliary 4:	9-24 VDC or VAC, ±10%, 5 mA (typical)

Determine appropriate connections between interface adapter and pool automation control board. If more than one interface adapter “Flow Setting” is activated, the highest flow number activated will have priority. Time and day function will still operate on the ecotech EZ® motor/control but the Pool Automation System will override when one of the flow rates is activated on the ecotech EZ® interface adapter.

Outputs:

MTR “ON”:	Switch Closure: 26.5 VDC or VAC MAX, 200 mA Maximum Closed when motor speed is greater than 1600RPM.

Please refer to ecotech EZ® manual for set-up and installation of the ecotech EZ® pool motor. A copy of the manual can be found at www.nidec-motor.com/pool.

† All marks shown within this document are properties of their respective owners.

For more information about the U.S. Motors brand, visit www.nidec-motor.com or www.usmotors.com.

NIDEC MOTOR CORPORATION

8050 W. Florissant Avenue | St. Louis, MO 63136
Phone: 888-637-7333 | Fax: 866-422-7758

www.nidec-motor.com/pool