Installation & Operating Manual

Please read this manual carefully before attempting to install, operate or maintain the product described. Failure to comply with the information provided in this manual could result in personal injury and/or property damage. Retain this manual for future reference.

LAING

E1, E3, E5, E10, and E14 Series

Description

Laing centrifugal pumps are designed for circulation and transfer of a variety of fluids compatible with their materials of construction limited to maximum fluid temperatures and maximum line pressures as indicated below. Unique leakproof integrated motor/pump design eliminates the need for conventional mechanical seals or other shaft sealing devices. They are self lubricating and require no external lubrication.

E Series Model/ Nomenclature Matrix

E1, E3, E5, E10, or E14	-	N	C	H	R	1	W	xx
Model		1st	2nd	3rd	4th	5th	6th	7th (Suffix position)
Family								

Position	Suffix	Attribute
1st	B	Pump Housing is bronze or brass
	N	Pump Housing is Noryl, Luranyl, or Ultramid. Wetted metal parts are 316 Stainless
	S	Pump Housing is Stainless
	T	Pump Housing is Noryl, Luranyl, or Ultramid. Wetted metal parts are Titanium
	H	Pump Housing is Cast Iron
2nd	C	Center Discharge
	S	Side Discharge
3rd	H	Hose Connection
	T	Threaded Connection
	S	Sweat Connection
	F	Flanged Connection
4th	V	Variable Control
	P	PWM Control
	A	1-5 volts Analog Control
	C	Temperature Control Fixed
	R	Temperature Control Adjustable
	F	Flow Control
	N	Fixed No Control
	T	Timer Control
	S	Self Regulates Pressure Control
5th	1	110-120 Volts AC
	2	208-240 Volts AC
	3	100-240 Volts AC
6th	W	With Cord
	Blank	No Cord
7th	xx	two digit suffix numbers changes with minor mechanical variations pump construction

E Series Specifications

E1, E3, E5, E10, and E14 Series

	Min Fluid Temp	Max Fluid Temp	Max Fluid Temp	Max Pressure	Max Pressure	Max Ambient Temp	Max Ambient Temp	Min Storage Temp	Min Storage Temp	Voltage Range	Freq	Rated Wattage	Max RPMs
	(°C)	(°C)	(°F)	(bar)	(PSI)	(°C)	(°F)	(°C)	(°F)	(V)		(max.: W)	
E1 Brass	10	95	203	10.32	150	50	122	-30	-22	100-240V	50-60Hz	12	3600
E1 Plastic	10	60	140	3.5	51	50	122	-30	-22	100-240V	50-60Hz	12	3600
E3 Brass	10	95	203	10.32	150	50	122	-30	-22	100-240V	50-60Hz	27	4800
E3 Brass Vario	10	95	203	10.32	150	50	122	-30	-22	100-240V	50-60Hz	27	4800
E3 Plastic	10	60	140	3.5	51	50	122	-30	-22	100-240V	50-60Hz	27	4800
E5 Strong Brass	10	80	176	10.32	150	50	122	-30	-22	100-240V	50-60Hz	50	5340
E5 Strong Plastic	10	80	176	3.5	51	50	122	-30	-22	100-240V	50-60Hz	50	5340
E10 Brass	10	95	203	4.14	60	50	122	-30	-22	115V	50-60Hz	80	3100
E10 Plastic	10	55	131	2	29	50	122	-30	-22	115V	50-60Hz	80	3100
E10 Cast Iron flanged	10	95	203	4.14	60	50	122	-30	-22	115V	50-60Hz	80	3100
E10 Brass	10	95	203	4.14	60	50	122	-30	-22	230V	50-60Hz	80	3100
E10 Plastic	10	55	131	2	29	50	122	-30	-22	230V	50-60Hz	80	3100
E10 Cast Iron flanged	10	95	203	4.14	60	50	122	-30	-22	230V	50-60Hz	80	3100
E14 Plastic	10	55	131	2	29	50	122	-30	-22	230V	50-60Hz	110	2700

Housing Codes	Material/Connection	Available On
BCS 1/2”	Brass 1/2” (5/8”) Sweat	E1, E3, E10
BCT 1/2”	Brass 1/2” (5/8”) Threaded Female NPT	E1, E3
BCS 3/4”	Brass 3/4” Sweat	E1, E3, E10
SCT 3/4”	Stainless 3/4” Threaded Female NPT	E10
BCF	Bronze 3/4” Flanged	E10
HCF	Cast Iron 3/4” Flanged	E10
NCH 1/2”	Noryl 1/2” OP Hose	E1, E3, E5
NCH 3/4”	Noryl 3/4” OP Hose	E1, E3, E5, E10
NCT 3/4”	Noryl 1/2” Threaded Male NPT	E1, E3, E15
NCT 3/4”	Noryl 3/4” Threaded Male NPT	E1, E3, E5, E10
NCH 1”	Noryl 1” OP Hose	E10

Materials of Construction (wetted parts)

Part	Plastic Housing Models	Non Plastic Housing Models
Pump Housing	Nylon/PPO	316 Stainless Steel, Metal, Brass
“O” Ring	EPDM or Viton	EPDM or Viton
Impeller	Nylon/PPO	Nylon/PPO
Bearing	Carbon/Allumina Ceramic	Carbon/Allumina Ceramic
All Other Wetted Parts	316 Stainless Steel or Plastic	316 Stainless Steel or Plastic

Unpacking

When unpacking the unit inspect carefully for any damage that may have occurred during transit. Check for loose, damaged, or missing parts. Do not attempt to assemble or operate pump if any parts are missing or damaged.

General Safety Information

1. Know the pump application, limitations and potential hazards.

⚠WARNING

Pump should only be used with liquids compatible with pump component materials. Do not use to pump flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. Do not use in flammable and/or explosive atmospheres.

⚠CAUTION

These pumps have been evaluated for use with water only. For your protection always wear proper clothing, eye protection, etc. in case of any malfunction. For proper handling techniques and precautions, contact your chemical supplier, insurance company and local agencies (fire dept., etc.). Failure to comply with this warning may result in personal injury and/or property damage.

2. Ensure that the power source conforms to the requirements of your equipment.
3. Disconnect power before servicing. If the power disconnect is out of sight, lock in the open position and tag it to prevent unexpected application of power. Failure to do so may result in a fatal electric shock!
4. Release all pressure within the system before servicing any component.
5. Drain liquids from the system before servicing.
6. Personal Safety:
    a. Wear safety glasses at all times when working with pumps.
    b. Wear a face shield and proper apparel when pumping hazardous chemicals.
    c. Keep work area clean, uncluttered, and properly lighted. Replace all unused tools and equipment.
    d. Keep visitors at a safe distance from the work area.
    e. Make workshop childproof with padlocks, master switches and by removing starter keys.
7. The motor is designed to be used in a clean dry location with access to an adequate supply of cooling air. Ambient temperature around the motor should not exceed 122ºF (50ºC). For outdoor installations motor must be protected by a cover that does not block airflow to and around the motor. This unit is not able to be submersed in water.
8. When wiring an electrically driven pump follow all electrical and safety codes, as well as the most recent United States National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

9. Single phase motors: All units are supplied with 115 volt, single phase motors (unless otherwise noted) and provided with a 6 foot 3 wire flexible cord with a 3 prong grounded plug suitable for a standard grounded type 115 volt receptacle. Where a 2 prong wall receptacle is encountered, it must be replaced with a properly grounded 3 prong receptacle installed in accordance with the National Electrical Code, local codes and ordinances. To ensure a proper ground, the grounding means must be tested by a qualified electrician.
10. Use only 3 wire extension cords that have 3 prong grounding type plugs and 3 pole receptacles that accept the equipment plug.
11. All wiring should be performed by a qualified electrician.
12. Protect electrical cord from sharp objects, hot surfaces, oil, and chemicals. Avoid kinking the cord. Replace or repair damaged or worn cords immediately.

⚠WARNING

Do not handle a pump or pump motor with wet hands or when standing on a wet or damp surface or in water.

U.L. Caution
This pump has been tested using water only.
Its suitability for use with liquids other than water is the end user's responsibility.

Australia
This pump must be installed in accordance with AS3500

Installation

The pump should not be used in flammable or explosive atmospheres. In order to safely use this product, familiarize yourself with this pump and also with the liquid (chemical, etc.) that is going to be pumped through the unit. This pump is not suitable for many liquids. For installations where property damage might result from an inoperative or leaking pump due to power outages, discharge line blockage, or any other reason, a backup system(s) should be used. Failure to follow any warning can result in personal injury and/or property damage.

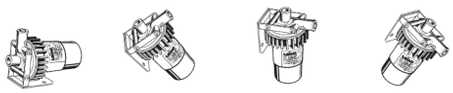
1. Locate pump as close to the fluid source as possible, thus making the suction line as short and direct as possible. The unit should be placed where the motor and electrical components are protected from the weather and humidity.
2. Attach piping suction line to suction inlet and piping discharge line to discharge outlet. Avoid using looped section of pipe or fittings which might permit air to compromise airtight pipe connections. IMPORTANT: If plastic or fabric hose is used for the suction piping it should be of a reinforced type so as not to collapse under suction.
3. Support the piping independently of the pump.
4. Laing pumps are lubricated by the pumped fluid. How they are mounted and the condition of the water in the system are important. THOROUGHLY CLEAN and FLUSH the system before installing the pump. If the fluid contains a high level of dissolved solids such as dirt, sediment, or products of corrosion, a strainer and/or filter should be installed at least 12" before the inlet to the pump.

Mounting

For installation purposes the arrows on the side of the pump housing indicate the direction of water flow through the pump. Check to make sure the pump is adequately supported and that neither the pump or the piping is severely stressed. Install the pump at a point closest to the highest static pressure point, but above the absolute lowest point in the system to avoid dirt and sediment build-up. If required by application and code, install a safety relief valve to protect against over temperature and pressure. Do not mount with the motor above the impeller. This can cause the pump to run dry leading to premature failure of the pump which voids the warranty. Refer to the figures below for proper orientation before installing the pump.

E1, E3, E5, E10, and E14 Series

Correct Installation

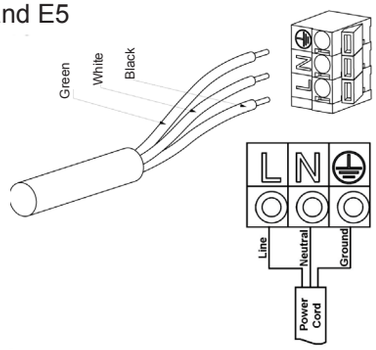


Improper Installation -
Do NOT mount in these orientations

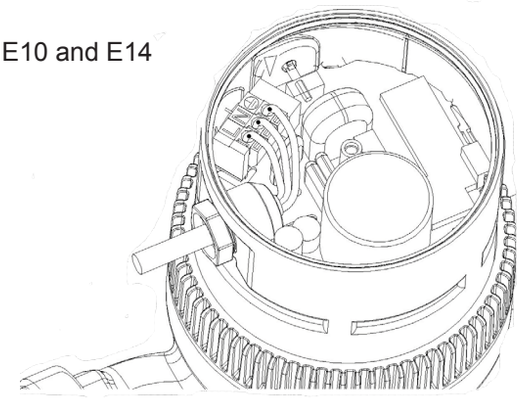
Electrical

These instructions must be followed to reduce risk of electrical shock. All work should be performed by a qualified electrician and in accordance with the current national and local electrical codes and regulations. Consult the nameplate for electrical data. The motor is impedance protected. Make certain that a properly sized circuit is available. Wire size should be based on the current carrying (amp) capacity of the conductor. The pump must be grounded in accordance with the current national and local codes. Ground wire should be copper with a current capacity at least equal to that of the wire carrying power to the pump. Observe all minimum code requirements for your jurisdiction. For pumps supplied with a power cord, the current carrying capacity of the cord is suitable for proper operation. Make certain the receptacle is properly configured and in good working order. Check to make certain that the circuit is properly sized for the load. Isolation valves are recommended for both sides of the pump. Valves should be positioned to avoid leakage onto the motor and electrical compartment. All elbows, tees, and sharp bends in the piping should be installed sufficiently upstream or downstream of the suction and discharge ports. Avoid welding or soldering close to the pump, which could cause damage to the unit. The pumps are exclusively for built-in use. After installation, the end product must comply with the relevant product standard. Product standard regulations must be observed during fitting and electric installation. For E5 95190 and E5 95191 types, where 2 cables are attached, both cables for live (non SELF) voltage and are to be considered untouchable, as are all further connections and connected parts. Installation and electric connections shall be carried out by professionals only.

E1, E3, and E5



E10 and E14



Options

Flow Control

Models with an “F” in the 4th position of the model number are equipped with an output which functions as a flow switch to conform with dry five protection of UL1563. When the flow of the pump is equal to or greater than 26pm the contacts will close and remain closed until the flow drops below 16pm. The contact will remain open until the flow is 26pm or greater, this is a low voltage isolated circuit, the contact is rated 5A at 250vac or 30vdc.

Variable Control

Models with a “V” in the 4th position of the model number are equipped with a dial that controls the pump speed.

Temperature Control

Adjustable models with a “B” in the 4th position of the model number are equipped with a dial that controls the pump to come on when the temperature drops below the set level. This can be adjusted between 68ºF (20ºC) to 158ºF (70ºC).

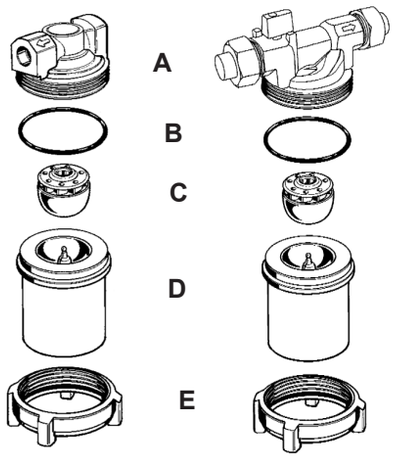
Operation

1. Completely fill the system before operating the pump. Do not start the pump until the system has been filled. Make sure the isolation valves are fully open and that there is water in the pump.
2. Purge air from the system prior to operating the pump. These two steps are very important. The pump should never be allowed to run dry. This can severely damage the pump and will void the warranty.

3. Operate the pump for approximately 10 minutes to purge any remaining air in the system. It may be necessary to open a discharge valve, port and/or fixture to ensure that the air has been purged. The pump should be running quietly. If a “gurgling” noise is present it may mean there is still air in the system. Turning the pump on and off several times will generally clear the remaining air. If this “gurgling” noise persists, recheck the system and re-purge the air. System and pump should now operate quietly and efficiently.
4. Dry Run Protection: Some pumps are equipped with Dry Run Protection. After a series of start attempts if the pump does not detect that it is pumping the pump will turn off and remain off until the power is interrupted. After the dry condition is eliminated and the pump is reenergized the pump will operate.

Maintenance ⚠WARNING

Ensure that the unit is disconnected from the power source before attempting to service or remove any components.
1. Since the rotor/impeller unit (see exploded views) is the only moving part, its replacement and/or the replacement of the motor is simple.
2. After the power has been disconnected using a counter clockwise motion remove the screw ring housing to motor connection on models E1, E3, and E5. The E10
3. Remove the “O” ring from the pump housing.
4. Remove and replace the rotor. Check to make sure that the ceramic bearing on the motor is intact and is not chipped or otherwise damaged.
5. Replace the “O” ring with a new one and reverse the disassembly procedure to reassemble the pump.
6. Since these units are self lubricated by the pumped fluid, they never need external lubrication.
7. Pump should be drained when subjected to freezing temperatures.
8. If provided, the suction line strainer should be cleaned at regular intervals.



Replacement Parts
Please provide the following information when ordering:
- Model number
- Serial number
- Part description

A - Housing
B - “O” Ring
C - Rotor Assembly
D - Motor Assembly
E - Screw Ring

Trouble Shooting Chart

Symptom	Possible Causes	Corrective Action
Motor will not start or run	1. Improperly wired 2. Blown fuse or open circuit breaker 3. Loose or broken wiring 4. Foreign object in impeller 5. Motor shorted out 6. Dry run cutout has opened circuit	1. Check motor wiring diagram 2. Replace fuse or circuit breaker after reason for overload has been corrected 3. Tighten connections, repair wiring 4. Disassemble pump, remove object 5. Replace motor 6. Allow unit to cool, restart after reason for cutout has been determined and corrected
Pump will not prime	1. Leak, obstruction, or kink in suction line 2. Suction line closed 3. Pump is worn	1. Repair as necessary 2. Open 3. Replace parts
Little or no discharge	1. Housing not filled with water 2. Suction piping too small 3. Total head too high 4. Impeller plugged 5. Pump not running	1. Properly prime housing 2. Increase to pump inlet size or one size larger 3. Reduce discharge head 4. Disassemble pump and clean impeller 5. Check motor operation
Noisy pump operation	1. Air trapped in housing 2. Rotor bearing worn 3. Debris in housing	1. Check pump prime, also turn pump on and off several times to bump air pocket out of pump 2. Replace rotor assembly 3. Disassemble pump and remove debris

Laing Warranty

LAING THERMOTECH, INC. (LAING) warrants that LAING products shall be free from defects in materials and workman-ship for a period of eighteen (24) months from the date of manufacture or twelve (12) months from date of purchase with proof of purchase (see manufacturing date on pump nameplate). All LAING product returned under warranty will be fully inspected to determine CAUSE OF FAILURE before any warranty repair or replacement is approved. If pump is found defective within the warranty period, the pump will be replaced or in the case of wholesale or OEM customers, appropriate purchase credit will be issued. This warranty is void if the product is altered or modified in any way by any person other than LAING, or if the product is not installed and used in accordance with LAING's instructions, or if the product has been subjected to misuse, abuse, or neglect, including corrosion or wear caused by chemical action. The component materials set forth in a proposal and/or the specifications of an order, are recommended by LAING for the particular application, but such recommendations shall not be construed as a warranty against wear and/or corrosion; and, such recommendations are subject in all cases to verification and acceptance by the buyer and/or user. This warranty is void if the label or other identifying marks have been altered, defaced, or removed. LAING's liability under this warranty shall be limited to the repair and/or replacement, at LAING's sole discretion, of any product or part thereof, without charge, F.O.B. LAING Factory. It is expressly understood and agreed that LAING shall not be liable or responsible for any costs incurred for labor, services, transportation, or any other charges which may arise in connection with the removal of the product and/or installation of repaired or replacement product. LAING also shall not be liable for any injury, loss or damage, direct, incidental or consequential (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or other incidental or consequential loss) resulting from the use or the inability to use the product, and the user agrees that no other remedy shall be available to it. The maximum liability under this warranty shall not exceed the LAING contract price of the product. In order to receive warranty consideration, the product must be returned prepaid to the company from which it was originally purchased together with proof of purchase, reason for return, return date, and description of installation and operating conditions. All product returned to LAING factory must comply with the following: (1) must have prior LAING authorization and shipped under Return Material Authorization (RMA) number provided by LAING; (2) must be sent prepaid, and; (3) must be accompanied by warranty claim supporting documentation. No LAING product will be accepted by LAING factory unless and until all of the above requirements are satisfied. LAING's liability under this warranty shall be in lieu of all warranties of fitness and in lieu of all warranties of merchantability. Before using, the user shall determine the suitability of the product for his intended use, and the user assumes all risk and liability whatsoever in connection therewith. This LIMITED WARRANTY contains the entire warranty for the products manufactured by LAING. No one is authorized to make any warranty of representation other than as described above, and buyer and/or user may not rely on any other warranty or representation. 11/00

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