

ALITA® LINEAR AIR COMPRESSORS

OPERATION & MAINTENANCE MANUAL

MODELS: AL-30, AL-40, AL-60, AL-80
AL-100, AL-120, AL-150, AL-200
AL-250, AL-300, AL-350, AL-400



ALITA INDUSTRIES, INC.
Efficient and Reliable Air Moving Products

AL-

Model Number

DateCode / Serial Number

Date of Purchase

Dealer

Phone

Dealer Address



**Remember to mail in your
Warranty Registration**

Alita Industries has made every effort to ensure the correctness and completeness of the materials in this document. Alita Industries shall not be liable for errors contained herein. The information in this document is subject to changes without notice. Alita Industries shall not be liable for any errors or for incidental or consequential damages in connection with the furnishing, performance, or use of this document. Alita Industries makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Revision F, May 2010

Copyright © 2010, Alita Industries, Inc. All rights reserved.

LIMITED WARRANTY

ALITA warrants to the original retail consumer purchaser ("Customer") that the ALITA product, when properly installed and operated under normal conditions of use, will be free from defects in materials and workmanship for a period of three (3) years from the date of purchase from ALITA or an authorized ALITA representative. This warranty applies only to ALITA products installed in the United States of America and Canada. Customer is responsible for registration of product warranty and maintaining a dated proof of purchase, and such registration and proof shall be used to determine warranty eligibility.

ALITA Limited Warranty covers only those defects which arise as a result of normal use of the product and do not apply to any: (a) defect or malfunctions resulting from failure to properly install, operate or maintain the ALITA product in accordance with printed instructions provided; (b) failures resulting from abuse, accident or negligence; (c) ALITA product which is not installed in accordance with applicable local codes, ordinances and good trade practices; (d) operation outside the ALITA product's specifications or used for purposes other than for what it was designed and manufactured; (e) improper or inadequate maintenance or modification, and (f) damage due to shipment, lightning, natural disaster, earthquake, fire, flood, force majeure or circumstances beyond the control of ALITA.

If within the duration of Limited Warranty, the ALITA product shall prove to be defective due to defective materials or workmanship of ALITA, ALITA shall either repair or replace the defective product, at ALITA's option. ALITA shall have no obligation to repair or replace until the Customer returns the defective product, together with dated proof of purchase and written notice of alleged defect to ALITA. Customer may be required at ALITA's request to verify that he or she is the original purchaser of the ALITA product and the ALITA product has been installed and operated in accordance with ALITA's instructions. Any replacement product may be either new or like-new, provided that it has functionality at least equal to that of the product being replaced. No requests for service under this warranty will be accepted if received more than 30 days after the term of the warranty.

ALITA shall be liable only for the cost of the replacement part, or the repair of any defective part. Customer shall be responsible for labor, cost of removal and installation at Customer's premises, transportation and insurance cost to and from ALITA, and any other incidental costs.

Correction of defects, in the manner and for the duration of the warranty described in this Limited Warranty, shall constitute complete fulfillment of all liabilities and responsibilities of ALITA to the Customer with respect to the product, and shall constitute full satisfaction of all claims, whether based on contract, negligence, strict liability or otherwise.

Except for the obligations specifically set forth in this Limited Warranty, in no event shall ALITA be liable for direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory and whether advised of the possibility of such damages.

ALITA disclaims all other warranties with respect to ALITA product, whether implied, and specifically disclaim the implied warranties or conditions or merchantability, satisfactory quality, fitness of a particular purpose.

Unauthorized extensions of warranties by the customer shall remain customer's responsibility.

ALITA reserves the right to change or improve its products or any portions thereof without being obligated to provide such a change or improvement for units sold and/or shipped prior to such a change or improvement.

The limited warranties described herein shall be the sole and exclusive remedy available to the Customer. This warranty is void if the ALITA product has been improperly used, mishandled, disassembled or modified.

Customer is responsible for determining the suitability of ALITA products for customer's use or resale or for incorporating them into objects or applications which customer designs, assembles, constructs or manufactures.

SAFETY INSTRUCTIONS

Special care should be taken when operating an electrical device. To avoid serious or fatal personal injury or major property damage, read and follow all safety instructions in manual and on pump.

WARNINGS

- DO NOT operate pump in the vicinity of explosive or flammable materials, liquids or gases.
- DO NOT operate pump if it has being inundated by water.
- DO NOT operate pump if it has a damaged cord or plug, if it is not working properly, or if it has been damaged or dropped.
- To avoid Electric Shock resulting from water back-siphoning, pump must be installed above the water level.

CAUTIONS

- Operate the pump only in fully assembled state.
- This product is designed to pump air only. Do not attempt to pump any other gases or fluids. Any airborne contaminants must be filtered out.
- Do not lubricate this oil-less air pump. No parts on this pump have oil or require lubrication. Avoid close proximity to products that may release oil or gasoline vapors.
- Connect the pump only to an outlet with GFCI (see Electrical Safety).
- Reduce the risk of bursting by only use air handling devices rated for pressure no less than 8 psi or 55 kPa.
- Keep power cable away from heated surfaces and pedestrian traffic.

INSTALLATION and OPERATION

Place the pump upright securely on a dry and stable surface that is easily accessible for inspection. Avoid location or elevation that will be inundated by water. For aeration applications, the pump must be installed above the water surface level.

PROPER VENTILATION

Allow ample clearance around the pump for free air circulation. Good ventilation ensures proper heat dissipation which lowers internal operating temperature and prevents thermal stress to key components.

When pump is to be placed under a protective enclosure, avoid designs that can cause thermal insulation. Install forced ventilation system to promote air circulation under the enclosure and improve pump reliability. Certain indoor installation may also require forced ventilation when the forces of air pressure and gravity are not enough to circulate air through a room or building.

For outdoor installations, shaded area that shelters from excessive weathering is ideal. Do not allow pump to swelter under intense sun and avoid places with excessive dust or debris.

The ambient operating temperature for this pump is between 5°C (41°F) and 40°C (104°F). Operation of pump in temperature outside of the recommended temperature range may result in malfunction or severely shorten the pump life.

PIPE SIZING

Utilize air tubing or pipes that are equal or larger than the pump discharge port. Matching pipe fittings should be used to reduce frictional losses. Incorrect pipe sizing can cause unsatisfactory performance.

When selecting or constructing an air manifold, the number of outlet fittings and their orifice size must be considered carefully to minimize frictional losses. Do not block or restrict pump discharge for extended periods. Install a bleed valve to vent any excess air volume and attach an air diffuser as silencer or muffler.

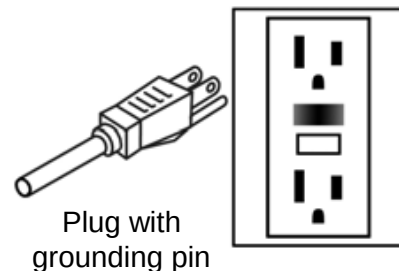
ELECTRICAL SAFETY

Form a drip loop with the power cord before connecting to the electrical terminal. Drip loops can prevent water from traveling down the cord and entering the power connection.

In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current. This pump is equipped with a cord having a grounding wire with an appropriate grounding plug. The plug must be plugged into an electrical terminal that is properly installed and grounded in accordance with all local codes and ordinances. Do not modify the plug provided; if it does not fit the outlet, have the proper outlet installed by a qualified electrician.

Connect the pump only to a terminal with **Ground Fault Circuit Interrupter (GFCI)** installed. This device should serve to interrupt the flow of electric current in the event of ground faults (electrical current that unintentionally flows to ground). Check proper operation of GFCI every month, and replace faulty GFCI immediately.

Electrical Outlet with GFCI



Plug with grounding pin

EXTENSION CORD

If an extension cord is required, use only a 3-wire extension cord that has a 3-blade grounding plug, and a 3-slot receptacle that accepts the plug on the pump. Be sure to use one heavy enough to carry the current the pump draws. For lengths less than 50 feet, No. 16/3 AWG extension cord shall be used. An undersized cord can result in a drop in line voltage, loss of power and overheating. Replace any damaged extension cord immediately.

MAINTENANCE INSTRUCTIONS

Periodic pump maintenance is required for reliable continuous operation. Any maintenance of the pump other than those described herein this manual must be performed by an authorized service facility.

CAUTION: Always turn off the power and unplug from electrical terminal before any maintenance. Failure to observe this precaution can result in serious accident.

AIR FILTER

Air filter pad under the filter cover should be cleaned every 3 to 6 months. Wash the filter pad gently in mild, soapy water then rinse thoroughly. Allow filter pad to dry completely before reinstalling.

DIAPHRAGM MODULES

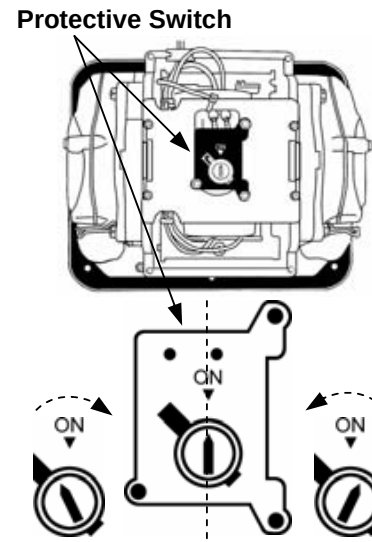
Diaphragm module replacement is typically recommended for every 24 months of operation. Replacement cycle may differ from application to application, it is prudent to perform the replacement before any actual diaphragm failure.

Diaphragm Replacement Kit (DRK) can be ordered from Alita Industries or authorized Alita representative.

Diaphragm Module Replacement

1. Set pump upside down (remove filter cover for stability if required), unscrew and remove all upper housing screws. Then return pump to upright position and lift away upper housing. Number of housing screws: AL-30~80 (4x), AL-100~200 (6x), AL-250~400 (12x)
2. Detach the L-tube from discharge port of each diaphragm housing.
3. Select a diaphragm housing on core frame, remove its 4 corner screws, then pull housing away. Proceed to remove the hex nut and washer from center of the diaphragm then pull and slide the entire diaphragm block away from magnetic rod and core frame.
4. Select a new diaphragm block from the DRK, align shape with core frame and magnetic rod then slide over the rod screw. Secure assembly firmly with washer and hex nut. Apply 1 to 2 drops of removable grade threadlocker between the hex nut and protruded rod screw.
5. Install new diaphragm housing then secure with 4 corner screws.
6. Attach L-tube to the discharge port of the new diaphragm housing then secure with silicone band or wire hose clamp.
7. Repeat step #3 through #6 on opposite side.
IMPORTANT: Do not mix old and new parts. For reliable operation, always replace both diaphragm modules in the pump at the same time.
8. Inspect the position of magnetic rod from the top. Magnetic rod should be centered between the electromagnets. No contact should exist between the magnetic rod and the two electromagnets.

9. If the pump includes a protective switch on top of the pump core, rotate and reset the switch to ON position. (See illustration)
10. Install upper housing, and secure firmly with all housing screws.



Magnetic Rod Replacement

Magnetic Rod between the two diaphragms may get damaged if diaphragm failure has already occurred. If the magnetic rod has suffer damages, order a new magnetic rod along with the diaphragm replacement kit.

In case of unusual noise or odor from the pump, turn off the power immediately, consult the maintenance guide, or contact your nearest pump representative or Alita service department for assistance.

PARTS

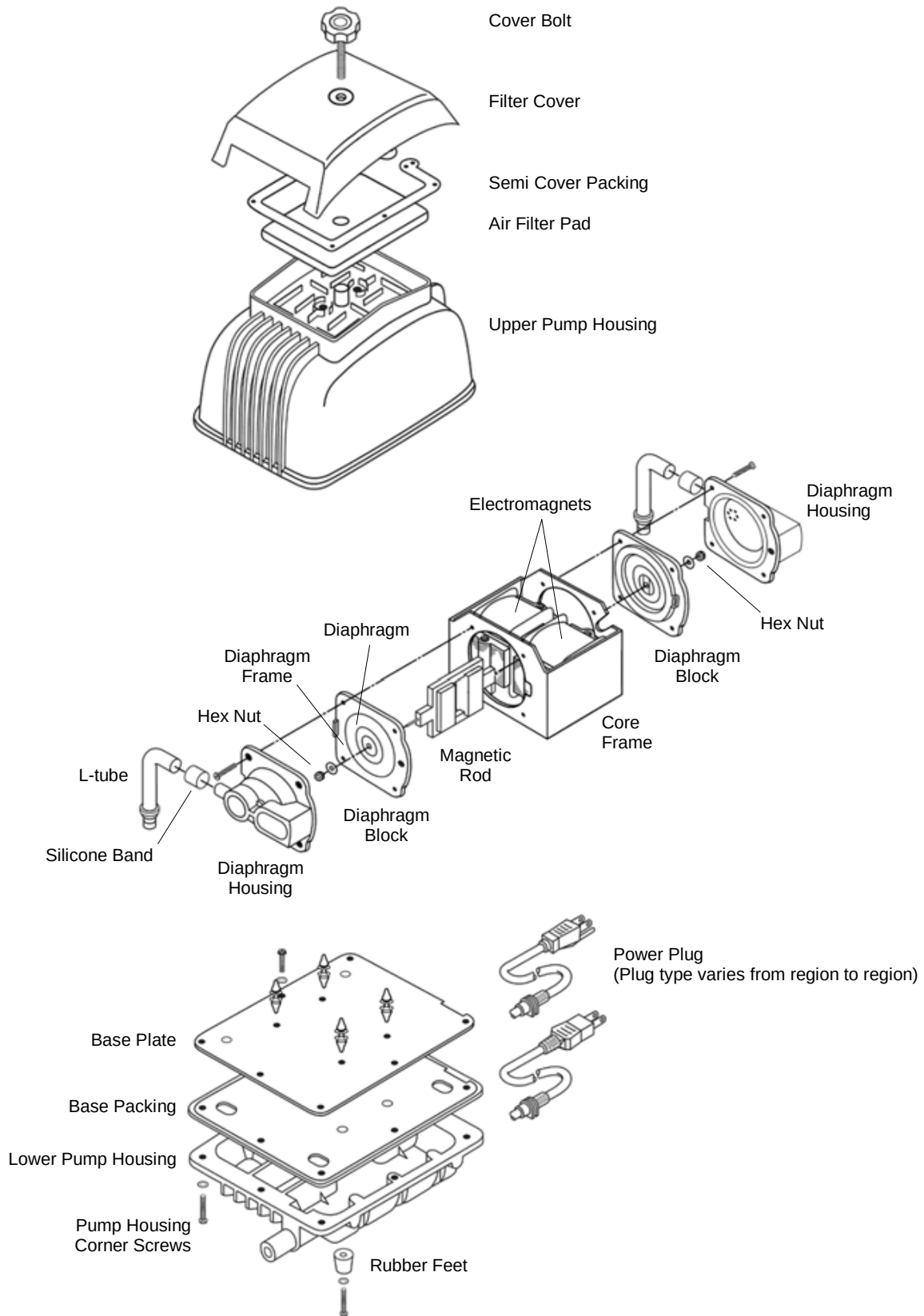
MODEL \ PARTS	DIAPHRAGM REPLACEMENT KIT	MAGNETIC ROD
AL-30	DRK40	MR30
AL-40	DRK40	MR40
AL-60	DRK60	MR60
AL-80, AL-100	DRK120	MR100
AL-120	DRK120	MR120
AL-150, AL-200	DKR200	MR200
AL-250	DRK120x2	MR120x2
AL-300	DRK200x2	MR200x2
AL-350, AL-400	DRK200x2	MR200x2

Standard Diaphragm Replacement Kit includes:

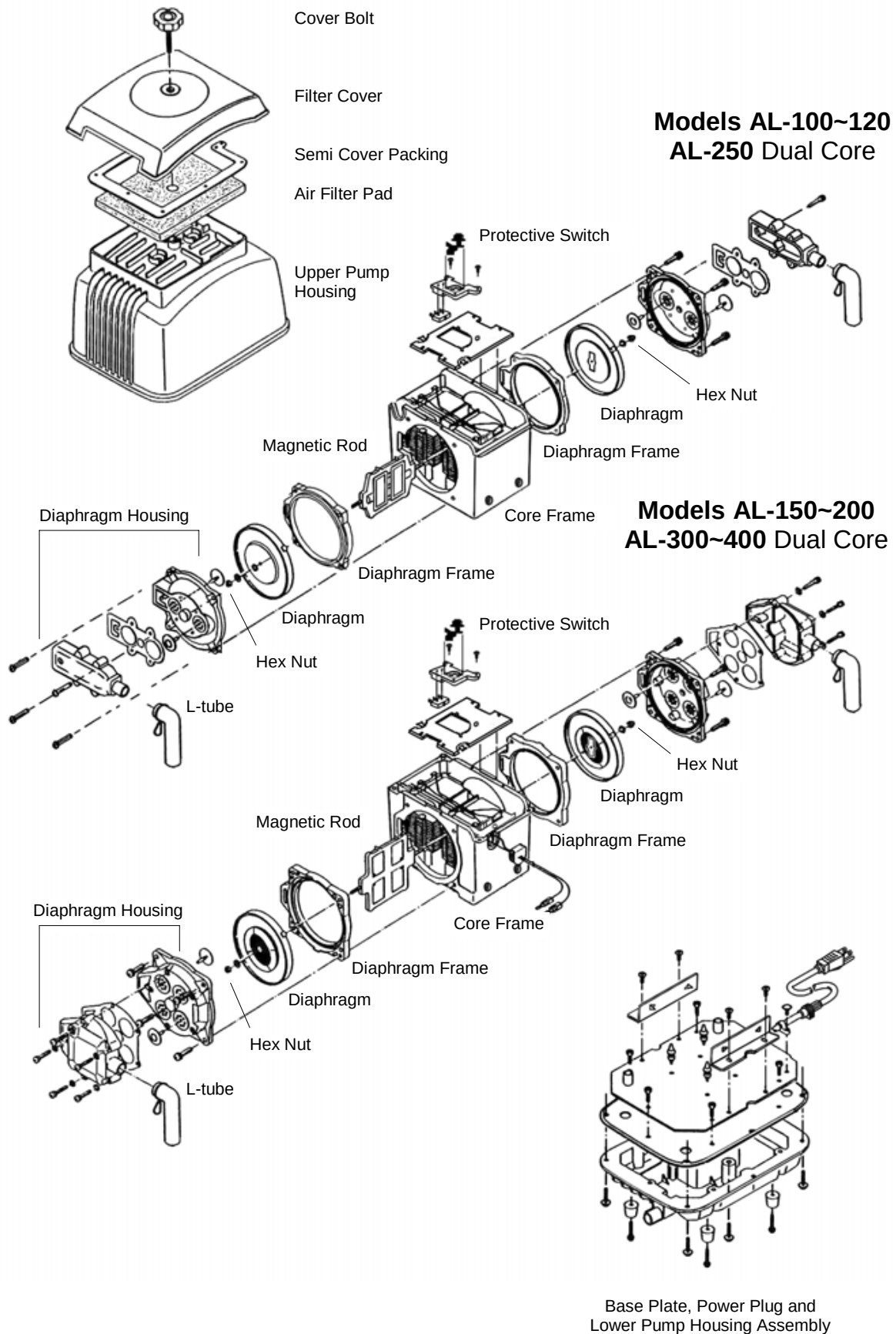
Diaphragm Block (2x)	Semi Cover Packing (1x)
Diaphragm Housing (2x)	Hex Nut & (2x) Washer (2x)
Air Filter Pad (1x)	Instruction Sheet

For parts identification, please refer to Assembly Diagrams.

Assembly Diagram for Models AL-40 ~ AL-80



Assembly Diagram for Models AL-100 ~ AL-400



TROUBLESHOOTING GUIDE

❖ Pump does not start

- Poor electrical connection: Plug the power plug firmly into AC outlet.
- Power cord damage: Contact ALITA for repair service.
- GFCI tripped: Check for moisture on plug or water inside the pump. Replace faulty GFCI and/or try another GFCI protected AC outlet.

❖ There exist a high humming or hissing noise

- High backpressure: Reduce pressure load or bleed off excess air flow.
- Poor air distribution lines: Re-configure or resize pipe lines and fittings, use sound dampening materials, make firm and stable connections.

❖ Pump stops intermittently

- High operating temperature: Follow Proper Ventilation instructions on this manual. Allow thermal protection circuit to reset after cooling.

❖ Reduced flow rate or performance (after a period of usage)

- Faulty air distribution medium: Replace clogged or damaged air line, clean air control valves or release bends in flexible tubing.
- Pump intake blocked: Remove blockage from pump intake.
- Fouled air diffusers: Replace or clean air diffuser thoroughly.
- Worn diaphragms: Replace aged or damaged diaphragm modules. See Maintenance Instructions.

❖ Pump stops and will not start (after a period of usage)

- Diaphragm failure, magnetic rod adhere to electromagnet: Open pump for inspection. Check for any damage to magnetic rod. Contact ALITA for assistance and procure replacement parts.
- For models AL-100~400 and certain models of AL-60/80
Protective Switch activated: Procure Diaphragm Replacement Kit for maintenance. Follow instructions #1, #9 and #10 on Diaphragm Module Replacement Procedure to reset Protective Switch.

❖ Pump produces an abnormal noise (after a period of usage)

- Diaphragm failure: Stop pump operation immediately. Open pump for inspection. Check for any damage to magnetic rod. Contact ALITA for assistance and procure replacement parts.

If none of the prescribed solution can help you resolve your pump problem, contact ALITA for repair service instructions. DO NOT ATTEMPT to repair the pump on your own.

For repair or service, contact your Alita representative or Alita Industries first for instructions and to receive an authorization number prior to sending of the pump. Alita Industries will not be responsible for any lost or misdirected package.

When sending a pump for service or repair, please include the following:

1. Dated proof of purchase.
2. Legible contact information and return address
i.e. Name
 Address
 Telephone / mobile number
 Fax number
 Email address
 etc.
3. Description of the pump application and installation setup.
(Include drawings or photographs if possible.)
4. Summary of the operating conditions and history.
5. Detailed description of the problems.

Every effort has been made to ensure the completeness and accuracy of this document. Please contact Alita Industries if you notice any possible error or omission.

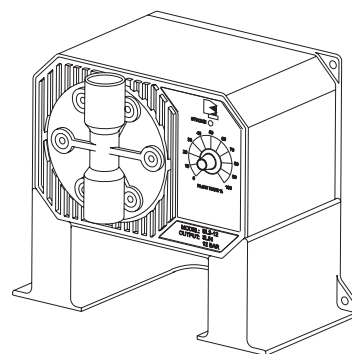


ALITA INDUSTRIES, INC.
PO Box 660923, Arcadia, CA 91066-0923, USA
Phone: (626) 962-2116 On-Line: www.alita.com E-mail: info@alita.com

Instruction Manual

**BL1.5 • BL3 • BL5
BL7 • BL10
BL15 • BL20**

Dosing Pumps



HANNA[®]
instruments
www.hannainst.com

Dear Customer,
Thank you for choosing a Hanna product.
Please read this instruction manual carefully
before using the pump.
If you need additional technical information,
do not hesitate to e-mail us at
tech@hannainst.com.
These instruments are in compliance with the
CE directives.

WARRANTY

All Hanna Instruments **pumps are warranted for one year** against defects in workmanship and materials when used for their intended purpose and maintained according to instructions.

This warranty is limited to repair or replacement free of charge. Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered. If service is required, contact the dealer from whom you purchased the instrument. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization Number from the Customer Service department and then send it with shipment costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

TABLE OF CONTENTS

Preliminary Examination	3
General Description	5
Flow Rate Chart	7
Functional Description	9
Specifications	10
Valve / Hose Assembly Diagram	11
Installation	12
Operational Guide	21
Troubleshooting Guide	23
Maintenance	25
Chemical Compatibility Guide	27
Accessories	29
CE Declaration of Conformity	31

PRELIMINARY EXAMINATION

Remove the pump from the packing material and examine it carefully to make sure that no damage has occurred during shipping. If there is any noticeable damage, notify your Dealer.

Each pump is supplied complete with:

- 7 m (23') LDPE suction and discharge tubing
- Instruction manual

Note: Save all packing material until you are sure that the pump functions correctly. Any defective item must be returned in the original packaging together with the supplied accessories.

READ ATTENTIVELY THE INSTRUCTIONS BEFORE INSTALLING OR OPERATING YOUR PUMP

The BL electronic dosing pumps are easy to use. We recommend, however, that you read the entire manual before using the pump. Familiarity with the features and controls of the unit will give you a better idea of the dosing potential and help reduce operator errors. Please operate the pump only as directed in the instruction manual. Follow all general safety guidelines during operation.

Remember: electrical devices are potentially hazardous. Check that the voltage of the installation matches the voltage indicated on the specification label on the back of the pump. Always be sure the pump is grounded.

Note: It is the responsibility of the user to install and ground the pump properly; it is highly recommended to install an external switch.

Always store chemicals in safe, out of reach places. Follow the directions for use with each chemical. Do not assume chemicals are the same because they look alike. Hanna Instruments cannot be held responsible for the misuse of chemicals or the pump.

Always wear protective clothing (gloves and safety glasses) when working near chemical dosing pumps. When pumping chemicals, make sure all tubes are securely attached to the fittings. It is recommended that tubing is shielded to prevent possible injury in case of rupture or accidental damage.

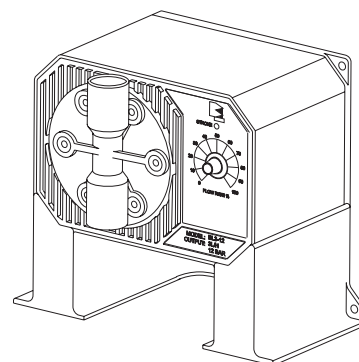
Avoid using a pipe wrench or pliers on plastic parts and connectors. These are best tightened with an open end or crescent wrench. Avoid overtightening these parts as this could cause damage to the seats and threads.

If a hose is used, it should be securely fastened to columns, walls, braces, etc. This will ensure that the hose connection will remain tight and leak free. Shield the hose from direct sunlight. Sunlight can cause an autocatalytic reaction with some chemicals and weaken the hose walls.

The arrow on the pump head indicates the direction of chemical flow and should always point upwards (vertically). Never position the pump horizontally with suction and discharge valves horizontal. Locate the pump in an area out of the reach of children and pets.

All pumps undergo stringent tests to ensure that they comply with their stated specifications and are calibrated at the maximum rated pressure.

GENERAL DESCRIPTION



BlackStone pumps are equipped with a single control for pump output.

Flow range is continuously adjustable from 0 to 100% of the maximum capacity through a graded dial on the front of the pumps.

Seven models are available, each with a different dosing capacity:

BL 20	18.3 lph (4.8 gph) @ 0.5 bar (7.4 psi)
BL 15	15.2 lph (4.0 gph) @ 1 bar (14.5 psi)
BL 10	10.8 lph (2.9 gph) @ 3 bar (43.5 psi)
BL 7	7.6 lph (2.0 gph) @ 3 bar (43.5 psi)
BL 5	5.0 lph (1.3 gph) @ 7 bar (101.5 psi)
BL 3	2.9 lph (0.8 gph) @ 8 bar (116 psi)
BL 1.5	1.5 lph (0.4 gph) @ 13 bar (188.5 psi)

High quality materials

To provide the maximum protection for parts that are in contact with aggressive chemicals, diaphragms, hose connectors and pump heads are produced using materials as PVDF and PTFE.

The ball valves are constructed in glass. The body is made of fiber-reinforced polypropylene for strength and durability.

Reliability through simplicity

All BlackStone pumps use the positive displacement solenoid method of pumping. This method has fewer moving parts than a standard motor-driven pump, and does not have the mechanical failures associated with conventional pumps.

BlackStone's Positive Displacement design has several distinct advantages over other types of mechanical designs:

- It is more accurate. Each stroke of the piston is precisely the same as the stroke before it ... and the stroke after it.
- Positive displacement allows for easier self-priming.
- Pumping pressure is as high as 12 bar (176 psi). This allows you to install your pump in the widest variety of tank-to-tank and tank-to-in-line applications.
- High accuracy and repeatability. A wire-wound potentiometer and solid state electronics are combined to achieve greater precision and control.

Easy installation

Designed with mounting holes in the base as well as rear panel, BlackStone pumps can be installed on a wall as well as directly on top of tanks and drums.

There is no need for additional hardware.

All the controls and pump assemblies are conveniently located on the front of the unit.

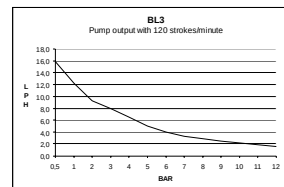
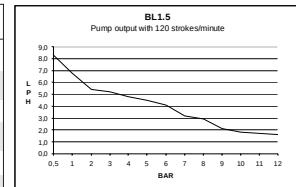
If the operator must access the pump head or control panel for any reason, there is no need to dismount the unit.

FLOW RATE CHART

The following charts show the relationship between their flow rate and pressure.

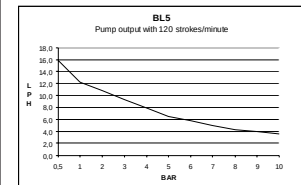
An increase of pressure in the system decreases the flow rate.

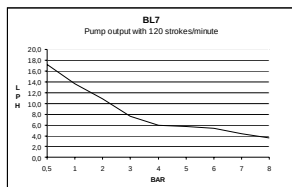
BL1.5		
bar (psi)	lph (gph)	
0.5 (7.4)	8.3 (2.20)	
1 (14.7)	6.8 (1.80)	
2 (29.4)	5.4 (1.43)	
3 (44.1)	5.2 (1.38)	
4 (58.8)	4.8 (1.27)	
5 (73.5)	4.5 (1.19)	
6 (88.2)	4.1 (1.08)	
7 (102.9)	3.2 (0.85)	
8 (117.6)	2.9 (0.77)	
9 (132.3)	2.1 (0.56)	
10 (147)	1.8 (0.48)	
11 (161.7)	1.7 (0.45)	
12 (176.4)	1.6 (0.42)	



BL3		
bar (psi)	lph (gph)	
0.5 (7.4)	15.8 (4.18)	
1 (14.7)	12.2 (3.23)	
2 (29.4)	9.3 (2.46)	
3 (44.1)	7.9 (2.09)	
4 (58.8)	6.5 (1.71)	
5 (73.5)	5.0 (1.32)	
6 (88.2)	4.0 (1.06)	
7 (102.9)	3.3 (0.87)	
8 (117.6)	2.9 (0.77)	
9 (132.3)	2.5 (0.66)	
10 (147)	2.2 (0.58)	
11 (161.7)	1.9 (0.50)	
12 (176.4)	1.5 (0.40)	

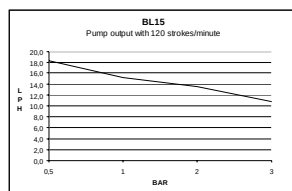
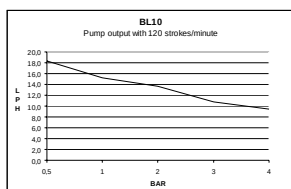
BL5		
bar (psi)	lph (gph)	
0.5 (7.4)	15.8 (4.18)	
1 (14.7)	12.2 (3.23)	
2 (29.4)	10.8 (2.86)	
3 (44.1)	9.3 (2.46)	
4 (58.8)	7.9 (2.09)	
5 (73.5)	6.5 (1.72)	
6 (88.2)	5.8 (1.53)	
7 (102.9)	5.0 (1.32)	
8 (117.6)	4.3 (1.14)	
9 (132.3)	4.0 (1.06)	
10 (147)	3.6 (0.95)	





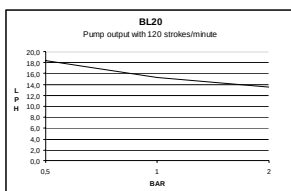
BL7		
bar (psi)	lph (gph)	
0.5 (7.4)	17.2 (4.55)	
1 (14.7)	13.6 (3.60)	
2 (29.4)	10.8 (2.86)	
3 (44.1)	7.6 (2.01)	
4 (58.8)	6.0 (1.59)	
5 (73.5)	5.7 (1.51)	
6 (88.2)	5.4 (1.43)	
7 (102.9)	4.4 (1.16)	
8 (117.6)	3.6 (0.95)	

BL10		
bar (psi)	lph (gph)	
0.5 (7.4)	18.3 (4.84)	
1 (14.7)	15.2 (4.02)	
2 (29.4)	13.6 (3.60)	
3 (44.1)	10.8 (2.86)	
4 (58.8)	9.4 (2.49)	

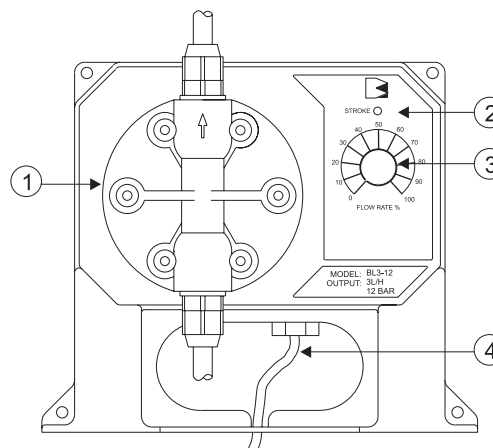


BL15		
bar (psi)	lph (gph)	
0.5 (7.4)	18.3 (4.84)	
1 (14.7)	15.2 (4.02)	
2 (29.4)	13.6 (3.60)	
3 (44.1)	10.8 (2.86)	

BL20		
bar (psi)	lph (gph)	
0.5 (7.4)	18.3 (4.84)	
1 (14.7)	15.2 (4.02)	
2 (29.4)	13.6 (3.60)	

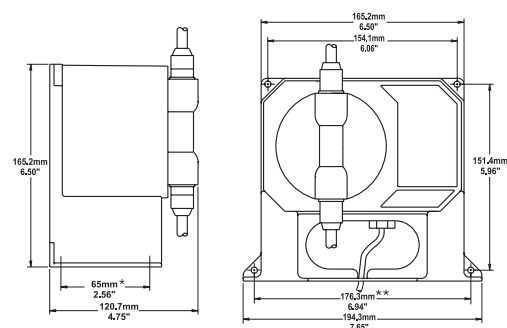


FUNCTIONAL DESCRIPTION



1. Pumphead
2. Stroke LED
3. Flow Rate % Knob
4. Power Cord

MECHANICAL DIMENSIONS



SPECIFICATIONS

MAX FLOW RATE

BL1.5	1.5 lph (0.4 gph) @ 13 bar (188.5 psi)
BL3	2.9 lph (0.8 gph) @ 8 bar (116 psi)
BL 5	5.0 lph (1.3 gph) @ 7 bar (101.5 psi)
BL7	7.6 lph (2.0 gph) @ 3 bar (43.5 psi)
BL10	10.8 lph (2.9 gph) @ 3 bar (43.5 psi)
BL15	15.2 lph (4.0 gph) @ 1 bar (14.5 psi)
BL20	18.3 lph (4.8 gph) @ 0.5 bar (7.4 psi)
	Adjustable from 0 to 100% of maximum pump capacity

MATERIAL	
PUMP CASING	fiber-reinforced polypropylene
VALVES	glass balls + O-rings in FPM/FKM
PUMPHEAD	PVDF
DIAPHRAGM	PTFE
TUBING	polyethylene

SELF PRIMING	Max. height: 1.5 m (5')
---------------------	-------------------------

POWER SUPPLY

BL...-1	100/115 Vac; 50/60 Hz
BL...-2	220/240 Vac; 50/60 Hz

MAX POWER CONSUMPTION	200 W
------------------------------	-------

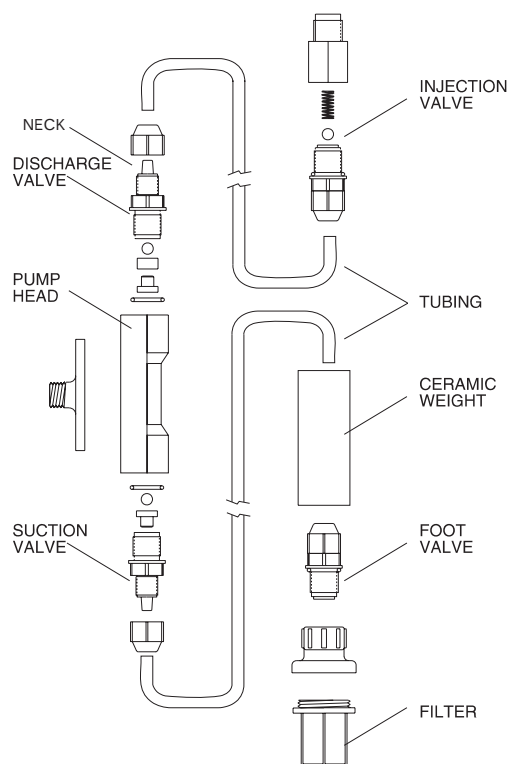
PROTECTION	IP65
-------------------	------

ENVIRONMENT	0 to 50°C (32 to 122°F) 95% RH max
--------------------	---------------------------------------

DIMENSIONS	194 x 165 x 121 mm (WxHxD) (7.6 x 6.5 x 4.8")
-------------------	--

WEIGHT	3 kg (6.6 lb.)
---------------	----------------

VALVE / HOSE ASSEMBLY DIAGRAM



INSTALLATION

Materials Needed

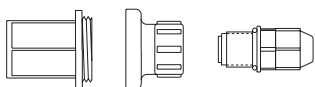
- LDPE hose (7 meter / 22 feet) (**included**) or other type of tubing (PTFE, for example) more suitable for a specific application (optional)

Optional Accessories

- 4 each, ceramic weights (**HI 721008**)



- 1 each, foot valve assembly (**HI 721005**)



- 1 each, injection valve assembly (**HI 721004**)



Location

A suitable location should:

- be near to a power source
- be conveniently close to the injection point
- allow easy access to the flow rate control and pipe or hose connections
- be no more than 1.5 meters (5 feet) above the operating position of the suction valve assembly.

Dimensions for Installation

BlackStone pumps are designed for permanent installation.

The pump can be mounted directly on a wall or tank.

Power Requirements

BlackStone pumps are designed to operate to specifications within the following voltage ranges:

100 - 130 Volts for -1 models

200 - 240 Volts for -2 models

To ensure maximum performance, check the voltage at the point of supply to verify that it is sufficient. It is recommended that you install a 1 Amp circuit breaker between the pump and the power supply. This will give additional protection to the internal circuit and provide a convenient way to disconnect the power supply prior to servicing the pump, if needed.

Injection Point

- Choose an injection point that allows you to mount the injection valve assembly vertically.
- The spring in the injection valve assembly (**HI 721004**) adds approximately 1.5 bar of back pressure. If pumping into a high back pressure, the spring should be removed.

Other Considerations

- If you are mounting the system to a wall, column, etc., be sure it is strong enough to support the weight of the entire system.
- The ambient temperature of the pump, when in operation, should be between 0 and 50°C (32 to 122°F) and should be protected from direct exposure to outdoor elements (direct sunlight, rain, extreme temperatures, high humidity, etc.).
- Generally speaking, the shorter the suction distance, the more efficient the pump operates.

- The pump should be placed in a conventional location that will allow easy access to the control and connections. It should be placed so that regular visual inspections of the connections and hoses are facilitated.

Vertical Surface Mounting

Once you have selected the best installation site, simply screw or bolt the unit into a wall or mounting panel above the chemical feed tank.

The 4 mounting screw holes on the pump will accommodate up to a 5 mm (3/16") screw or bolt (remember to use heavy screws or bolts to secure the system).

Be sure you do not over tighten and cause excessive stress on the mounting holes.

Electrical Connections

Note: All cables must be according to local electrical codes.

For safety of the users, the pump has to be grounded.

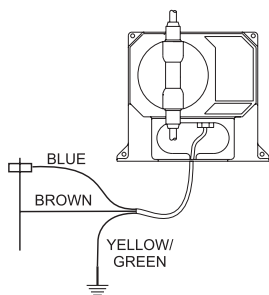
The pump should be connected to a single phase power source.

Color coding for wires:

Blue - Live

Brown - Neutral

Yellow/Green - Ground (earth)



14

It is recommended that the system be connected to a power line/leg equipped with a circuit breaker of 1 Amp.

Permanent Connection using 3/8" PVC pipe

All piping for the pump feed and discharge should be plumbed to the location of the pump.

The threads on both valve assemblies allow the use of standard 3/8" (European) pipe fittings for permanent pipe connections.

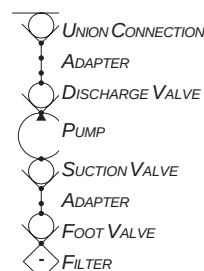
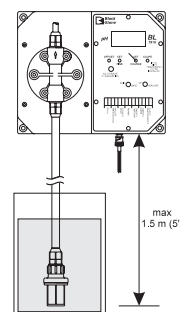


Diagram for Rigid Pipe Hose

The foot valve assembly (**HI 721005**) should always hang vertically and not lay horizontal on the bottom of the tank or drum.

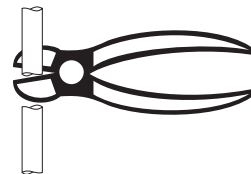
A vertical assembly will ensure that the valve is positioned properly and prevent loss of prime.



For the U.S. standard installations, use PVC adapters to connect the suction and discharge valves to the PVC pipe.

Hose Connections

- Cut a long enough section of the hose to reach the suction valve of the pumphead from

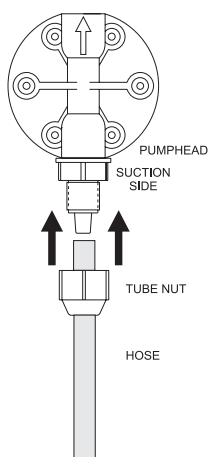
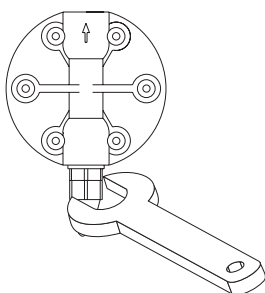


15

the feed tank. Allow some slack in the hose and be sure it is not kinked or twisted.

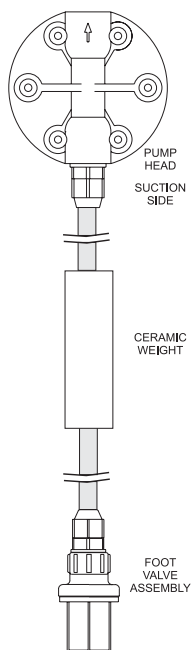
- Slip a hose connector onto the hose over the head valve and up to the bottom of the threads ensuring it is fully seated.

- Slide the connector up to the threads and tighten to form a seal.

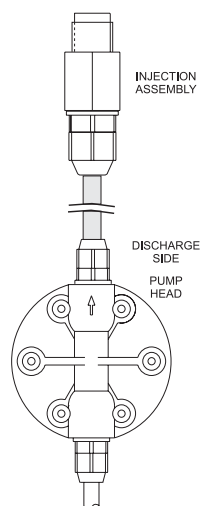
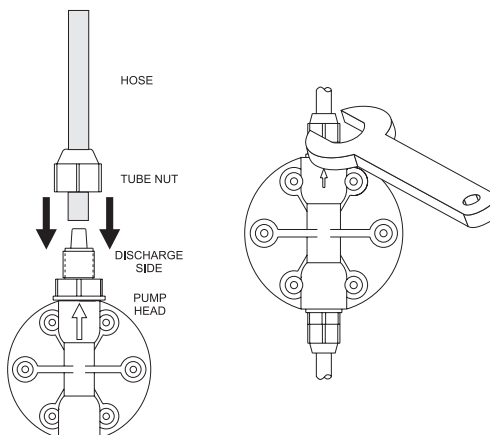


- Slip the ceramic weight (HI 721008) and a connector over the other end of the hose.

- Attach the foot valve assembly (HI 721005) to the hose and slide the connector up to the threads and tighten to form a seal.



- Repeat the same installation procedure for the hose connections on the discharge end with the injection assembly (HI 721004).

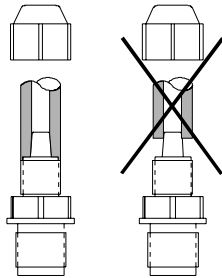


- Secure the hose so that its movement is minimized when the pump is operating. Excessive hose movement could cause the connectors to loosen and result in leakage.

Assembling the Hose to the Valve

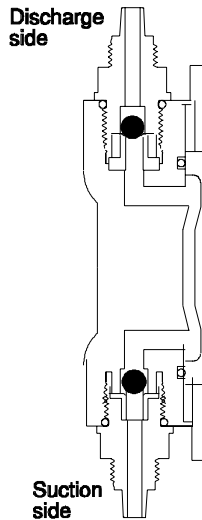
The end of the valve is specially tapered to form a leak free seal when the hose is properly installed.

Be sure to seat the hose completely so that there is no gap. Push the hose until it covers the end of the valve completely.



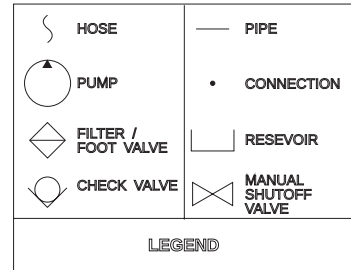
Suction and Discharge Valves

The suction and discharge valves located on the pumphead should not be interchanged as they are different internally. The discharge valve is fitted with a valve guide and will not function properly if used on the suction side.



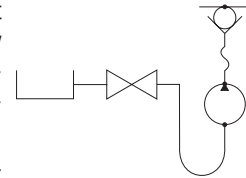
18

EXAMPLE OF TYPICAL INSTALLATIONS



Flooded Suction Installation

Suggested Installation for consistent output when using a low stroke rate. Also suggested for highly viscous chemicals.

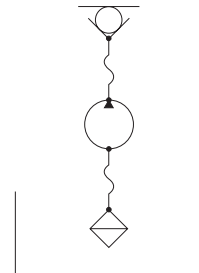


A slight suction pressure avoids self-priming problems, especially with high viscosity liquids.

Suction Lift Installation

Suggested installation for most in-line applications with nominal output and pressures.

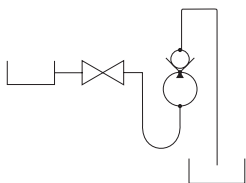
The maximum self-priming height is 1.5 m (5 ft.). It is advisable to install a level controller in order to stop the pump when feed tank liquid level is low.



19

Uphill Installation

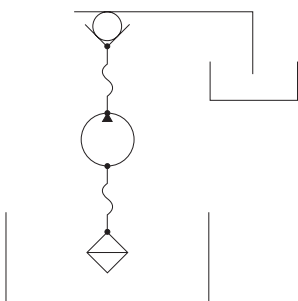
Suggested installation whenever the supply is located higher than the discharge point; typically a waste water application.



It is important to install the Injection valve to prevent siphoning.

Downhill Installation

Suggested installation when pumping from one container to another, each at different levels and with only nominal pressure.



OPERATIONAL GUIDE

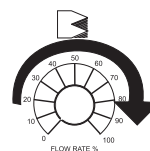
START-UP

At start-up, purge all chemical gases and air from the suction tubing, valves and pump head. Start the pump.

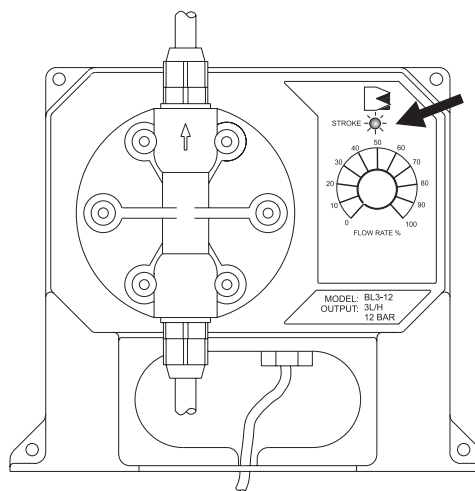
When all the air or gas is vented, the solution being metered will appear in the output line.

Note: Only when operating under pressure, the pump must be started unloaded.

An external Flow Rate Control (potentiometer) on the face of the pump allows to adjust the flow up to 100% of the pump's rated capacity.



A LED indicator will light up each time a stroke begins.



Operating Pressure and Back Pressure

Operating pressure is a combination of back pressure plus all of the other resistances to flow present in your system.

BlackStone Pumps are designed to dose their rated output at the operating (*rated*) pressure. Therefore, *rated* pressure of the pump you install should be close to operating pressure present in the system.

Too little back pressure can cause the pump to overdose.

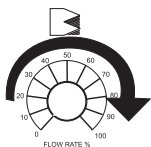
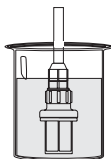
To prevent this from happening on a low back pressure installation, a spring has been added to the discharge/anti-siphon valve assembly (**HI 721004**).

When pumping into a high back pressure, the spring should be removed.

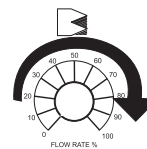
Actual Flow Rate

The actual flow rate depends upon the operating pressure which includes resistance at the injection fittings, hose and piping, the chemical viscosity and suction lift. The Flow Rate Control adjusts the flow up to 100% of the *rated* output. Less back pressure will increase the output, more will decrease it. To determine the correct setting for your application, use the following procedure.

1. Be sure that the pump is primed and that the output connections are completed at the injection point.
2. Place the foot valve assembly (**HI 721005**) in a graduated container with 500 mL of the solution to be dosed.
3. Switch the pump from OFF to the 100% setting and run until the system has been fully reprimed. Switch OFF and refill the container to the 500 mL level.



4. Switch the pump ON to the estimated setting and run for a specific amount of time (e.g. 1 minute). Count the number of strokes, length of time, and volume pumped.



Note: It is suggested that you run the test for as long as possible to maximize the accuracy.

For example, if at the maximum setting of 100% you find you pumped 200 mL in one minute, your hourly output would be 12 liters/hour (200 mL x 60 min. = 12000 mL/hr). If your application called for 9 liters/hour, turn the Flow Rate Control to 7 (9/12). Run the test again to verify the results.

TROUBLESHOOTING GUIDE

Electrical

The pump does not operate when turned ON:

- Check the power supply and connections. Voltage should be between 100 - 130 Vac for -1 models and between 200 - 240 Vac for -2 models.
- Check wiring color scheme. See Installation section or call for technical assistance.

Liquid

The pump operates but does not prime:

- Check for a clogged or loose filter on the suction valve assembly. Retighten if necessary.
- Check to see if the pump is too high above the foot valve assembly (**HI 721005**) in the feed tank. This vertical distance should not

exceed 1.5 meters (5 feet). Either lower the pump or raise the feed tank.

- Check the pumphead, suction and discharge valves for blockage.

Pump flow rate is reduced:

- Check the pumphead, discharge and injection valve assembly for any clogging. Clean and reassemble.
- Check for any additional back pressure created since the last flow rate was conducted.
- Check for any changes in the viscosity of the chemicals being used. Increase the % flow by adjusting the Flow Rate control to a higher setting and run a Flow Rate test.
- Be sure that valves have been properly installed in the pumphead.

Leakage at the connections:

- Be sure that the hose is fully seated and hose connectors are tight.
- Be sure that valves are tight and O-rings are in place.

Leakage around the pumphead:

- Be sure that the valves are tight and O-rings are in place and the head screws (hex bolts) are tight.

MAINTENANCE

Your BlackStone Pump is designed to give you years of trouble-free service. Maintenance should be the preventative type, that is, periodic cleaning and inspecting for any damage or leakage.

Cleaning the Suction, Discharge and Injection Valves

Remove the valves from the pumphead, the injection fitting and the feed.

Keep the suction and discharge valves separated as they are not interchangeable.

Disassemble each valve and clean it with a neutral liquid. Inspect the PVDF springs.

After cleaning the glass balls, inspect them for any excessive wear due to abrasion from the chemical. Replace if necessary with parts from **HI 721102**, **HI 721103**, **HI 721104** and **HI 721105**.

When reinstalling the valves into the pumphead, tighten by hand first and then with a wrench $\frac{1}{4}$ to $\frac{1}{2}$ turn.

Inspecting the hose (if used as supplied with the pump)

Inspect to see if the hose has worn out or weakened due to the chemicals. Pay particular attention for any signs of abrasion or discoloration. Also check the connectors to ensure they are tight.

Replace if necessary with parts from **HI 720032**.

Cleaning the Pumphead

The pumphead should be cleaned at regular intervals and at least once a year. Remove the deposits that form in the cavities with a solution that is neutral to the chemical the pump has been dosing. Inspect the head for any cracks or worn areas.

Replace if necessary with parts from the pumphead spare part **HI 721106** (for BL7, BL10, BL15 and BL20) or **HI 721107** (for BL1.5, BL3 and BL5).

SCHEDULED MAINTENANCE

After 50 hours

Tight the pumphead screws with a torque force of 2.5 Nm (22" lbf).

After 12 months

It is recommended to replace **HI 721102**, **HI 721103** (suction and discharge valves assemblies) as well as the O-rings. The LDPE hose can also deteriorate over time and, for safety reasons, should also be changed with **HI 720032**.

After 24 months

It is recommended to replace **HI 721102**, **HI 721103**, **HI 720032** and **HI 721106** (for BL7, BL10, BL15 and BL20) or **HI 721107** (for BL1.5, BL3 and BL5).

CHEMICAL COMPATIBILITY GUIDE

Partial Listing of Chemicals that can be used with BlackStone Pumps

(Rated for 45°C. For higher temperatures consult your dealer or nearest Hanna Service Center)

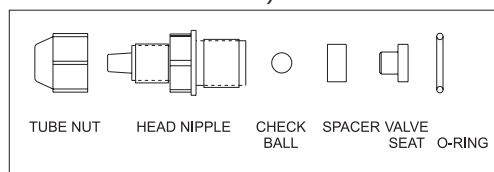
Adipic Acid	Castor Oil
Alcohol Amyl	Caustic Soda
Alcohol, Diacetone	Chloral Hydrate
Alcohol, Isopropyl	Chromic Acid 50%
Alcohol, Methyl	Citric Acid
Aluminium, Ammonium Sulfate	Copper Chloride
Aluminium Chloride	Copper Cyanide
Aluminium Sulfate	Copper Nitrate
Alums	Copper Sulfate
Ammonium Carbonate	Corn Oil
Ammonium Chloride	Cottonseed Oil
Ammonium Fluoride	Cresylic Acid
Ammonium Hydroxide	Crude Oil
Ammonium Nitrate	Dextrose
Ammonium Phosphate	Detergents (general)
Ammonium Sulfate	Diesel Fuel
Aqua Ammonia	Diethyl Phthalate
Arsenic Acid	Disodium Phosphate
Barium Carbonate	Ethanol (1-95%)
Barium Chloride	Ethylene Dichloride
Barium Hydroxide	Ethylene Glycol
Barium Sulfate	Fatty Acids
Beer	Ferric Chloride
Beet Sugar Liquors	Ferric Nitrate
Bismuth Carbonate	Ferric Sulfate
Black Liquor	Ferrous Chloride
Bleach	Ferrous Sulfate
Borax	Fluoboric Acid
Boric Acid	Fluosilicic Acid
Bromic Acid	Formaldehyde
Butyric Acid	Fruit Juice Pulp
Calcium Bisulfite	Fuel Oil
Calcium Carbonate	Gallic Acid
Calcium Chlorate	Gasoline, Refined
Calcium Chloride	Glucose
Calcium Hydroxide	Glycerine or Glycerol
Calcium	Glycolic Acid 30%
Hypochlorite	Hexane
Calcium Nitrate	Hydrazine
Calcium Sulfate	Hydrobromic Acid 20%
Carbonic Acid	Hydrochloric Acid (Concentrated)

Hydrochloric Acid (Diluted)	Propyl Alcohol
Hydrofluoric Acid 60%	Propylene Dichloride
Hydrogen Sulfide	Sea Water
Aqueous Solution	Silver Nitrate
Hypochlorous Acid	Silver Plating Solutions
Kerosene	Soaps
Lactic Acid	Sodium Acetate
Lard Oil	Sodium Bicarbonate
Lauric Acid	Sodium Bisulfate
Lead Acetate	Sodium Bisulfite
Linoleic Acid	Sodium Borate
Linseed Oil	Sodium Chlorate
Lithium Salts	Sodium Chloride
Magnesium Carbonate	Sodium Cyanide
Magnesium Chloride	Sodium Fluoride
Magnesium Hydroxide	Sodium
Magnesium Nitrate	Hexametaphosphate
Magnesium Oxide	Sodium Hydroxide 50%
Magnesium Sulfate	Sodium Hypochlorite 18%
Maleic Acid	Sodium Metaphosphate
Malic Acid	Sodium Nitrate
Mercuric Chloride	Sodium Peroxide
Methanol	Sodium Phosphate
Methyl Sulfate	Sodium Silicate
Milk	Sodium Sulfate
Mineral Oils	Sodium Sulfide
Naptha Petroleum	Sodium Sulfite
Nickel Chloride	Sodium Thiosulfate
Nickel Sulfate	Sour Crude Oil
Nitric Acid 50%	Stannic Chloride
Oils and Fats	Stannous Chloride
Oleic Acid	Stearic Acid
Olive Oil	Sulfur
Oxalic Acid	Sulfuric Acid Concentration
Palmitric Acid	Sulfurous Acid
Perchloric Acid 70%	Tannic Acid
Perchloroethylene	Tanning Liquors
Petroleum Oils (sour)	Tartaric Acid
Phenol	Tetrachlorethane
Phosphoric Acid	Tetraethyl Lead
Photographic Solutions	Tetralin
Plating Solutions	Tin Salts
Potassium Carbonate	Vegetable Oils
Potassium Bromide	Vinegar
Potassium Chlorate	Water Acid, Mine
Potassium Chloride	Water, Fresh
Potassium Cyanide	Water, Distilled
Potassium Ferrocyanide	Water, Salt
Potassium Hydroxide	Whiskey
Potassium Nitrate	Wines
Potassium Permanganate 10%	Zinc Chloride
Potassium Phosphate	Zinc Sulfate
Potassium Sulfate	

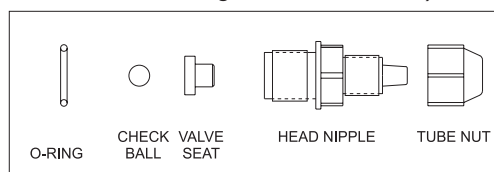
ACCESSORIES

SPARE PARTS

HI 721102 Discharge Valve
(Glass Ball, Valve O-Ring, Hose Connector)

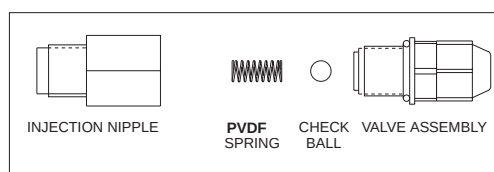


HI 721103 Suction Valve (Glass Ball, Valve O-Ring, Hose Connector)

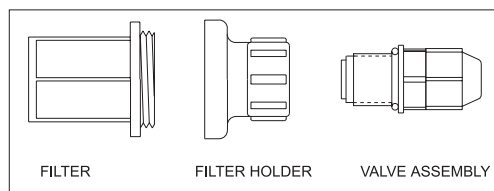


HI 721003 10 x Glass Balls
10 x Valve O-Rings

HI 721004 Injection Valve Assembly



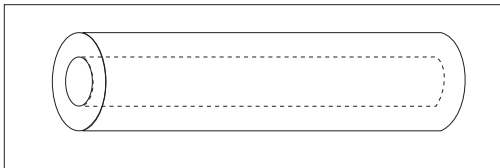
HI 721005 Foot Valve Assembly



HI 721006 PVDF Springs, 4 pcs

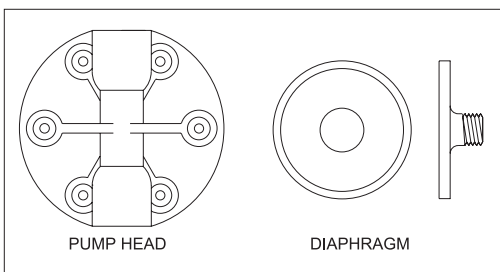
HI 720032 LDPE Hose - 100 m (330')

HI 721008 Ceramic Weights, 4 pcs



HI 721101 Pumphead, O-Ring, 6 screws and washers

HI 721106 (for BL7, BL10, BL15 and BL20)
Pumphead
Large PTFE Diaphragm
Aluminum Piston
Aluminum Disk



HI 721107 (for BL1.5, BL3 and BL5)
Pump-head
Small PTFE Diaphragm
Aluminum Piston

OTHER ACCESSORIES

HI 731326 Calibration screwdriver (20 pcs)

CE DECLARATION OF CONFORMITY



DECLARATION OF CONFORMITY

We

Hanna Instruments Italia Srl
via E.Fermi, 10
35030 Sarmeola di Rubano - PD
ITALY

herewith certify that the dosing pumps

BL 1.5 BL 3 BL 5 BL 7 BL 10
BL 15 BL 20 BL 7913 BL 7914

have been tested and found to be in compliance with EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC according to the following applicable normative:

EN 50082-1: Electromagnetic Compatibility - Generic Immunity Standard
IEC 801-2: Electrostatic Discharge
IEC 801-3: RF Radiated
IEC 801-4: Fast Transient

EN 50081-1: Electromagnetic Compatibility - Generic Emission Standard
EN 55011: Radiated, Class B

EN 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use

Date of Issue: 2-12-1998


P. Cesa - Technical Director
On behalf of
Hanna Instruments S.r.l.

Recommendations for Users

Before using these products, make sure that they are entirely suitable for the environment in which they are used.

Operation of these instruments in residential area could cause unacceptable interferences to radio and TV equipments, requiring the operator to take all necessary steps to correct interferences.

Any variation introduced by the user to the supplied equipment may degrade the instruments' EMC performance.

Hanna Instruments reserves the right to modify the design, construction and appearance of its products without advance notice.

SALES AND TECHNICAL SERVICE CONTACTS

Australia:

Tel. (03) 9769.0666 • Fax (03) 9769.0699

China:

Tel. (10) 88570068 • Fax (10) 88570060

Egypt:

Tel. & Fax (02) 2758.683

Germany:

Tel. (07851) 9129-0 • Fax (07851) 9129-99

Greece:

Tel. (210) 823.5192 • Fax (210) 884.0210

Indonesia:

Tel. (21) 4584.2941 • Fax (21) 4584.2942

Japan:

Tel. (03) 3258.9565 • Fax (03) 3258.9567

Korea:

Tel. (02) 2278.5147 • Fax (02) 2264.1729

Malaysia:

Tel. (603) 5638.9940 • Fax (603) 5638.9829

Singapore:

Tel. 6296.7118 • Fax 6291.6906

South Africa:

Tel. (011) 615.6076 • Fax (011) 615.8582

Taiwan:

Tel. 886.2.2739.3014 • Fax 886.2.2739.2983

Thailand:

Tel. 66.2619.0708 • Fax 66.2619.0061

United Kingdom:

Tel. (01525) 850.855 • Fax (01525) 853.668

USA:

Tel. (401) 765.7500 • Fax (401) 765.7575

MANBUR2
11/05

*For e-mail contacts and complete list of Sales and Technical offices, please see **www.hannainst.com***

ITALIAN

Istruzioni d'installazione

Installare la valvola in sette fasi passaggi--

1. Collegare le valvole
2. Collegare i circuiti degli spruzzatori
3. Far scorrere il filo
4. Collegare il filo
5. Chiudere le valvole degli spruzzatori
6. Collaudare l'impianto
7. Aprire le valvole

Collegare le valvole

A valle delle linee di flussaggio, installare la valvola sul collettore con un adattatore o un nipplo. (L'Adattatore o nipplo non richiesti per la valvola Jar-Top machino). NON AVVIARE ECCES-SIVAMENTE. Non utilizzare composto per il nastro del tubo. Utilizzare esclusivamente nastri sigillanti per filettature. Fare attenzione alla freccia per la direzione del flusso d'acqua. Le valvole presentano una raccomandata resistenza e i ricambi pertanto serie o otto giri di nastro sigillante per filettature, in modo da prevenire perdite e da impedire alle connessioni di toccare il fondo. Per prevenire possibili perdite d'acqua, accertarsi che il collettore e il tubo siano appropriatamente allineati.

Collegare i circuiti degli spruzzatori

Collegare i circuiti degli spruzzatori alla valvola mediante un adattatore (Adattatore o nipplo non richiesti per la valvola Jar-Top machino). RACCOMANDAZIONE: Utilizzare il collettore preassemblato prodotto da Orbit per rendere più facile la manutenzione della valvola o per modifiche future del collettore.

Far scorrere il filo

Con l'elemento di distacco, collegare le valvole ad un timer Orbit* (o a qualsiasi altro timer che utilizzi un trasformatore di Classe 2, 24 V, omologato UL come alimentatore). Utilizzare un cavo per spruzzatori multicolore, multistrato dotato di rivestimento approvato. Assicurarsi che il cavo presenti almeno un filo in più rispetto alla quantità di valvole nel collettore. Cablare fino alle valvole (in genere, nella stessa zona del tubo degli spruzzatori). RACCOMANDAZIONE: Utilizzare un pezzo di tubo in PVC come protezione per il cavo degli spruzzatori nelle zone scavate frequentemente.

Collegare il filo

Collegare in filo colorato ad un filo della valvola sul solenoide ed un filo comune all'altro filo sul solenoide. Qualsiasi filo del solenoide può essere utilizzato come comune. Collegare i fili colorati al morsetto del terminale corrispondente nel timer e il filo comune alla connessione comune nel timer. Utilizzare cavo standard per spruzzatori, calibro 20, per distanze inferiori a 800 piedi. Utilizzare cavo di calibro 18 per distanze superiori a 800 piedi. Utilizzare una calotta di lubrificazione a grasso Orbit e un dado per filo per ogni connessione della valvola (cf. Figura A). Inoltre, verificare la tenuta stagna di qualsiasi giuntura eseguita lungo il cavo d'irrigazione.

Chiudere le valvole degli spruzzatori

Ruotare la leva manuale di spurgo in senso orario fino a completa chiusura. Con l'acqua aperta, la valvola resterà chiusa.

Collaudare l'impianto

Dopo aver installato tutti i tubi e la raccorderia, aprire l'acqua e verificare eventuali perdite con la valvola chiusa.

Aprire le valvole

Ruotare la leva vite manuale di spurgo in senso orario per aprire manualmente la valvola. Chiudere quindi la leva vite manuale di spurgo per la manutenzione dell'impianto e adesso pronto per essere comandato elettricamente dal timer oppure manual-mente, aprendo la leva vite di spurgo manuale.

Scarico

Nelle zone soggette a congelamento, è necessario scaricare le valvole e le tubazioni. Consultare l'apposita documentazione Orbit oppure contattare il rivenditore locale per definire i punti di scarico appropriati. Per assicurarsi che l'elettrovalvola sia completamente scaricata nella fogna, distaccare la valvola di chiusura degli spruzzatori principale e far funzionare elettricamente ogni valvola a secco per pochi minuti. Disatturare il timer (posizione "OFF").

Avvertenze

- Controllare i codici locali per i tipi di valvole e le informazioni sui permessi.
- Se la pressione statica dell'acqua supera gli 80 PSI è necessario utilizzare un regolatore di pressione.
- Non per impiego all'esterno con acqua fredda. Non per uso interno. Posizionare le valvole in modo che scarichino lontano dalla casa.
- Note
- Ove possibile, proteggere sempre le valvole con una cassetta per valvole Orbit e posizionare gli ausili sul fondo.
- Verificare tutti i condotti e i tubi della raccorderia prima di sostituire l'impianto.
- Utilizzare un filtro se nell'impianto non sarà utilizzata acqua per uso alimentare.

Ricerca guasti per valvole in linee

È raro che l'elettrovalvola di bassa tensione dell'Orbit* non funzioni in modo corretto, ma in caso di problemi, provare quanto segue.

Problema: La valvola non si apre elettricamente

Per prima cosa, attivare manualmente la valvola aprendo la leva vite manuale di spurgo (ruotare in senso orario). Chiudere la leva vite manuale di spurgo una volta completato il test manuale.

Verificare se...	Soluzione
1. La valvola è installata in modo ... non corretto	Assicurarsi che la freccia sulla valvola sia orientata nella direzione del getto d'acqua.
2. Il cablaggio non è corretto	Controllare il cablaggio sulla valvola e sul timer con le istruzioni. Verificare che il timer stia funzionando correttamente.

3. Vi sono detriti nel portello	Chiudere l'acqua. Rimuovere il solenoide. Spingere un filo o una graffetta attraverso il portello rotondo agendo verso l'alto e verso il basso per rimuove tutti i detriti. Assicurarsi che il pistoncino e l'O-ring siano in posizione al momento del riasssemblaggio.
4. Solenoide difettoso	Chiudere l'acqua. Svitare il solenoide e sostituirlo con uno proveniente da una valvola funzionante. Se la valvola funziona, sostituire il solenoide. Assicurarsi che il pistoncino e l'O-ring siano in posizione al momento del riasssemblaggio.
5. Pistoncino del solenoide inceppato	Chiudere l'acqua. Rimuovere il solenoide e pulirlo da sabbia e detriti. Assicurarsi che il pistoncino e l'O-ring siano in posizione al momento del riasssemblaggio.

Problema: La valvola non si chiude	Soluzione
1. La valvola è installata in modo ... non corretto	Assicurarsi che la freccia sulla valvola sia orientata nella direzione del getto d'acqua.
2. Pistoncino del solenoide inceppato	Chiudere l'acqua. Rimuovere il solenoide e pulirlo da sabbia e detriti. Assicurarsi che il pistoncino e l'O-ring siano in posizione al momento del riasssemblaggio.
3. Presenza di terra o detriti tra la rondella e la sede della valvola	Chiudere l'acqua. Rimuovere il coperchio della valvola e l'assemblaggio membrana e pulire l'interno della valvola.
4. Membrana rotta	Chiudere l'acqua. Rimuovere il coperchio e verificare eventuali rotture della membrana. Sostituire l'assemblaggio membrana, se rotto.

Problema: Perdite della valvola esterna	Soluzione
1. La raccorderia in PVC da inserire nella valvola è installata in modo non corretto	Guarnire abbondantemente le filettature con apposito nastro sigillante e avvitare saldamente. Non avvitare eccessivamente.
2. Pressione troppo alta	Installare un regolatore di pressione a monte della valvola e regolare su circa 80 PSI.
3. Perdita dal solenoide	Chiudere l'acqua. Avvitare il solenoide.

GERMAN

Installationsanleitung

Bringen Sie den Controller in sieben einfachen Schritten an--

1. Ventile anschließen
2. Regnerleitungen anschließen
3. Kabel verlegen
4. Kabel anschließen
5. Regnerventile schließen
6. System testen
7. Ventile öffnen

Ventile anschließen

Nach dem Speilen aller Leitungen, schließen Sie das Ventil mit einem Adapter oder Nippel am Verteiler an (Adapter oder Nippel wird für Ventil mit Schraubgewinde-Test-Off-Deckel nicht benötigt). NICHT ÜBERDREHEN! Verwenden Sie keine Dichtmittel für Schlauchverbindungen. Verwenden Sie ausschließlich Gewindesteinhand. Achten Sie auf den Pfeil für die Fließrichtung des Wassers. Die Ventile verfügen über keramische Fittings, sie müssen etwas sieben bis acht Mal mit Dichtband umwickelt werden, damit eine einwandfreie Dichtigkeit des Gewindes und damit ein Schutz gegen die unten hervorstechenden Anschlüsse gewährleistet ist. Um mögliche Leckage zu vermeiden, stellen Sie sicher, dass Verteiler und Rohr ordnungsgemäß angeschlossen sind.

Regnerleitungen anschließen

Bringen Sie die Regnerleitungen mit einem Adapter an das Ventil an (Adapter oder Nippel wird für Ventil mit Schraubgewinde-Test-Off-Deckel nicht benötigt). EMPFEHLUNG: Verwenden Sie den vorgefertigten Verteiler von Orbit, dies erleichtert die Wartung des Ventils bei späteren Veränderungen am Verteiler.

Kabel verlegen

Führen Sie die Arbeiten bei angeschauter Stromversorgung durch. Schließen Sie die Ventile an eine Orbit-Zeitschaltuhr (oder eine andere Zeitschaltuhr mit einem UL-zertifizierten 24 Volt Klasse 2 Transformator als Stromversorgung). Verwenden Sie ein mehrfarbiges, mehradriges und zugelassenes Regnerkabel. Stellen Sie sicher, daß das Kabel über eine Ader mehr verfügt, als Ventile im Verteiler vorhanden sind. Verlegen Sie die Kabel an die einzelnen Ventile (gewöhnlich im gleichen Graben, wie die Regnerleitungen). EMPFEHLUNG: Falls an bestimmten Stellen häufig gependelt werden sollte, verwenden Sie ein PVC-Rohr als Schutz für das Kabel.

Kabel anschließen

Schließen Sie ein farbiges Kabel an einem Ventilbalken der Magnetspule und ein O-Lederkabel am zweiten Kabel der Magnetspule an. Es bleibt Ihnen freigestellt, welches der beiden Magnetspulenkabel Sie an O-Lederkabel verwenden. Schließen Sie das farbige Kabel an den entsprechenden Klemme der Zeitschaltuhr und das O-Lederkabel an O-Leder-Anschluß der Zeitschaltuhr an. Bei Entfernungen von weniger als 800 Fuß (ca. 270 m) verwenden Sie Standardkabel, Typ 20. Bei Entfernungen von über 800 Fuß (ca. 270 m) verwenden Sie Standardkabel, Typ 18. Verwenden Sie an jeder Kabelverbindung auch Schirmabdeckungen von Orbit und Drahtmatern (siehe Abb. A). Isolieren Sie alle Verbindungsstellen am Regnerkabel ab.

Regnerventile schließen

Drhen Sie die manuelle hebel in Uhrzeigersinn, bis sie geschlossen ist. Wenn Sie das Wasser auf-drehen, bleibt das Ventil geschlossen.

System testen

Nachdem Sie alle Leitungen und Fittings eingehaut haben, drhen Sie die Wasserversorgung auf und überprüfen die Anlage bei geschlossenen Ventilen auf Undichtigkeiten.

Ventile öffnen

Drhen Sie die manuelle hebel/Abschraube per Hand gegen den Uhrzeigersinn, um das Ventil zu öff-nen. Anschließend schließen Sie die manuelle hebel/Abschraube, um das Ventil zu schließen. Das System ist nun für die elektrische Steuerung durch die Zeitschaltuhr bereit für den normalen Betrieb durch Öffnen der hebel/Abschraube bereit.

Entleerung

In Gebieten mit Frostgefahr müssen die Leitungen entleert werden. Nähere Informationen hierzu find-en Sie in den Orbit Planungsunterlagen oder bei Ihrem örtlichen Vertragshändler. Um sicherzustellen, daß das Magnetventil im Herbst, sobald es kalter wird, vollständig entleert ist, schließen Sie das Regner-Hauptregnerventil und lassen Sie jedes Ventil einige Minuten (elektrisch) trocken laufen. Drhen Sie die Zeitschaltuhr in die Stellung "OFF".

Achtung

- Überprüfen Sie die örtlichen Codes für Ventiltypen und Zulassungsanforderungen.
- Wenn der Wassermindruck über 80 PSI (5,6 kg/cm²) liegt, sollte ein Druckregler verwendet werden.
- Nur für Verwendung im Freien mit kaltem Wasser. Nicht geeignet für den Gebrauch in geschlos-senen Räumen. Stellen Sie die Ventile so ein, daß Sie nicht in Richtung zu Gebäuden enden.

Hinweise

- Wo es möglich ist, sollen Sie die Ventile mit einer Orbit Valve Box schützen und darunter Kies auf den Untergrund aufbringen.
- Prüfen Sie vor dem Kauf die Systeme alle Leitungen und Fittings.
- Falls Sie kein Trinkwasser in Ihrem System verwenden, empfehlen sich der Einsatz eines Filters.

Fehlersuche bei Reihenventilen

Fehlfunktionen des Niederstrom-Magnetventils ihres Orbit* kommen nur äußerst selten vor. Falls dennoch Probleme auftreten sollten, gehen Sie folgendermaßen vor:

Problem: Das Ventil öffnet sich nicht elektrisch

Beheben Sie das Ventil zuerst manuell, indem Sie die hebel/Abschraube per Hand öffnen (drhen Sie gegen den Uhrzeigersinn). Nach Beendigung der manuellen Prüfung schließen Sie die hebel/Abschraube wieder.

Prüfen Sie ob...

1. Das Ventil ist nicht korrekt eingebaut
Stellen Sie sicher, daß die Pfeile in Fließrichtung des Wassers gerichtet sind.
2. Die Verkabelung ist nicht korrekt.
Überprüfen Sie anhand der Anleitungen die Verkabelung am Ventil und an der Zeitschaltuhr. Überprüfen Sie die Zeitschaltuhr auf ihren einwand-freien Betrieb.
3. Die Zulaufleitung ist verschmutzt.
Drhen Sie das Wasser ab. Rufen Sie die Magnetspule aus. Füllen Sie einen Eimer mit Wasser. Drhen Sie die Magnetspule heraus und tauchen Sie sie in den Eimer. Drhen Sie die Magnetspule in die runde Zulauföffnung ein und schrauben Sie sie durch Auf- und Abbewegung frei, um die Verunreinigungen zu entfernen. Stellen Sie sicher, daß der Kolben und O-Ring sich beim Einbau in der korrekten Einbaulage befinden.
4. Die Magnetspule ist defekt.
Drhen Sie das Wasser ab. Drhen Sie die Magnetspule heraus und lassen Sie sie funktions-stüchtiges Ventil ein. Falls das Ventil funktioniert, erneuern Sie die Magnetspule. Stellen Sie sicher, daß der Kolben und O-Ring sich beim Einbau in der korrekten Einbaulage befinden.
5. Der Magnetspulenkolben klemmt.
Drhen Sie das Wasser ab. Rufen Sie die Magnetspule aus und entfernen Sie Sand und Verunreinigungen. Stellen Sie sicher, daß der Kolben und O-Ring sich beim Einbau in der korrekten Einbaulage befinden.

Problem: Das Ventil schließt sich nicht

Prüfen Sie ob...

1. Das Ventil ist nicht korrekt eingebaut
Stellen Sie sicher, daß die Pfeile in Fließrichtung des Wassers gerichtet sind.
2. Der Magnetspulenkolben klemmt.
Drhen Sie das Wasser ab. Rufen Sie die Magnetspule aus und entfernen Sie Sand und Verunreinigungen. Stellen Sie sicher, daß der Kolben und O-Ring sich beim Einbau in der korrekten Einbaulage befinden.
3. Steinchen oder Verunreinigungen zwischen dem Dichtstift und dem Ventilhebel
Drhen Sie das Wasser ab. Rufen Sie die Ventilabdeckung und die Membranbaugruppe aus, und reinigen Sie das Innere des Ventils.
4. Die Membran ist beschädigt.
Drhen Sie das Wasser ab. Rufen Sie die Abdeckung aus und überprüfen Sie die Membran auf Risse. Erneuern Sie bei Beschädigungen die Membranbaugruppe.

Problem: Außenventil ist undicht

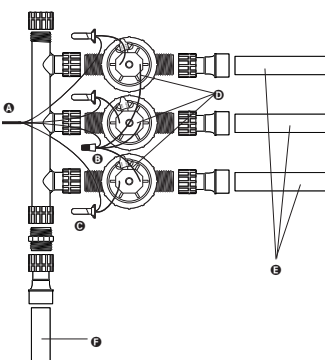
Prüfen Sie ob...

1. Die PVC-Zulaufleitungen für das Ventil sind nicht korrekt angebracht
Bringen Sie großzügig Dichtband auf den Gewinden an und ziehen Sie die Gewinde gut fest. Nicht über drehen!
2. Der Druck ist zu hoch.
Schalten Sie dem Ventil einen Druckregler vor, und stellen Sie den Druck auf etwa 80 psi ein.
3. Eine Undichtigkeit hinter der Magnetspule
Drhen Sie das Wasser ab. Drhen Sie die Magnetspule fest.

- **Controllare sempre i codici locali prima d'installare qualsiasi impianto di irrigazione.**
- **Le frecce indicano la direzione del flusso d'acqua.**
- **Se la pressione statica dell'acqua supera gli 80 PSI è necessario utilizzare un regolatore di pressione.**

- **Vor dem Einbau eines Bewässerungssystems sollten Sie immer die örtlichen Codes überprüfen.**
- **Der Pfeil gibt die Fließrichtung des Wassers an.**
- **Wenn der Wassermindruck über 80 PSI (5,6 kg/cm²) liegt, sollte ein Druckregler verwendet werden.**

Figura A
Abbildung A



- A) Al timer An Zeitschaltuhr
- B) Filo comune - al timer O-Volt-Leiter-Ausgang an Zeitschaltuhr
- C) Colotta di lubrificazione a grasso Schmierabdeckung
- D) Filo comune valvola O-Volt-Leiter, Ventil
- E) Alle teste degli spruzzatori AnRegnerköpfe
- F) Forte principale d'acqua per gli spruzzatori Hauptwasserleitung, Regner

Distinta componenti
Teilleiste

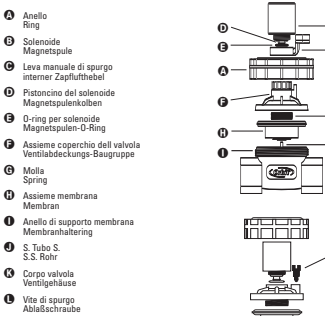
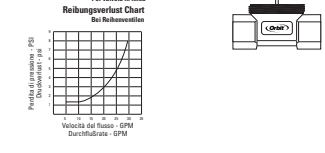


Diagramma della perdita per altro
Per valvole in linea



Requisiti elettrici minimo 115 V CA al solenoide.	Assestamento: min. 115 V - an Elektroanlagen
Corrente massima di funzionamento (50%)	600 V CA - 6,5 VA
Corrente massima di funzionamento (50%)	600 V CA - 6,5 AMP
Corrente minima di funzionamento (50%)	600 V CA - 5,5 VA
Corrente minima di funzionamento (50%)	600 V CA - 5,5 AMP

Garanzia limitata di 6 anni
Orbit* Irrigation Products, Inc. garantisce ai suoi clienti che i prodotti Orbit* sono esenti da difetti dei materiali e di costruzione per un periodo di sei anni dalla data dell'acquisto. Siamo garantiti la sostituzione, esente da spese, del componente o dei componenti risultanti difettosi in condizioni di utilizzo e manutenzione normali per un periodo di sei anni dopo l'acquisto (prova d'acquisto richiesta). La Orbit*, si riserva il diritto di controllare il componente difettoso prima della sua sostituzione. Orbit* Irrigation Products, Inc. non si riterrà responsabile per spese dirette o consequenziali o per danni provocati da anomalie del prodotto. La responsabilità di Orbit* Irrigation Products, Inc. a proposito di tale garanzia è limitata esclusivamente alla sostituzione o alla riparazione dei componenti difettosi.

Begrenzte 6-Jahre-Garantie
Die Orbit* Irrigation Products, Inc. gewährleistet ihren Kunden für einen Zeitraum von sechs Jahren ab Kaufdatum, daß die Produkte der Orbit*-Reihe keinerlei Material- und Fertigungsfehler aufweisen. Defekte Teile oder Teile, die unter normalen Betriebsumständen innerhalb dieses Zeitraumes einen defekt aufweisen werden gegen Unterbreitung eines Kaufschweites (Raubschaden) kostenlos ersetzt. Die Orbit* Irrigation Products, Inc. behält sich das Recht vor, das defekte Teil vor dem Ersetzen zu überprüfen. Die Orbit* Irrigation Products, Inc. haften nicht für Schadensgebühren oder andere Kosten sowie für Schäden, die durch den ungeschickten Gebrauch des Produktes entstehen. Die Haftung der Orbit* Irrigation Products, Inc. beschränkt sich im Bereich dieser Gewährleistung ausschließlich auf den Austausch oder die Insatsetzung defekter Teile.

User's Guide

Jar Top Automatic In-Line Control Valve

Guía del usuario

Valvula de control automática en línea Jar Top

Guide de l'utilisateur

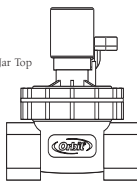
Vanne automatique en ligne Jar Top

Manuale dell'utente

Valvola di comando in linea automatica superiore

Bedienungsanleitung

Jar Top Automatisches Inline-Ventil



MODELO DE INSTRUCCIONES
NÚMERO DE LOS MODELOS
VARIANTES DEL MODELO
MODELLNUMMERN
57471, 57467, 57461,
57477, 94130, 94131,
91130, Visual Run
Model 27671

Instructions for Operation

Instrucciones para el funcionamiento

Mode d'emploi

Istruzioni di funzionamento

Betriebsanleitung

Automatic In-Line Control Valve is a 1" or 3/4" (24-wb) versatile valve

La valvula de control automática en línea es una valvula versatil de 1 o 3/4 pulg (24 wlb)

La vanne automatique en ligne est une vanne polyvalente de 1 po ou 3/4 po (24 V)

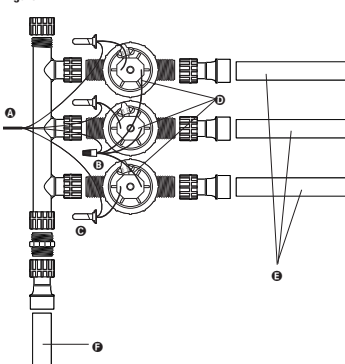
La valvola di comando in linea automatica è una valvola versatile da 1" o 3/4" (24 wlb)

© 1985
Orbit Irrigation Products, Inc.

9519-888-008
555-555-697-101-108
www.orbitirrigation.com
845 N. 10th St., Phoenix, AZ 85004

- Always check local codes before installing any sprinkler system.
- Arrow indicates direction of water flow.
- If static water pressure exceeds 80 psi (5.5 bars), a pressure regulator should be used.
- Compruebe siempre los códigos locales antes de instalar un sistema de riego por aspersión.
- La flecha indica la dirección del flujo del agua.
- Si la presión del agua en reposo es superior a 80 psi (5.5 bars), debe utilizarse un regulador de presión.
- Consultez toujours les codes locaux avant d'installer un arrosage.
- La flèche indique le sens d'écoulement de l'eau.
- Si la pression d'eau statique dépasse, l'utilisation d'un régulateur de pression est recommandée.

Figure A
Ilustración A
Figure A



- A To Timer
Al programador
Vers le programmeur
- B Common Wire Out To Timer
Cable Común que va al programador
Cable Fil neutre de sortie vers le programmeur
- C Grease Cap
Capuchon
Capuchon de graisse
- D Valve Common Wires
Cables comunes de válvula
Fils neutres de la vanne
- E To Sprinkler Heads
A los cabezales del aspersor
Vers les têtes d'arroseur
- F Main Sprinkler Water Line
Conducción de agua del aspersor principal
Conduite d'alimentation d'eau de l'arroseur principal

Parts Listing Listado de piezas Liste des pièces

- A Ring
Anillo
- B Solenoid
Solenóide
- C Internal Bleed Lever
Palanca de purga
Lever de purge
- D Solenoid Plunger
Pistón de solenóide
Tige du solénoïde
- E Solenoid O-Ring
Anillo en forma de O de solenóide
Joint du solénoïde
- F Valve Lid Assembly
Ensamblaje de la cubierta de la válvula
Couvercle de la vanne
- G Spring
Muelle
Resort
- H Diaphragm Assembly
Ensamblaje de diafragma
Membrane
- I Diaphragm Support Ring
Anillo de soporte de diafragma
Bague d'appui de la membrane
- J S.S. Tube
Tube en acero inoxidable
- K Valve Body
Cuerpo de válvula
- L Bleed Screw
Tornillos de purga
Vis de purge

Tableau des parties de charge par foullement des vannes en ligne



Orbit® Irrigation Products, Inc. garantiza a sus clientes que sus productos Orbit® están protegidos contra cualquier defecto de fabricación durante un periodo de sesos años a contar a partir de la fecha de compra. Le cambiamos, sin ningún pago adicional, la pieza o piezas defectuosas antes de que el periodo de sesos años a partir de la fecha de compra (o necesario presentar el documento que certifique la compra). Nos reservamos el derecho de inspeccionar la pieza defectuosa antes de proceder a su sustitución. Orbit® Irrigation Products, Inc. no se hace responsable de los gastos incidentales o derivados ni de los daños producidos por defectos del producto. La responsabilidad de Orbit® Irrigation Products, Inc. según esta garantía se limita únicamente a la sustitución o reparación de las piezas defectuosas.

Garantía limitada de 6 años

Orbit® Irrigation Products, Inc. garantit à ses clients que ses produits Orbit® sont protégés contre tout défaut de fabrication pendant une période de six ans à compter de la date d'achat. La société s'engage à remplacer, gratuitement, la ou les pièces qui se révéleraient défectueuses dans des conditions d'utilisation et de fonctionnement normales pendant au plus six ans à compter de l'achat (preuve d'achat exigée). La société se réserve le droit d'inspecter toute pièce défectueuse avant de la remplacer. Orbit® Irrigation Products, Inc. décline toute responsabilité en matière de frais ou de dommages directs ou indirects imputables à une défaillance de ses produits. En vertu de la présente garantie, la responsabilité d'Orbit® Irrigation Products, Inc. ne limite exclusivement au remplacement ou à la réparation des pièces défectueuses.

Garantie limitée de 6 ans

Orbit® Irrigation Products, Inc. garantiza a sus clientes que sus productos Orbit® están protegidos contra cualquier defecto de fabricación durante un periodo de sesos años a contar a partir de la fecha de compra. Le cambiamos, sin ningún pago adicional, la pieza o piezas defectuosas antes de que el periodo de sesos años a partir de la fecha de compra (o necesario presentar el documento que certifique la compra). Nos reservamos el derecho de inspeccionar la pieza defectuosa antes de proceder a su sustitución. Orbit® Irrigation Products, Inc. no se hace responsable de los gastos incidentales o derivados ni de los daños producidos por defectos del producto. La responsabilidad de Orbit® Irrigation Products, Inc. según esta garantía se limita únicamente a la sustitución o reparación de las piezas defectuosas.

ENGLISH Installation Instructions

Install the valve in seven easy steps—

1. Attach the Valves
2. Attach Sprinkler Lines
3. Run the Wire
4. Attach the Wire
5. Close the Sprinkler Valves
6. Test the System
7. Open the Valves

Attach the Valves

After flushing lines, install the valve to the manifold with an adapter or nipple (adapter or nipple not required for Male Jar-Top valve). DO NOT OVERTIGHTEN. Do not use pipe joining compound. Use thread seal tape only. Note arrow for water flow direction. Valves have tapered fittings and therefore require seven to eight turns of thread seal tape to prevent leaking and to guard against the connections becoming loose. To prevent possible leaking, make sure that the manifold and pipe are properly aligned.

Attach Sprinkler Lines

Attach sprinkler lines to valve with an adapter (adapter or nipple not required for Male Jar-Top valve).
RECOMMENDATION: Use Orbit's Pre-Assembled Manifold to make the valve easier to service or for future manifold modifications.

Run the Wire

With the power off, connect the valves to an Orbit® timer (or any other timer that uses a UL-approved 24-volt Class 2 transformer as a power source). Use a multi-colored, multi-strand approved jacketed sprinkler wire. Be sure the wire has at least one more strand than the number of valves in the manifold. Run the wire to the valves (usually in the same trench as the sprinkler pipe).
RECOMMENDATION: Use a piece of PVC pipe as a protective covering for sprinkler wire in areas of frequent digging.

Attach the Wire

Attach a colored wire to one valve wire on the solenoid and a common wire to the other wire on the solenoid. It doesn't matter which solenoid wire you use as the common. Attach the colored wires to the corresponding zone terminal in the timer and the common wire to the common connection in the timer. Use standard 20 gauge sprinkler wire for distances less than 800 feet (244 m). Use 18 gauge wire for distances over 800 feet (244 m). Use an Orbit grease cap and wire nut at each cable connection (See Figure A). Also, waterproof any splices made along the sprinkler wire.

Close the Sprinkler Valves

Turn the manual bleed clockwise until closed. When the water is turned on, the valve will remain closed.

Test the System

After all pipe and fittings have been installed, turn the water supply on and check for leaks with the valves closed.

Open the Valves

Turn the manual bleed lever/clockwise to manually open the valve. Then close manual bleed lever/clockwise to shut the valve off. The system is now ready to be controlled electrically from the timer or manually by opening the manual lever/clockwise.

Draining

In freezing areas, the valves and lines will need to be drained. Refer to the Orbit Layout Guide or local dealer to recommend proper drain points. To ensure the electric valve is completely drained in the fall, turn off the main sprinkler shut-off valve and electrically run each valve dry for a few minutes. Turn timer to the "OFF" position.

Cautions

- Check local codes for valve types and permit information.
- If static water pressure exceeds 80 psi, a pressure regulator should be used.
- For outdoor use with cold water only. Not for indoor use. Place valves so they drain away from the house.

Notes

- Where possible, always protect valves with an Orbit Valve Box and place gravel in the bottom.
- Test all lines and fittings before burying the system.
- Use a filter if you will not be using culinary water in your system.

Troubleshooting for Inline Valves

It is rare that your Orbit® low voltage electric valve will not operate as it should. If you do have any problems, try the following solutions.

Problem: The valve will not open electrically
First, run the valve manually by opening the manual bleed lever/clockwise (turn counter-clockwise). Close the manual bleed lever/clockwise when manual test is complete.

Check if...

1. The valve is installed incorrectly... Make sure that the arrows are in the direction of water flow.
2. Wiring is incorrect... Check wiring at the valve and at the timer with the instructions that come with that timer is working properly.
3. There is debris in the port hole... Turn off water. Remove the solenoid. Push a wire or large paper clip down through the round port hole working it up and down to free any debris. Be sure the plunger and O-ring are in place when reassembling.
4. Defective solenoid... Turn off water. Unscrew the solenoid and replace with one from a working valve. If the valve works, replace the solenoid. Be sure the plunger and O-ring are in place when reassembling.
5. Solenoid plunger is stuck... Turn off water. Remove the solenoid and clean out sand and debris. Be sure the plunger and O-ring are in place when reassembling.

Problem: The valve will not close

Check if...

1. The valve is installed incorrectly... Make sure that the arrows are in the direction of water flow.
2. Solenoid plunger is stuck... Turn off water. Remove the solenoid and clean out sand and debris. Be sure the plunger and O-ring are in place when reassembling.
3. Rock or debris is between the washer and the valve seat... Turn off water. Remove valve lid and diaphragm assembly and clean the interior of the valve.
4. Diaphragm has ruptured... Turn off water. Remove the lid and inspect the diaphragm for tears. Replace the diaphragm assembly if torn.

Problem: External valve leaks

Check if...

1. PVC fittings going into valve... Use thread seal tape generously on threads and tighten firmly. Do not over tighten.
2. Pressure is too high... Install a pressure regulator upstream of the valve and set at about 80 psi (5.3 bars).
3. Leaking below solenoid... Turn off water. Tighten solenoid.

SPANISH Instrucciones de instalación

Instale la válvula siguiendo estos siete pasos—

1. Fije las válvulas
2. Fije las conducciones de los aspersores
3. Tendido el cable
4. Fijelo
5. Cierre las válvulas del aspersor
6. Compruebe el sistema
7. Abra las válvulas

Fije las válvulas

Después de haber limpiado con una descarga de agua los conductos, instale la válvula en el colector con un adaptador o acoplador (No se necesita un adaptador o boquilla para la válvula tipo Jar-Top de tapa superior de rosca). NO LO APRIETE DEMASIADO. No utilice un compuesto para unir tuberías. Utilice cinta adhesiva únicamente. Observe la flecha para ver la dirección del flujo del agua. Las válvulas disponen de accesorios cónicos y por tanto es necesario que se enroscasen siete u ocho veces con cinta adhesiva para impedir que haya fuga y evitar que las conexiones suelten ruidos. Para evitar posibles goteos, verifique que el distribuidor y el tubo estén adecuadamente alineados.

Fije los conductos del aspersor

Fije los conductos del aspersor a la válvula con un adaptador (No se necesita un adaptador o boquilla para la válvula tipo Jar-Top de tapa superior de rosca).
RECOMENDACIÓN: Utilice el colector de Orbit® previamente montado para hacer que la válvula sea más fácil de reparar o por si más adelante es necesario realizar modificaciones en el colector.

Tienda el cable

Con el suministro eléctrico desconectado, conecte las válvulas a un programador Orbit® (o otro programador que utilice un transformador aprobado por UL (laboratorio de aseguradores) de 24 volt Clase 2 como fuente de alimentación eléctrica). Utilice un cable de aspersor de manguito de múltiples hebras y varios colores autorotado. Asegúrese que el cable tiene una hebra más que el número de válvulas que hay en el colector. Tendido el cable a las válvulas (por lo general en la misma ranura en la que se encuentra la tubería del aspersor).
RECOMENDACIÓN: Utilice un pedazo de tubería PVC como cubierta de protección para el cable del aspersor en zonas donde se cave a menudo.

Fije el cable

Conecte un cable de color a un cable de válvula en el solenóide y un cable normal en el otro polo del solenóide. No importa qué cable solenóide utilice como normal. Fije los cables de colores a la zona terminal correspondiente del programador y el cable normal a la conexión normal del programador. Utilice cable del aspersor estándar de espesor 20 para distancias de menos de 800 feet (244 m). Utilice cable de calibre 18 para distancias de 244 metros. Utilice una capucha de goma y una tuerca para cables Orbit® en cada conexión de válvula. (Ver Ilustración A). Impermeabilice los empalmes que se hayan hecho a lo largo del cable del aspersor.

Cierre las válvulas del aspersor

Gire la palanca de purga manual en el sentido de las agujas del reloj hasta cerrarla. Cuando fluya el agua, la válvula permanecerá cerrada.

Compruebe el sistema

Después de que se hayan instalado la tubería y los accesorios, abra el suministro de agua y compruebe que no haya fugas con las válvulas cerradas.

Abra las válvulas

Gire la palanca/tornillo de purga manual en sentido contrario a las agujas del reloj para abrir la válvula manualmente. Luego cierre manualmente el tornillo de purga para cerrar la válvula. Abra el sistema está listo para ser controlado eléctricamente desde el programador o manualmente si se abre el palanca/tornillo de purga manual.

Drenaje

En áreas muy frías, las válvulas y los conductos necesitarán drenarse. Consulte la guía de distribución Orbit® o a su proveedor para que le recomiende los puntos de drenaje adecuados. Para asegurarse de que la válvula eléctrica está drenada completamente en otoño, desconecte la válvula de cierre del aspersor principal y haga funcionar sin lubricante cada válvula durante unos minutos. Ponga el programador en la posición "OFF" (desconectado).

Precaución

- Compruebe los códigos locales para los tipos de válvulas e informaciones de permiso.
- Si la presión del agua en reposo es superior a 80 psi (5.3 bars), debería utilizar un regulador de presión.
- Solo puede utilizarse en el exterior con agua fría. No se puede utilizar en el interior de casa. Coloque las válvulas de modo que se drenen lejos de su casa.

Notas

- Siempre que sea posible proteja las válvulas con una caja para válvulas de Orbit® y ponga gravilla en el fondo.
- Compruebe todos los conductos y accesorios antes de enterrar el sistema.
- Utilice un filtro si no va a utilizar agua potable en el sistema.

Resolución de problemas para válvulas en línea

Es poco frecuente que la válvula de bajo voltaje eléctrico Orbit® no funcione correctamente. Si tiene problemas, intente una de las siguientes soluciones.

Problema: La válvula no se abre automáticamente

Primero, pruebe en manual la válvula manualmente abriendo la palanca/tornillo de purga manual. (girando en sentido contrario a las agujas del reloj). Cierre la palanca/tornillo de purga manual cuando se haya completado el test manual.

Compruebe si...

1. La válvula no está instalada correctamente... Asegúrese que las flechas se encuentran en la dirección del flujo de agua.
2. El cableado no es correcto... Compruebe el cableado de la válvula y del programador con las instrucciones. Compruebe que el programador funciona correctamente.
3. Hay residuos en la abertura de entrada y salida de la válvula... Cierre el agua. Retire el solenóide. Con un alfiler o un clip extraído moviendo de arriba abajo los residuos que se encuentran alrededor de la abertura de entrada y salida de la válvula. Asegúrese que el pistón y el anillo en forma de O están en su sitio cuando vuelva a colocar las piezas.
4. Solenóide defectuoso... Cierre el agua. Destornille el solenóide y sustituyalo por uno de la válvula de manifiesto. Si la válvula funciona, sustituya el solenóide. Asegúrese que el pistón y el anillo en forma de O están en su sitio cuando vuelva a colocar las piezas.
5. El pistón de solenóide está atascado... Cierre el agua. Retire el solenóide y limpie la arena y los residuos. Asegúrese que el pistón y el anillo en forma de O están en su sitio cuando vuelva a colocar las piezas.

Problema: La válvula no se cierra

Compruebe si...

1. La válvula no está instalada correctamente... Asegúrese que las flechas se encuentran en la dirección del flujo de agua.
2. El pistón solenóide está atascado... Desconecte el agua. Retire el solenóide y limpie la arena y los residuos. Asegúrese que el pistón y el anillo en forma de O están en su sitio cuando vuelva a colocar las piezas.
3. Hay piedras o residuos entre la arandela y el asiento de válvula... Desconecte el agua. Retire la cubierta de la válvula y el ensamblaje de diafragma y limpie el interior de la válvula.
4. Se ha roto el diafragma... Cierre el agua. Retire la cubierta e inspeccione el diafragma en busca de desgarramientos. Retire el ensamblaje del diafragma si se encuentra roto.

Problema: Fugas en las válvulas externas

Compruebe si...

1. Los accesorios PVC que van a la... Utilice una cinta adhesiva para sujetar firmemente las válvulas no están instalados correctamente.
2. La presión es demasiado alta... Instale un regulador de presión contrapunto de la válvula y establezca una presión de 80 psi (5.3 bars).
3. Hay una pérdida debajo del solenóide... Cierre el agua. Apriete firmemente el solenóide.

FRANÇAIS Instructions d'installation

Pose de la vanne en sept étapes simples

1. Fixation des vannes
2. Raccordement des conduites d'arrosage
3. Traction du fil
4. Raccordement du fil
5. Fermeture des vannes d'arrosage
6. Mise à l'essai de l'installation
7. Ouverture des vannes

Fixer les vannes

Après avoir rincé les conduites, installez la vanne sur le collecteur avec un adaptateur ou un manchon (l'adaptateur ou un raccord ne sont pas nécessaires pour la valve mât à couvercle de local). NE SERREZ PAS EXCESSIVEMENT. N'utilisez pas de pâte à joint. N'utilisez que du ruban pour joints filés. Notez l'orientation de la flèche: elle indique le sens d'écoulement de l'eau. Les vannes ont des raccords coniques; appliquez-y sept à huit tours de ruban pour joints filés pour les étanchéifier et empêcher les connexions de fuir en fin de course. Pour éviter des fuites possibles, s'assurer que le collecteur et le tuyau sont alignés correctement.

Raccordement des conduites d'arrosage

Raccordez les conduites d'arrosage à la vanne avec un adaptateur (un adaptateur ou un raccord ne sont pas nécessaires pour la valve mât à couvercle de local).
RECOMMANDATION: Utilisez un collecteur préassemblé Orbit®, pour faciliter l'entretien de la vanne ou pour modifier ultérieurement le collecteur.

Traction du fil

Après avoir coupé l'alimentation électrique, connectez les vannes à un programmeur Orbit® (ou à tout autre programmeur alimenté par un transformateur 24 V catégorie 2 agréé UL). Utilisez un fil à arrosage multicouche, à plusieurs torsions, gainé et étiré. Assurez-vous que le fil comporte au moins un tour de plus que le nombre de vannes du collecteur. Tirez le fil jusqu'aux vannes (généralement dans la même tranchée que la tuyauterie d'arrosage).
RECOMMANDATION: Utilisez du tuyau en PCV pour protéger le fil à arrosage dans les zones où on creuse fréquemment.

Raccordement du fil

Raccordez un fil coloré à une extrémité du solénoïde de la vanne et un conducteur neutre à l'autre extrémité du solénoïde. On peut utiliser n'importe quel fil du solénoïde comme conducteur neutre. Raccordez les fils colorés à la borne de zone correspondante du programmeur, et le conducteur neutre, à la borne neutre du programmeur. Utilisez un fil à arrosage standard de 20 pour des distances inférieures à 800 pieds (244 m). Utilisez du fil de calibre 18 pour les distances supérieures à 800 pieds. Utilisez un capuchon de graisse Orbit® et une connexion à chaque connexion de la vanne.
(Voir Figure A.) De plus, étanchéifiez toute jonction réalisée sur le fil à arrosage.

Fermeture des vannes d'arrosage

Tournez le levier manuel de purge dans le sens des aiguilles d'une montre jusqu'à ce qu'il soit fermé. Lorsqu'on rétablit l'alimentation d'eau, la vanne reste fermée.

Mise à l'essai de l'installation

Après avoir posé tous les tuyaux et tous les raccords, rétablissez l'alimentation d'eau et vérifiez toute fuite lors de la fermeture des vannes.

Ouvrir les vannes

Tournez le levier/sans de purge en sens inverse des aiguilles d'une montre pour ouvrir manuellement la valve. Ensuite fermez le levier/sans de purge pour fermer la valve. Le circuit est à présent prêt à être commandé électriquement à partir du programmeur ou manuellement en dévissant le levier/sans de purge manuelle.

Purge

Dans les zones où la température baisse au-dessous du point de congélation, on doit purger les vannes et les conduites. Consultez le guide de disposition Orbit® ou le détaillant de la localité au sujet des points de purge recommandés. En automne, pour s'assurer que l'électrovanne est complètement purgée, fermez le robinet principal des arroseurs et faites fonctionner électriquement chaque vanne, à sec, pendant quelques minutes. Mettez le programmeur sur "ARRET".

Notes

- Consultez les codes locaux pour les types de vannes et tout renseignement relatif aux permis.
- Si la pression statique de l'eau dépasse 80 psi (5.3 bars), l'utilisation d'un régulateur de pression est recommandée.
- À utiliser à l'extérieur, avec une alimentation d'eau froide uniquement. Ne pas utiliser à l'intérieur. Disposez les vannes avec une orientation à au à que la purge se fasse en direction opposée de la maison.

Remarques

- Si possible, protégez toujours les vannes par une boîte à vanne Orbit®, en plaçant du gravier au fond.
- Testez toutes les conduites et tous les raccords avant d'enterrer le circuit.
- Utilisez un filtre si le circuit n'est pas alimenté avec de l'eau potable.

Dépannage des vannes en ligne

Il est rare qu'une électrovanne basse tension Orbit® fonctionne mal. En cas de problème, essayez les solutions suivantes.

Problème: La vanne ne s'ouvre pas électriquement.

Primo, manœuvrez la valve manuellement en ouvrant le levier/sans de purge (tournez le levier/sans de purge manuelle dans le sens contraire des aiguilles). Fermez le levier/sans de purge quand le test manuel est terminé.

1. La vanne est correctement posée... Assurez-vous que les flèches indiquent le sens d'écoulement de l'eau.
2. Le câblage est satisfaisant... Vérifiez-le au niveau de la vanne et du programmeur pour vous assurer qu'il est conforme aux instructions. Assurez-vous que le programmeur fonctionne correctement.
3. Il y a des débris dans l'orifice circulaire... Coupez l'eau. Retirez le solénoïde. Introduisez un fil ou un grand trombone par l'orifice circulaire et, d'un mouvement de va et vient, enlevez tous les débris. Assurez-vous que le plunger et le joint torique sont à leur place lors du remontage.
4. Le solénoïde est défectueux... Coupez l'eau. Dévissez le solénoïde et remplacez-le par celui d'une vanne en bon état. Si la vanne fonctionne, remplacez le solénoïde. Assurez-vous que le plunger et le joint torique sont à leur place lors du remontage.
5. Le plunger du solénoïde est bloqué... Coupez l'eau. Retirez le solénoïde et enlevez sable et débris. Assurez-vous que le plunger et le joint torique sont à leur place lors du remontage.

Problème: La vanne ne se ferme pas

Vérifiez si...

1. La vanne est correctement posée... Assurez-vous que les flèches indiquent le sens d'écoulement de l'eau.
2. Le plunger du solénoïde est bloqué... Coupez l'eau. Retirez le solénoïde et enlevez sable et débris. Assurez-vous que le plunger et le joint torique sont à leur place lors du remontage.
3. Une pierre ou des débris sont pris dans l'orifice et le siège de la vanne... Coupez l'eau. Retirez le couvercle de la vanne et la membrane, et nettoyez l'intérieur de la vanne.
4. La membrane s'est déchirée... Coupez l'eau. Retirez la membrane et vérifiez la membrane en cas de déchirure.

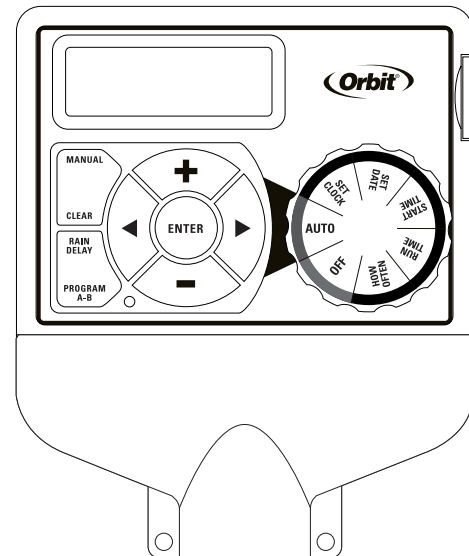
Problème: Fuites à l'extérieur de la vanne

Vérifiez si...

1. Les raccords en PCV qui entrent dans la vanne sont correctement posés... Posez une bonne quantité de ruban pour joints filés sur les filets et serrez fermement. Ne serrez pas excessivement.
2. La pression est excessive... Installez un régulateur de pression en amont de la vanne et réglez-le à l'environ.
3. Fuites sous le solénoïde... Coupez l'eau. Serrez le solénoïde.

USERS MANUAL

MANUAL DEL USUARIO



MODELS / MODELOS:
28954, 28956, 57854, 57856, 57874, 57876

PN 57874-24 rD

 FLUID P 801 295 9820 F 801 951 5815 www.fluid-studio.net 1065 South 500 West Bountiful, Utah 84010	PROOF NO: 5 DATE: 09.13.11 DES: SM CLIENT: Orbit SKU: 57874 UPC: NA FILE NAME: 57874-24 rD.indd SOFTWARE: InDesign CS5	DIMENSIONS: FLAT: W: 14" H: 5" FINISHED: W: 7" D: " H: 5" COLORS Registration color non printing color non printing PMS ???? PMS ???? PMS ???? ADDITIONAL INSTRUCTIONS: · Translation Approval Code: LB682594 · ·	Printers are responsible for meeting print production requirements. Any changes must be approved by the client and Fluid Studio. PRINTED PIECE MUST MEET DESIGNATED SPECIFICATIONS ON THIS FORM. © 2011 Fluid Studio. This work is the property of Fluid Studio, and cannot be used, reproduced or distributed in any way without their express permission.
---	---	---	--

Congratulations on selecting your new Easy Dial™ timer! With Orbit's exclusive Easy-Set Logic™, simple programming and setup are combined with the latest timer technology and versatility.

Your new timer provides convenience and flexibility, letting you run a fully automatic, a semi-automatic, or a manual watering program for all your watering needs. Although this timer is so easy to program that you likely will not need instructions, we recommend that you read this manual fully before installation so that you understand all of the advanced features.

Table of Contents

Section 1: Get to know your timer 4

Section 2: Installation 6

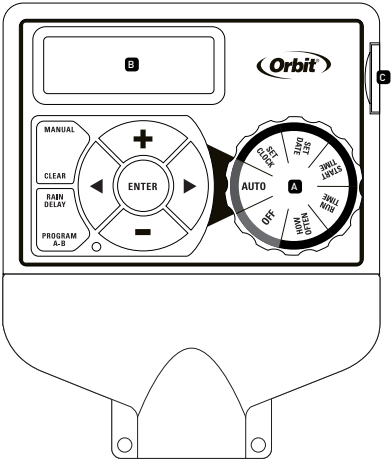
Section 3: Programming with Easy-Set Logic™ 9

Section 4: Additional Features 11

Section 5: Reference 15

Section 1: Get to know your timer

- A Dial
- B Digital Display
- C Battery Compartment



Buttons	Function
ENTER	To confirm a new setting
MANUAL	To water manually
CLEAR	To clear a setting
PROGRAM	To move between programs: A and B
ARROW [▶]	To advance to the next setting/watering station or move to other programs/settings
ARROW [◀]	To go back to the previous setting/watering station or move to other programs/settings
RAIN DELAY	To pause operation for 24-72 hours due to rain or other factors
+	To increase a numeric setting
-	To decrease a numeric setting

Dial Position	Function
AUTO	Set program is running automatically
SET CLOCK	Set clock time
SET DATE	Year, Month, and Day
START TIME	Set time to begin watering
RUN TIME	Set watering duration for each station
HOW OFTEN	Set frequency of watering days
OFF	Turn all stations/functions off

Section 2: Installation

Required Tools

- Phillips Screwdriver
- Wire Strippers

1. Select a Location

When choosing a location for your timer, consider the following:

- Choose a location near an electrical outlet.
- Ensure operating temperatures are not below 32° or above 158° Fahrenheit (below 0° Celsius or above 70° Celsius).
- Locate the timer where there is easy access to sprinkler wire (from valves).

2. Mount the Timer

- Use the mounting template (included) to mark the mounting screw location on the wall. See figure 1
- Install a No. 8 screw into wall in the upper template location. Leave the screw head protruding 1/8" (3mm) from wall. Use expanding anchors (included) in plaster or masonry, if necessary, for a secure hold.
- Slip the timer over protruding screw (using keyhole slot in back of timer). See figure 2
- Drive a No. 8 screw through one of the two pre-formed holes located in lower corners of the cabinet. See figure 2

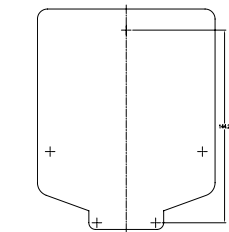


Figure 1: Use Mounting Template (included)

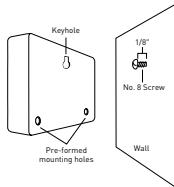


Figure 2: Hang timer on screw using keyhole

3. Connecting the Timer to Valves

Wiring Electric Valves

Taking the sprinkler wire, strip 1/2" (12 mm) of the plastic insulation off the end of each individual wire. Connect one wire from each valve (it doesn't matter which wire) to the "Common" sprinkler wire (usually white in color). Next connect the remaining wire from each valve to a separate colored sprinkler wire.

See figure 3

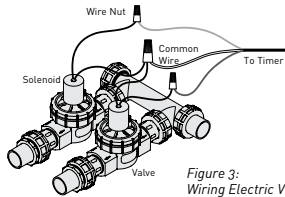


Figure 3: Wiring Electric Valves

Note: The maximum loading for each station/pump is 250mA (one valve), the maximum loading for the timer is 500mA.

If the distance between the sprinkler timer and valves is under 700' (210 m), use Orbit® sprinkler wire or 20 gauge (AWG) plastic jacketed thermostat wire to connect the sprinkler timer to the valves. If the distance is over 700' (210 m), use 16 gauge (AWG) wire.

Important: The wire can be buried in the ground; however, for more protection wires can be pulled through PVC pipe and buried underground. Be careful to avoid burying the wires in locations where they could be damaged by digging or trenching in the future.

All wires should be joined together using wire nuts, solder, and/or vinyl tape. In wet environments like a valve box it is recommended to use Orbit Grease Caps or Speed Seals to prevent corrosion of the connection and for protection from water infiltration.

Connecting Sprinkler Wires to the Timer

Taking the sprinkler wire, strip 1/4" (6 mm) of the plastic insulation off the end of each individual wire. Connect the "Common" sprinkler wire (usually white in color) to the terminal labeled "COM". Next connect the remaining wires to a separate terminal. See Figure 4

To avoid electrical hazards and damage to the timer, only one valve should be connected to each station. See Figure 4

Only connect one valve to each terminal (station) or damage will occur

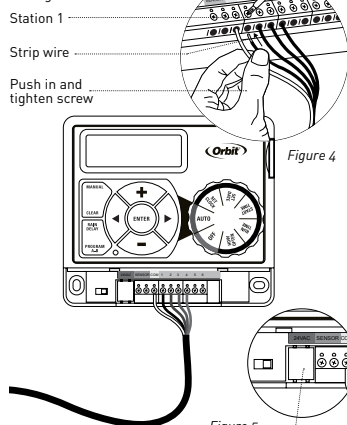


Figure 4

4. Connect Electrical Transformer Power

Connect power connector to the timer. Insert the transformer into an 120V electrical outlet. See Figure 5

5. Activate Battery

One Lithium CR2032 battery (included) is required to retain the program in memory during power loss. Annual replacement is recommended.

Remove the plastic strip to activate the pre-installed battery. (See page 12 for battery replacement)

Note: The battery alone will not operate the valves in your sprinkler system. The sprinkler timer has a built-in transformer that must be connected to an AC voltage source.

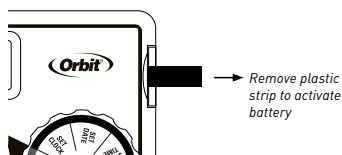


Figure 5
Connect the transformer here

Section 3: Programming with Easy-Set Logic™

A note about multiple programs

Your sprinkler timer provides the flexibility of using 2 independent programs (A, B). The programs are where you store all of your sprinkler settings. Each program consists of a group of stations set to specific start times and run times. Multiple programs allow you to run different valves on different days with different run times. While many applications only require one program (A), using multiple programs (A, B) can be useful for drip areas, newly planted lawn, or rotary sprinkler stations. Using programs to group stations with similar water needs will maximize irrigation efficiency.

Primary programming can be accomplished in just a few basic steps.

Primary Programming

Press the [RESET] to clear any previous factory programming

1. Set Clock

- Turn dial to [SET CLOCK].
- Press the [+/-] buttons to set the current time of day.

Tip: To increase or decrease more rapidly, hold down either the [+] or [-] buttons until the display goes into rapid advance mode.

- Press the [◀ ▶] buttons to set am/pm.
- Turn dial to accept time.

2. Set Date

- Turn dial to [SET DATE].
- Y/M/D will appear (blinking letter indicates selection).
- Press the [+/-] buttons to set the correct year, then press [ENTER] or [◀ ▶].
- Press the [+/-] buttons to set the correct month, then press [ENTER].
- Press the [+/-] buttons to set the correct date.
- Turn dial to accept date.

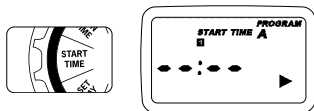
3. Start time

- Turn dial to [START TIME].
- Press the [+/-] buttons to select time you'd like your watering to begin. (time will adjust in 1 minute increments)

The display will show

Please note that [START TIME] is the time of day that your programmed watering starts. You can set up to 4 start times at each program if you want to water more than once per day. All stations that have a

programmed run time (how long) will run in sequence at each start time.



Note: Start-Time Stacking

When a start time is set before the previous program has completed, that start time will be "stacked" or delayed, and will start upon completion of the previous program.

Example: Bill just planted new grass seed and wants to water three times per day. He sets START TIME 1 for 5am, START TIME 2 for 12pm, and START TIME 3 for 5 pm.

He sets the INT (interval) to water every 1 DAYS (see section 3, HOW OFTEN).

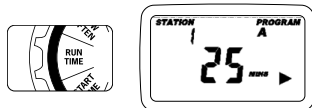
In AUTO mode the system will water 3 times per day. Once Bill's sod is established he can CLEAR start times 2 and 3 and return to watering just once per day.

4. Run Time

- Turn the dial to [RUN TIME].
- Press the PROGRAM button to select which program you'd like to set.

STATION is the area that will be watered by each valve.

On this screen the RUN TIME or duration for each station is set.



- Press the [◀ ▶] to select a station and press the [+/-] buttons to enter the watering duration for that station.
- Press [ENTER] or the [◀ ▶] buttons to move to the next station/valve, and enter watering duration for each station.

5. How Often

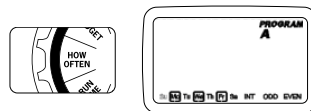
- Turn the dial to [HOW OFTEN] - this screen allows you to set how often to water.

There are 3 options provided:

1. Days of the week (Mon, Tues, Wed, etc.)
2. Intervals (Every "X" number of days)
3. Odd or Even Days

Days of the Week

- Your dial should be set to [HOW OFTEN].
 - Press the PROGRAM button to select which program you'd like to set



- Press the [◀ ▶] buttons to move from one day to another.
- Press [+] or [ENTER] to select a day for watering. A frame will appear around the selected days.
- To delete a previously entered day, press [-] or [CLEAR].

Example: Monday, Wednesday, & Friday

Intervals

- Use the [◀ ▶] buttons to move to the INTERVAL option "INT".
- Press [+/-] buttons to select the number of days between watering.

Example: An interval of 1 will water every day; an interval of 3 will water every 3rd day, etc.

Odd or Even Days

- Use the [◀ ▶] buttons to move to the ODD or EVEN day watering.

- Press [+] or [ENTER]

- Selecting a different option or pressing clear will erase the previous selection.

Example: Odd: 1st, 3rd, 5th, etc.

Example: Even: 2nd, 4th, 6th, etc.

Turn the dial to [AUTO] and that's it! You have programmed your timer!

Turn dial to [AUTO] to activate your program.

Note: If your program is lost, the factory installed fail-safe program will turn on each station every day for 10 minutes.

Note: Your prior programming will not be disturbed unless altered. Always be aware of the program you are in (A or B) when you are making changes.

Reviewing and Changing Your Program

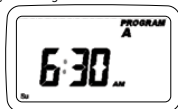
If you want to review or change the start times, run times, or how often to water, simply follow the directions again for that option. After reviewing or changing a watering schedule, remember to turn the dial back to [AUTO] for automatic operation.

Section 4: Additional Features

Rain Delay

[RAIN DELAY] allows you to delay your sprinkler timer from watering for a set period of time. Delay settings are 24, 48, and 72 hours.

- Turn dial to [AUTO]
- Press the [RAIN DELAY] button to automatically delay watering for 24 hours.
- If a longer Rain Delay is desired, press the [+/-] buttons to increase or decrease the setting.
- Press [ENTER] or wait 10 seconds and the selected rain delay will begin.



- [CLEAR] button stops the rain delay and scheduled watering will resume.
- At the end of the selected rain delay amount of time, automatic watering resumes.
- While in rain delay mode, the timer display will switch between the actual time and the remaining hours of the delay, every 2 seconds.

Manual Watering

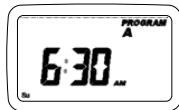
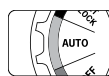
Your timer has the ability to allow you to manually water without disturbing the preset program.

- Turn the dial to [AUTO].
- Press the [MANUAL] button. Display will show A B and ALL. After a few seconds or by pressing

[ENTER] the timer will begin manual watering.

- All stations will water consecutively for their programmed duration.

Note: If the run times have not been set, the timer will not initiate manual watering and the screen will return to the current time.



- To specify a specific program or stations, Press the [◀ ▶] buttons to select A or B.
- Press [ENTER] to activate.
- To select a specific station, continue pressing the [◀ ▶] buttons until desired station number appears.
- Press the [+/-] to enter the desired duration from 1 to 240 minutes.
- Wait 5 seconds and your station will begin.
- To stop Manual Watering press [CLEAR].
- The timer will go back to your original automatic watering schedule.

Example: To manually water on station 3 for five minutes, press the [MANUAL] button then press the [◀ ▶] buttons until you see station 3; using the [+/-] buttons, set duration to five minutes; press [ENTER].

Note: After the [MANUAL] button has been pushed, if a selection is not made within 5 seconds all stations and programs will begin watering using the programmed RUN TIMES. If no RUN TIMES have been set, nothing will happen and the display will return to the time of day.

Connecting a Rain Sensor

- Connect the rain sensor wires to the wiring terminal ports (yellow in color) labeled "Sensor" [see figure 6].

Note: Refer to your rain sensor manual for specific wiring instructions.

- Place the sensor on/off switch to the "on" position to begin operation.

Rain Sensor Bypass

This sprinkler timer is equipped with a sensor override "on/off" switch. This switch is for use during maintenance and repairs, so the sprinkler timer can be operated even if the rain sensor is in active mode.

Important: If the rain sensor switch is in the "on" position and no sensor is connected, the sprinkler

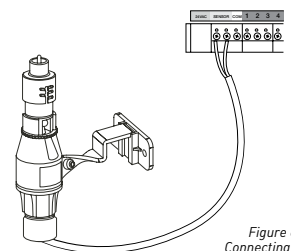


Figure 6:
Connecting a
Rain Sensor

timer will not operate. To resume sprinkler timer operation place the switch in the off position.

Replacing the Battery

Your timer requires a CR2032 Lithium battery.

- The battery will maintain your program in case of an AC power loss.
- Battery should last approximately one year.
- Open by sliding the battery tray out to the right.

- Insert one CR2032 battery into the compartment with the + side up.
- Slide back into place.

A weak or missing battery can cause the time, date, and program to be erased after a power failure. If this happens, you will need to install a fully charged battery and reprogram the timer.

Tip: Replace battery every year, to avoid loss of programming.

Note: A battery alone will not operate the valves in your sprinkling system. The sprinkler timer transformer must be connected to an AC line voltage source.

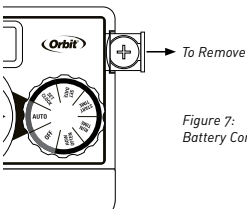


Figure 7:
Battery Compartment

Section 5: Reference

TERM	DEFINITION
START TIME	The time the program begins watering the first programmed station.
VALVE	Supplies water to a specific station or area. The opening and closing of the valve is accomplished through electrical current supplied by the sprinkler timer.
MASTER VALVE	Typically located at the main water source. Turns on and off water for the entire irrigation system when not in use.
MULTIPLE START TIMES	A controller feature that allows a program to be operated multiple times on the same watering day.
OVERLAPPING PROGRAMS	When a "Start Time" is set for a program before the previous program has completed.
PROGRAM (A OR B)	Individual programs as set by the user. Each program operates independently. If one program overlaps the other the programs will be "stacked." After the first program finishes the next program will begin.
RAIN DELAY	A feature that postpones the running of a scheduled watering program for a specific duration.
SOLENOID	The electrical part on an irrigation valve that opens and closes the valve.
SPRINKLER TIMER	A device which instructs the station valves to operate.
STATION	A grouping of sprinklers operated by a single valve which is controlled by the timer.

Troubleshooting

PROBLEM	POSSIBLE CAUSE
One or more valves do not turn on	1. Faulty solenoid connection
	2. Wire damaged or severed
	3. Flow control stem screwed down, shutting valve off
	4. Programming is incorrect
Stations turn on when they are not supposed to	1. Water pressure is too high
	2. More than one start time is programmed
	3. AM/PM is incorrect
	4. B program activated
One station is stuck on and will not shut off	1. Faulty valve
	2. Particles of dirt or debris stuck in valve
	3. Valve diaphragm faulty
All valves do not turn on	1. Transformer defective or not connected
	2. Programming is incorrect
Timer will not power up	1. Transformer not plugged into a working outlet
Valves continue to turn on and off when they are not programmed	1. More than one start time is programmed with overlapping schedules
	2. Excessive pressure
	3. B program activate

HELP

1-800-488-6156 or 1-801-299-5555
www.orbitonline.com
Before returning this sprinkler timer to the store, contact Orbit® Technical Service at: 1-800-488-6156, 1-801-299-5555.
LISTINGS
This Class B digital apparatus complies with Canadian ICES-003.
Disconnection : Type 1Y
Normal Pollution Situation.

TRADEMARK NOTICE

WaterMaster® is a registered trademark of Orbit® Irrigation Products, Inc. The information in this manual is primarily intended for the user who will establish a watering schedule and enter that schedule into the sprinkler timer. This product is intended to be used as an automatic sprinkler timer for activating 24 VAC irrigation valves, as described in this manual.

WARRANTY AND STATEMENT

Orbit® Irrigation Products, Inc. warrants to its customers that its products will be free from defects in materials and workmanship for a period of six years from the date of purchase.
We will replace, free of charge, the defective part or parts found to be defective under normal use and service for a period of up to six years after purchase (proof of purchase required).
We reserve the right to inspect the defective part prior to replacement.
Orbit® Irrigation Products, Inc. will not be responsible for consequential or incidental cost or damage caused by the product failure. Orbit® liability under this warranty is limited solely to the replacement or repair of defective parts.
To exercise your warranty, return the unit to your dealer with a copy of the sales receipt.
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: [1] This device may not cause harmful interference, and [2] This device must accept any interference received, including interference that may cause undesired operation.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: This appliance is not intended for use by young children or infirm persons without supervision. Young children should be supervised to ensure that they do not play with the appliance.

Caution: Risk of electric shock or personal injury or fire, only use power unit model WR1-41-065R-1 (or WT1-41-065R) with this timer.

Felicitaciones por seleccionar su nuevo temporizador Easy Dial™. Con Easy-Set Logic™ exclusivo de Orbit®, la programación y configuración simples se combinan con la última tecnología y versatilidad en temporizadores.

Su nuevo temporizador brinda conveniencia y flexibilidad, lo que le permite ejecutar un programa de riego completamente automático, semiautomático o manual para todas sus necesidades de riego. Aunque su temporizador es tan fácil de programar que no necesitará instrucciones, recomendamos que lea este manual antes de la instalación, para que entienda todas las características avanzadas.

Índice

Sección 1: Conozca su temporizador..... 20

Sección 2: Instalación..... 22

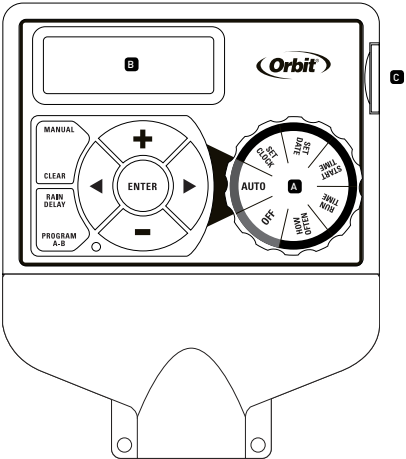
Sección 3: Programación con Easy-Set Logic™ 25

Sección 4: Características adicionales 27

Sección 5: Referencia..... 30

Section 1: Conozca su temporizador

- A Selector
- B Pantalla digital
- C Compartimiento para baterías



Botones	Función
ENTER	Para confirmar una nueva configuración
MANUAL	Para regar manualmente
CLEAR	Para borrar una configuración
PROGRAM	Para moverse entre programas: A y B
FLECHA [▶]	Para avanzar a la siguiente configuración / estación de riego o moverse a otros programas/configuraciones
FLECHA [◀]	Para volver a la configuración/estación de riego previa o moverse a otros programas/configuraciones
RAIN DELAY	Para pausar el funcionamiento durante 24 a 72 horas debido a lluvias u otros factores
+	Para aumentar una configuración numérica
-	Para disminuir una configuración numérica

Posiciones del selector	Función
AUTO	El programa de configuración está funcionando automáticamente.
AJUSTE DEL RELOJ	Ajuste de la hora del reloj
AJUSTE DE LA FECHA	Año, Mes y Día
START TIME	Configura la hora para comenzar a regar
RUN TIME	Configura la duración del riego para cada estación
HOW OFTEN	Configura la frecuencia de los días de riego
OFF	Desconecta todas las estaciones/funciones

Sección 2: Instalación

Herramientas necesarias

- Destornillador Phillips
- Pinzas pelacables

1. Elija una ubicación

Al elegir una ubicación para su temporizador, considere lo siguiente:

- Elija una ubicación cerca de un tomacorriente eléctrico.
- Asegúrese de operar a temperaturas no inferiores a 0 °C o superiores a 70 °C (inferiores a 32 °F o superiores a 158 °F).
- Ubique el temporizador donde exista un acceso fácil al conductor del regador (desde las válvulas).

2. Monte el temporizador

- Utilice la plantilla de montaje (incluida) para marcar la posición de los tornillos de montaje en la pared. Consulte la figura 1.
- Instale un tornillo No. 8 en la pared, en la ubicación superior de la plantilla. Deje que sobresalga la cabeza del tornillo 3 mm (1/8") de la pared. De ser necesario, utilice anclas de expansión (incluidas) en yeso o mampostería para un agarre seguro.
- Deslice el temporizador sobre el tornillo sobresaliente (con la ranura con forma de cerradura en la parte posterior del temporizador). Consulte la figura 2.
- Coloque un tornillo No. 8 a través de uno de los dos orificios preformados ubicados en las esquinas inferiores del gabinete. Consulte la figura 2.

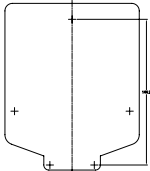


Figura 1: Utilice la plantilla de montaje (incluida)

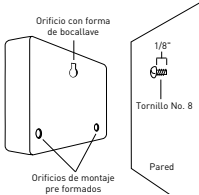


Figura 2: Cuelgue el temporizador en el orificio con forma de bocallave con un tornillo

3. Conecte el temporizador a las válvulas

Cableado eléctrico

Tome el conductor del regador, pele 12,7 mm (1/2") del aislamiento de plástico de los extremos de cada conductor individual. Conecte un conductor de cada válvula (no importa cuál) al conductor del regador común (generalmente blanco). Luego conecte el conductor restante de cada válvula a un conductor regador de color que se encuentra separado.

Consulte la figura 3.

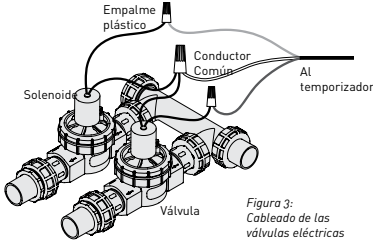


Figura 3: Cableado de las válvulas eléctricas

Nota: La carga máxima para cada estación/bomba es 250 mA (una válvula), la carga máxima para el temporizador es 500 mA.

Si la distancia entre el temporizador del regador y las válvulas no supera los 210 m (700'), utilice el conductor del regador Orbit o un conductor de termostato calibre 20 (AWG) con recubrimiento de plástico para conectar el temporizador del regador a las válvulas. Si la distancia supera los 210 m (700'), utilice un conductor calibre 16 (AWG).

Importante: El conductor se puede enterrar en el suelo; sin embargo, para mayor protección, los conductores pueden extenderse por tubos de PVC y enterrarse en el suelo. Tenga cuidado y evite enterrar los conductores en sitios donde se puedan dañar por futuras excavaciones o zanjas.

Importante: Todos los cables se deben unir con empalmes plásticos, soldaduras y/o cinta de vinilo. Se recomienda utilizar un sellador rápido o engrasador Orbit en ambientes húmedos como una caja de válvulas para evitar la corrosión de la conexión y para protegerla de la filtración de agua.

Conexión de los conductores del regador al temporizador

Tome el conductor del regador, pele 6 mm (1/4") del aislamiento de plástico de los extremos de cada conductor individual. Conecte el conductor del regador común (generalmente blanco) al terminal marcado como COM. Luego conecte los conductores restantes a un terminal que se encuentra separado. Consulte la figura 4.

Importante: Para evitar peligros eléctricos y daños en el temporizador, se debe conectar sólo una válvula a cada estación. Consulte la figura 4.

4. Conexión de la alimentación eléctrica del transformador

Interiores – Conecte el conector de alimentación al temporizador. Enchufe el transformador en un tomacorriente eléctrico de 110 V. Consulte la figura 5.

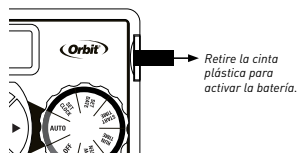
5. Active la batería

Se requiere una batería de litio CR2032 (incluida) para mantener el programa en la memoria durante cortes de electricidad. Se recomienda su reemplazo cada año.

Retire la cinta plástica para activar la batería preinstalada.

(Consulte la página 12 para leer sobre el reemplazo de batería)

Nota: La batería sola no hará funcionar las válvulas de su sistema de riego. El temporizador de regador tiene un transformador empotrado que se debe conectar a una fuente de voltaje de CA.



Sólo conecte una válvula a cada terminal (estación) o se producirán daños.

Estación 1

Pele el cable

Empuje el cable y apriete el tornillo

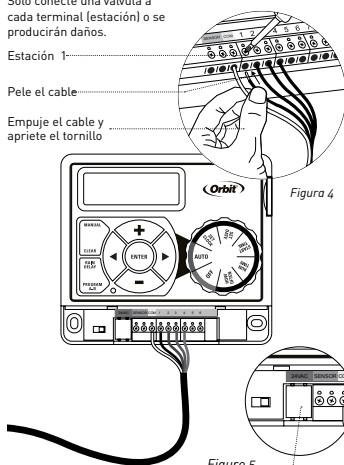


Figure 5
Conecte el transformador aquí

24

Sección 3: Programación con Easy-Set Logic™

Una nota sobre programas múltiples.

Su temporizador de regador brinda la flexibilidad de utilizar 2 programas independientes (A, B). Un programa es donde almacena todas sus configuraciones del regador. Consiste en un grupo de estaciones establecidas para horas de inicio y de funcionamiento específicas. Los programas múltiples le permiten hacer funcionar diferentes válvulas en diferentes días con diferentes tiempos de funcionamiento. Mientras que muchas aplicaciones sólo requieren un programa (A), usar programas múltiples puede ser útil en áreas de riego por goteo, césped recién plantado o estaciones del regador rotativas. Usar programas para agrupar estaciones con necesidades de riego similares maximizará la eficiencia de la irrigación.

La programación primaria se puede lograr con sólo unos pasos básicos.

Programación primaria

Presione [RESET] para borrar toda programación previa de fábrica.

1. Configuración de reloj

- Gire el selector a [SET CLOCK].
- Presione los botones [+/-] para configurar la hora actual del día.

Sugerencia: Para aumentar o disminuir más rápidamente, mantenga presionados los botones [+/-] hasta que la pantalla cambie a modo de avance rápido.

- Presione los botones [◀ ▶] para configurar a.m./p.m.
- Gire el selector para aceptar la hora.

2. Configuración de fecha

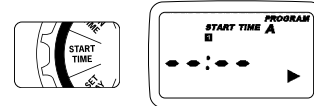
- Gire el selector a [SET DATE].
- Aparecerá A/M/D (la letra parpadeando indica la selección).
- Presione los botones [+/-] para configurar el año correcto y luego presione [ENTER] o [◀ ▶].
- Presione los botones [+/-] para configurar el mes correcto y luego presione [ENTER].
- Presione los botones [+/-] para configurar la fecha correcta.
- Gire el selector para aceptar la fecha.

3. Hora de inicio

- Gire el selector a [START TIME].
- Presione los botones [+/-] para seleccionar la hora a la que le gustaría que comience el riego.

(La hora se ajustará en incrementos de 1 minutos).

La pantalla mostrará.



25

Tenga en cuenta que la HORA DE INICIO es la hora del día en que comienza su riego programado. Puede programar hasta 4 inicios si desea regar más de una vez al día. Todas las estaciones que tienen un TIEMPO DE FUNCIONAMIENTO programado (frecuencia) funcionarán en secuencia a estas horas.

Nota: Almacenamiento de horas de inicio
Cuando una hora de inicio se configurará antes de que el programa previo termine, dicha hora de inicio quedará "en cola" o se retrasará, y comenzará una vez que el programa previo termine.

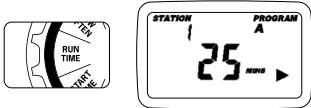
Ejemplo: Bill acaba de plantar semillas para césped y desea regar tres veces al día. Configura la HORA DE INICIO 1 para las 5 a.m., la HORA DE INICIO 2 para las 12 p.m. y la HORA DE INICIO 3 para las 5 p.m.

Configura el INT (intervalo) para regar cada 1 DÍA (consulte la sección 3, HOW OFTEN).

En el modo AUTO el sistema regará 3 veces al día. Una vez que el tepe de Bill esté firme, podrá BORRAR las horas de inicio 2 y 3, y volver a regar sólo una vez al día.

4. Tiempo de funcionamiento

- Gire el selector a [RUN TIME].



STATION es el área que regará cada válvula. En esta pantalla, se configura el TIEMPO DE FUNCIONAMIENTO o duración para cada estación.

- Presione [◀ ▶] para seleccionar una estación y presione los botones [+ / -] para ingresar la duración de riego para esa estación.
- Presione [ENTER] o los botones [◀ ▶] para pasar a la siguiente estación o válvula e ingresar la duración de riego para cada estación.

5. Frecuencia

- Gire el selector a [HOW OFTEN]; esta pantalla le permitirá configurar la frecuencia del riego. Se brindan 3 opciones:
 1. Días de la semana (Lun, Mar, Miér, etc.)
 2. Intervalos (cada "X" número de días)
 3. Días impares o pares



Días de la semana

- Debe configurar el selector a [HOW OFTEN].
 - La opción parpadeará para indicar la selección.

- La pantalla mostrará la letra del programa (A o B).
- Presione los botones [◀ ▶] para pasar de un día a otro a través de las opciones.
- Presione [+] o [ENTER] para seleccionar un día de riego.
- Para borrar un día ingresado con anterioridad, presione [-] o [CLEAR].

Ejemplo: Lunes, miércoles y viernes.

Intervalos

- Utilice los [◀ ▶] botones para pasar a la opción INTERVALO "INT".
- Presione los botones [+ / -] para seleccionar el número de días entre riegos.

Ejemplo: Un intervalo de 1 regará todos los días; un intervalo de 3 regará cada 3 días, etc.

Días impares o pares

- Utilice los [◀ ▶] botones para pasar al riego en día IMPAR o PAR.
 - Configuración de IMPAR o PAR, presione [+] o [ENTER].
 - Seleccionar una opción diferente o presionar borrar, borrará la selección previa.
- Ejemplo: Impares: 1º, 3º, 5º, etc.
Ejemplo: Pares: 2º, 4º, 6º, etc.

Gire el selector a [AUTO] y ¡listo!
Acaba de programar su temporizador.
Gire el selector a AUTO para activar el programa.

Nota: Si su programa se pierde, el programa a prueba de fallos instalado en fábrica encenderá cada estación todos los días por 10 minutos.
Nota: Su programación anterior no se verá afectada a menos que se modifique. Siempre esté atento al programa en el que está (A o B) cuando realice cambios.

Revisión y cambio de un programa

Si desea revisar o cambiar las horas de inicio, los tiempos de funcionamiento o la frecuencia de riego, simplemente siga las instrucciones nuevamente para esa opción. Recuerde girar el selector de vuelta a AUTO después de revisar o cambiar un plan de riego para el funcionamiento automático.

Sección 4: Características adicionales

Retardo por lluvia

El retardo por lluvia le permite retardar el temporizador de regador para que no riegue durante un periodo de tiempo establecido. Las configuraciones de retardo son 24, 48 y 72 horas.

- Gire el selector a [AUTO].



- Presione el botón de retardo por lluvia para detener automáticamente el riego por 24 horas.

- Si desea un retraso por lluvia más largo, presione los botones [+/-] para aumentar o disminuir la configuración.
- Presione [ENTER] o espere 10 segundos y el retardo por lluvia seleccionado comenzará.
- El botón [CLEAR] detiene el retardo por lluvia y el riego programado continúa.
- Al final del tiempo de retardo por lluvia seleccionado, continúa el riego automático.
- Mientras se encuentre en modo de retardo por lluvia, la pantalla del temporizador cambiará cada 2 segundos entre la hora actual y las horas de retraso restantes.

Riego manual

Su temporizador tiene la capacidad de permitirle regar sin interrumpir el programa actual.

- Gire el selector a [AUTO].



- Presione el botón [MANUAL]. La pantalla mostrará A B y ALL. Luego de pocos segundos o al presionar [ENTER], el temporizador comenzará el riego manual.
- Todas las estaciones regarán consecutivamente en su duración programada.

Nota: Si no se configuraron los tiempos de funcionamiento, el temporizador no comenzará el riego manual y la pantalla volverá a la hora actual.

- Para especificar un programa o estaciones específicas, presione los [◀ ▶] botones para seleccionar A o B.
- Presione [ENTER] para activar.
- Para seleccionar una estación específica, continúe presionando los botones de [◀ ▶] hasta que aparezca el número de la estación deseada.
- Presione [+/-] para ingresar la duración deseada de 1 a 240 minutos.
- Espere 5 segundos y comenzará su estación.
- Para detener el riego manual, presione [CLEAR].
- El temporizador volverá a su plan de riego automático original.

Ejemplo: Para regar manualmente en la estación 3 durante cinco minutos, presione el botón [MANUAL] y luego presione los botones hasta que vea la estación 3; usando los botones [+/-], configure la duración en cinco minutos; presione [ENTER].

Nota: Después de que se ha presionado el botón [MANUAL], si no se realiza una selección dentro de 5 segundos, todas las estaciones y programas comenzarán el riego usando los TIEMPOS DE FUNCIONAMIENTO programados. Si no se han configurado TIEMPOS DE FUNCIONAMIENTO, no sucederá nada y la pantalla volverá a la hora del día.

Conexión de un detector de lluvia

- Conecte el detector de lluvia a los puertos del terminal de cableado (amarillo en color) etiquetado "Sensor".

Nota: Consulte el manual del detector de lluvia para obtener instrucciones de cableado específico.

- Coloque el interruptor de encendido y apagado del detector en la posición "on" para comenzar el funcionamiento (consulte la figura 6).

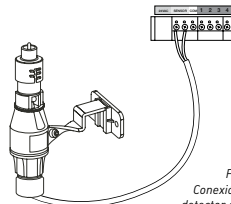


Figura 6:
Conexión de un
detector de lluvia

Derivación del sensor de lluvia

El temporizador de este regador está equipado con un interruptor "on/off" de anulación del sensor. El interruptor se utiliza durante el mantenimiento y reparación, así el temporizador del regador puede ser operado aún si el sensor de lluvia está activado.

Importante: Si el interruptor del sensor de lluvia está en la posición de encendido "on" y el sensor no está conectado, el temporizador del regador no funcionará. Para reanudar el funcionamiento del temporizador del regador, coloque el interruptor en la posición de apagado "off".

Reemplazo de la batería

Su temporizador requiere una batería de litio CR2032.

- La batería mantendrá su programa en caso de pérdida de alimentación de CA.
- La batería debe durar un año aproximadamente.
- Abra deslizando la bandeja del compartimento de pilas hacia fuera a la derecha.
- Inserte una batería CR2032 en el compartimiento con el signo + hacia arriba.
- Deslice hacia atrás a su sitio.

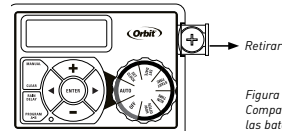


Figura 7:
Compartimento de
las baterías

Una batería descargada o la ausencia de baterías puede borrar la hora, la fecha y el programa tras un corte de energía. Si esto sucede, tendrá que instalar una batería completamente cargada y reprogramar el temporizador.

Sugerencia: Reemplace la batería todos los años para evitar perder la programación.

Nota: Una batería sola no hará funcionar las válvulas de su sistema de riego. El transformador del temporizador de regador se debe conectar a una fuente de voltaje de línea de CA.

Sección 5: Referencia

TÉRMINO	DEFINICIÓN
HORA DE INICIO	La hora en que el programa comienza el riego la primera estación programada.
VÁLVULA	Suministra agua a una estación o área específicos. La abertura y el cierre de la válvula se realizan con la corriente eléctrica que suministra el temporizador de regador.
VÁLVULA MAESTRA	Suele ubicarse en la fuente de agua principal. Abre y cierra el agua para todo el sistema de irrigación cuando no está en uso.
HORAS DE INICIO MÚLTIPLES	Una característica de control que permite que un programa funcione a múltiples horas en el mismo día de riego.
PROGRAMAS SUPERPUESTOS	Cuando se configura una "hora de inicio" para un programa antes de que el programa previo haya terminado.
PROGRAMA (A O B)	Programas individuales configurados por el usuario. Cada programa funciona de forma independiente. Si un programa se superpone al otro, los programas quedarán "en cola". Después de que termine el primer programa comenzará el programa siguiente.
RETARDO POR LLUVIA	Una característica que pospone el funcionamiento de un programa de riego programado para una duración específica.
SOLENOIDE	La parte eléctrica en una válvula de irrigación que abre y cierra la válvula.
TEMPORIZADOR DE REGADOR	Un dispositivo que les ordena a las válvulas de la estación que funcionen.
ESTACIÓN	Un grupo de regadores que funcionan con una sola válvula controlada por el temporizador.

Solución de problemas

PROBLEMA	CAUSA POSIBLE
Una o más válvulas no encienden.	1. La conexión del solenoide no es la correcta.
	2. El cable está dañado o cortado.
	3. Vástago de control de flujo hacia abajo, válvula cerrada.
	4. La programación es incorrecta.
Las estaciones se encienden cuando no deben hacerlo.	1. La presión del agua es demasiado alta.
	2. Se ha programado más de una hora de inicio.
	3. A.M./P.M. es incorrecto.
	4. Programa B activado.
Una estación permanece activa y no se apaga.	1. Válvula defectuosa.
	2. Partículas de suciedad o desechos atascados en la válvula.
	3. Diafragma de la válvula defectuoso.
Ninguna de las válvulas enciende.	1. Transformador defectuoso o desconectado.
	2. La programación es incorrecta.
El temporizador no se enciende.	1. El transformador no está conectado a un tomacorriente en funcionamiento.
Las válvulas siguen encendiéndose y apagándose cuando no están programadas para hacerlo.	1. Hay más de una hora de inicio programada con planes superpuestos.
	2. Presión excesiva.
	3. Programa B activado.

AYUDA

1-800-488-6156 or 1-801-299-5555

www.orbitonline.com

Antes de devolver este temporizador de regador a la tienda, póngase en contacto con el Servicio técnico de Orbit® al:

1-800-488-6156, 1-801-299-5555.

CLASIFICACIONES

Este instrumento digital clase B cumple con el ICES-003 de Canadá.

Desconexión: Tipo 1Y

Situación de contaminación normal.

AVISO DE LA MARCA

WaterMaster® es una marca registrada de Orbit® Irrigation Products, Inc. La información de este manual está pensada para el usuario que establecerá un plan de riego y que ingresará dicho plan en el temporizador de regador. Este producto está pensado para ser utilizado como un temporizador de regador automático para la activación de válvulas de irrigación de 24-V CA como se describe en este manual.

GARANTÍA Y DECLARACIÓN

Orbit® Irrigation Products Inc. garantiza a sus clientes que sus productos estarán libres de defectos en los materiales y en la fabricación durante un período de seis años a partir de la fecha de compra.

Reemplazaremos, sin cargos, la o las piezas defectuosas o las piezas que se consideren defectuosas bajo un uso y servicio normales por un período de hasta seis años después de la compra (se exige comprobante de compra).

Nos reservamos el derecho de inspeccionar la pieza defectuosa antes de su reemplazo.

Orbit® Irrigation Products Inc. no será responsable de costos ni daños indirectos o incidentales causados por la falla del producto. La responsabilidad de Orbit® bajo esta garantía se limita solamente al reemplazo o la reparación de las piezas defectuosas.

Para utilizar su garantía, regrese la unidad al distribuidor con una copia del recibo de venta.

Este dispositivo cumple con la Sección 15 de las reglas de la FCC. El funcionamiento está sujeto a las siguientes dos condiciones: (1) Este dispositivo no debe causar interferencia perjudicial, y (2) deberá aceptar cualquier interferencia recibida, incluida la interferencia que pudiese causar la operación no deseada.

Advertencia: Los cambios o las modificaciones a esta unidad que no estén expresamente aprobadas por la parte responsable del cumplimiento podrían anular la autorización del usuario para utilizar el equipo.

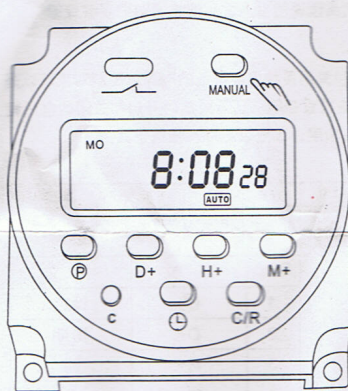
NOTA: Este equipo ha sido probado y se ha verificado que cumple los límites para un dispositivo digital Clase B, conforme a la Sección 15 de las reglas de la FCC. Estos límites están diseñados para proporcionar protección razonable contra interferencia perjudicial en una instalación residencial. Este equipo genera, utiliza y puede irradiar energía de radiofrecuencia y, si no se instala y usa de acuerdo con las instrucciones, puede causar interferencia perjudicial a las comunicaciones de radio. Sin embargo, no se garantiza que no se producirán interferencias en una instalación en particular.

Si este equipo genera interferencia perjudicial a la recepción de radio o televisión, lo que se puede determinar apagando y encendiendo el equipo, se recomienda al usuario que intente corregir la interferencia con una o más de las siguientes medidas:

- Reorientar o reubicar la antena de recepción.
- Aumentar la separación entre el equipo y el receptor.
- Conectar el equipo a un tomacorriente de un circuito distinto al que usa el receptor.
- Solicitar ayuda al concesionario o a un técnico con experiencia en radio/TV.

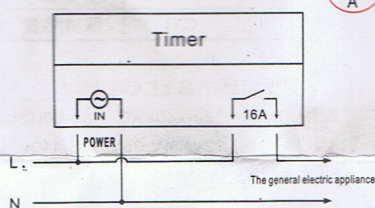
Precaución: Este electrodoméstico no está pensado para ser utilizado por niños pequeños o por personas enfermas sin supervisión. Se debe supervisar a los niños pequeños para asegurarse de que no jueguen con el electrodoméstico.

CN101 WEEKLY PROGRAMMABLE TIMER

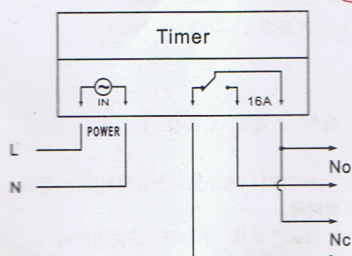


CONNECTION DIAGRAM

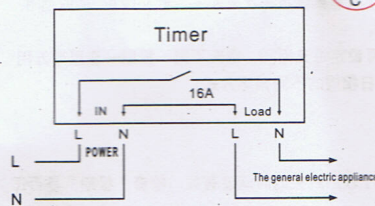
TYPE A



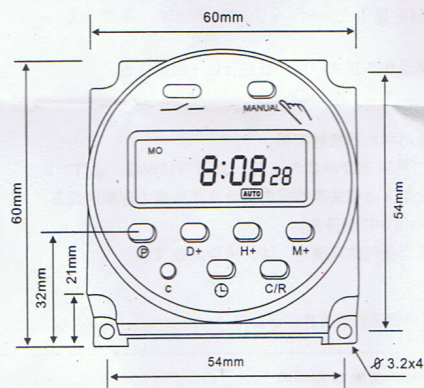
TYPE B



TYPE C



DIMENSIONS



DIN Rail Installation

Advanced pre-setting one week before

Digital electronic time switch with daily programs

Repeat programs with 17 on/off setting; and manual over-ride

Lithium battery power reserve

Auto time error correction ± 60 sec/weekly

TECHNICAL DATA

Voltage rating: AC 220V 50/60Hz

Voltage limit: AC 180V~250V

Hysteresis: ≤ 1 sec/day (25°C)

ON/OFF operation: 17 ON & 17 OFF

Power consumption: 2VA(max)

Display: LCD

Service life: Mechanical 10^7

Electrically 10^5

Minimum interval: 1 minute

Weight: approx 40g

Order voltage

12V, 24V, 36V, 48V, 110V:

Count down: 1 sec-99 min 56 sec

Pulse: 1 sec-59 min 59 sec

Load capacity: resistive load: 16A/250V AC

Lagging load: 10A/250Vac

lamp load: 2000W

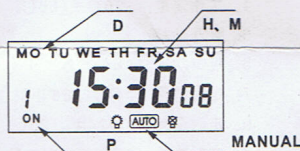
Switching contact: 1 changeover switch

Power reserve: 3 years (Lithium battery)

Ambient temperature: -10~+40°C

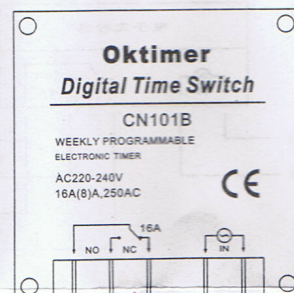
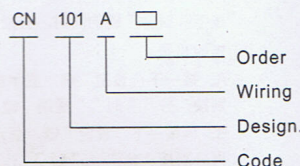
Ambient humidity: 35~85%RH

DISPLAY



1	⊕	TIMER
2	D+	DAY
3	H+	HOUR
4	M+	MIN
5	⊖	CLOCK
6	C	RESET
7	MANUAL	MANUAL C/R
8	C/R	Cancel/recovery

MEANING.



Operating Instruction:

- To start switch: press reset Key. At the first time, if you want to the present time, please press "⊖" On board, then press D+, H+, M+ to adjust the number to the present time.
- Enter into programming as follows:

Step	Key	Programming
1	Press P	Setting 1 ON time(display 1on)
2	Press H+/M+	Setting hours and minutes
3	Press D+	To select same every day, or different time each day
4	Press P	Setting 1 off time (display 1 off)
5	Press H+/M+	Setting hours and minutes turn off time
6	Press D+	If you want the same every day, you need not press this key
7	Repeat step 2-6	Set 2-17 on/off time
8	Press ⊖	End

If you do not require 17 settings, press "⊖" to the end.

NOTE:

- Time setting should according to the time sequence, couldn't be set crossly
- System with quit automatically if there's no operating within 10 seconds and no data is saved.
- Function 3, 4, 5 can not be used simultaneously.



Mini Submersible / Fountain / Pond Pump



Item 68372



Item 68389



Item 68393



Item 68395



Item 68396

⚠ WARNING

Read this material before using this product. Failure to do so can result in serious injury. **SAVE THIS MANUAL.**

When unpacking, make sure that the product is intact and undamaged. If any parts are missing or broken, please call 1-800-444-3353 as soon as possible.

Visit our website at: <http://www.harborfreight.com>

Copyright© 2011 by Harbor Freight Tools®. All rights reserved. No portion of this manual or any artwork contained herein may be reproduced in any shape or form without the express written consent of Harbor Freight Tools. Diagrams within this manual may not be drawn proportionally. Due to continuing improvements, actual product may differ slightly from the product described herein. Tools required for assembly and service may not be included.

Before start-up:

The pump can be connected to any shock-proof plug which has been installed according to regulations. The plug must have a supply voltage of 120 V~ at 60 Hz.

CAUTION:

This pump has been evaluated for use with clear water only. Do not use in or around swimming pools.

WARNING:

IMPORTANT! For your own safety – before starting to run the pump, please have the following items checked by an expert:

1. To reduce the risk of electric shock, use only on portable self-contained fountains no larger than 5 feet in any dimension.
2. Risk of electric shock – This pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of electric shock, connect only to a properly grounded, grounding-type receptacle.
3. Risk of electric shock – This pump has not been investigated for use in swimming pool areas.
4. The electrical connections must be protected from moisture.
5. If there is danger of flooding, the electrical connections must be taken to higher ground.
6. Circulation of caustic fluids, as well as the circulation of abrasive materials, must be avoided at all costs.

7. The pump must be protected from frost.
8. The pump must be protected from running dry.
9. Access by children should also be prevented with appropriate measures.
10. To avoid the possibility of the pump plug or receptacle getting wet, position pump to one side of a wall mounted receptacle to prevent water from dripping onto the receptacle or plug. The user should arrange a “drip loop” in the cord connecting the pump to a receptacle. The “drip loop” is that part of the cord below the level of the receptacle, or the connector if an extension cord is used, to prevent water traveling along the cord and coming in contact with the receptacle.
11. **WARNING:** Handling the Power Cord on this product will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. Wash hands after handling. (California Health & Safety Code § 25249.5, *et seq.*)
12. The warnings, precautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

Fluid Type

The Pump is designed for use with salt and fresh water with a maximum temperature of 77° F (25°C). Do not use in hot water. Do not use the pump for other fluids, especially not fuels, cleaning fluids, or other chemical products.

Specifications

Description	Item # 68372	Item # 68389	Item # 68393	Item # 68395	Item # 68396
Electrical Input	120 V~ / 60 Hz				
Amps	.195 A	.07 A	.58 A	.23 A	.14 A
Max. Flow Rate	200 GPH	92 GPH	620 GPH	264 GPH	158 GPH
Max. Head Lift	4.6 FT.	2.3 FT.	11.5 FT.	4.6 FT.	3.6 FT.
Outlet Size	.53 IN.	.5 IN.	.56 IN.	.5 IN.	.56 IN.
Cord Length	6 FT.				



Save This Manual

Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual and the receipt in a safe and dry place for future reference.

Installation

Please note!

1. The pump is designed to be used in aquariums/water features.
2. The pump must be placed on the bottom of the aquarium/water feature. To ensure that the pump works properly, keep the bottom of the aquarium/water feature free from sludge and dirt of all kinds.
3. For proper cooling, only operate pump when it is completely submerged. See the Specifications Chart for the maximum lift for your particular pump.
4. **NOTE:** Pumps models **68393** and **68395** each come with their own extension set. To attached extension to the pump, thread selected extension outlet to top of extension. Then thread bottom of extension to extension valve. Use adapter to connect assembled extension to water outlet at top of pump housing.

Power Supply

1. The pump is equipped with a shock-proof plug according to regulations. The pump is designed to be connected to 120 V~, 60 Hz GFCI-protected safety socket.
2. Make sure that the socket is sufficiently secured and is in excellent condition.

3. When the plug is inserted into the socket the pump will operate.

WARNING! If the power cord or plug is damaged, do not use the pump. The power cord or plug may only be repaired by a certified electrician.

Operation

1. Set the pump on a level spot in the aquarium/water feature. The suction cups must be in contact with the aquarium/fountain floor or a smooth platform.

NOTE: Do not plug in pump yet.

CAUTION: Verify pump is adequately supported. If you use an additional hose and in-line filter (not included), do not use it or the connecting tube to support the pump.

2. Once the pump is fully submerged and adequately supported, shift the regulator to adjust flow rate.
3. **NOTE:** After reading these instructions, consider the following points before starting the pump:
 - a. Verify that the pump rests on the floor of the shaft, if it is not suspended by the power cord.
 - b. Verify that the delivery pipe is properly connected.
 - c. Verify that the electrical connection is 120 V~, 60 Hz.
 - d. Verify that the electrical socket is in good condition.
 - e. Verify that water and moisture cannot get near the power supply socket.
 - f. Verify that the pump is installed so as to prevent running dry.
4. Once you've verified that the pump has a proper setup, dry your hands and plug the power cord into the electrical outlet to begin pump operation.

⚠ WARNING

TO PREVENT SERIOUS INJURY FROM ACCIDENTAL OPERATION:
Unplug the Pump from its electrical outlet before performing any inspection, maintenance, or cleaning procedures.

If the pump is moved to a different aquarium or water feature, flush it out with clean water and dry before setting up in new water feature.

If cord is damaged, it must be replaced by a qualified technician.

Quarterly Maintenance

The below maintenance should be performed at least once every 3 months under optimal conditions. If pump starts to sound abnormal, unplug it and check the Impeller by doing the following:

1. Remove the front cover and filter/regulator (depending on particular pump).
2. Gently pull out the Impeller from the pump body.
3. Rinse the Impeller assembly with clean water. Use an old toothbrush to remove any debris.
4. To prevent damage, do not rest the pump on the impeller or pry against the impeller
5. Once, clean reassemble Pump.
6. **NOTE: Make sure the power cord is unplugged before performing any maintenance or cleaning.**

Troubleshooting

Problem	Possible Causes	Possible Solutions
Pump runs, but will not deliver any water.	1. Filter and/or impeller clogged. 2. When starting, the pump water height is beyond the head lift. 3. Low line voltage. 4. Optional connecting tube is improperly installed.	1. Remove filter. Clean out dirt and debris from filter and impeller. Then replace Filter. 2. Check specifications chart and verify pump is not exceeding head lift. 3. Consult an electrician. 4. Remove and examine check valve.
Pump won't start or run.	1. Check power connections and circuits/fuses. 2. Filter and/or impeller clogged 3. Defective motor.	1. Consult an electrician. 2. Remove filter. Clean out dirt and debris from filter and impeller. Then replace filter. 3. Have a qualified service technician repair or replace.
Excessive noise or vibration.	1. Worn bearings. 2. Debris in impeller.	1. Have a qualified service technician repair or replace. 2. Remove filter. Clean impeller. Then replace filter.
Pump starts and stops too frequently.	1. Water temperature too high. 2. Pump placed in fluid that is not clear fresh or salt water.	1. Do not exceed 77° Fahrenheit. 2. Install pump in clear fresh or salt water aquarium/water feature.



Follow all safety precautions whenever diagnosing or servicing the tool. Disconnect power supply before service.

PLEASE READ THE FOLLOWING CAREFULLY

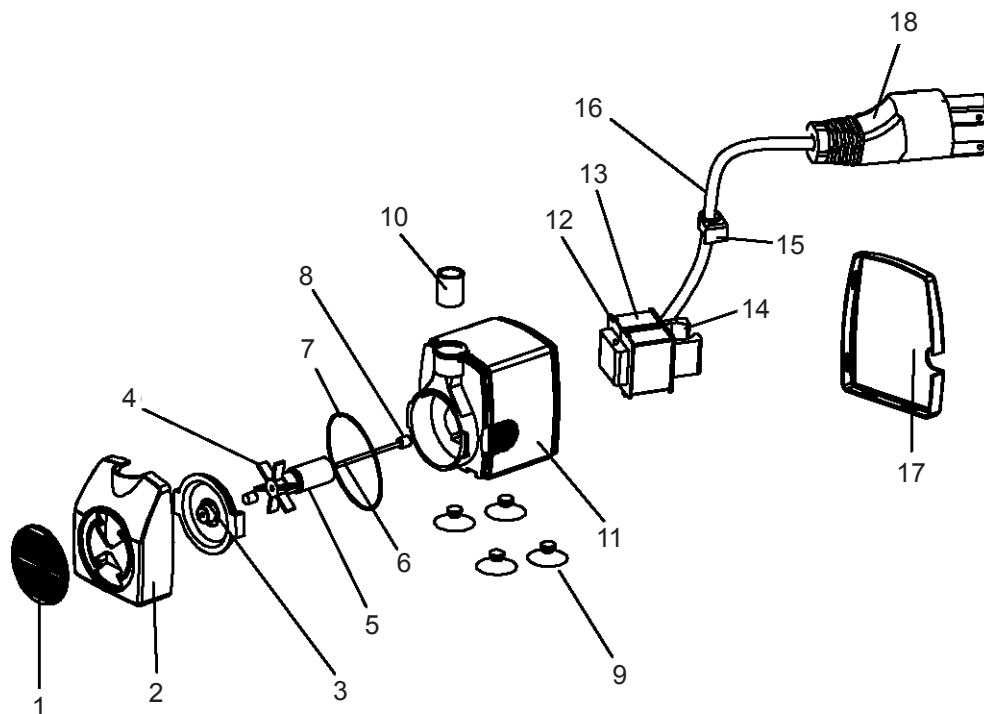
THE MANUFACTURER AND/OR DISTRIBUTOR HAS PROVIDED THE PARTS LIST AND ASSEMBLY DIAGRAM IN THIS MANUAL AS A REFERENCE TOOL ONLY. NEITHER THE MANUFACTURER OR DISTRIBUTOR MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND TO THE BUYER THAT HE OR SHE IS QUALIFIED TO MAKE ANY REPAIRS TO THE PRODUCT, OR THAT HE OR SHE IS QUALIFIED TO REPLACE ANY PARTS OF THE PRODUCT. IN FACT, THE MANUFACTURER AND/OR DISTRIBUTOR EXPRESSLY STATES THAT ALL REPAIRS AND PARTS REPLACEMENTS SHOULD BE UNDERTAKEN BY CERTIFIED AND LICENSED TECHNICIANS, AND NOT BY THE BUYER. THE BUYER ASSUMES ALL RISK AND LIABILITY ARISING OUT OF HIS OR HER REPAIRS TO THE ORIGINAL PRODUCT OR REPLACEMENT PARTS THERETO, OR ARISING OUT OF HIS OR HER INSTALLATION OF REPLACEMENT PARTS THERETO.

Parts List

Part	Description	Qty
1	Regulator	1
2	Front Cover	1
3	Water Seating	4
4	Impeller Head	1
5	Impeller	1
6	Impeller Shaft	1
7	Sealing Ring	1
8	Shaft Cover	1
9	Suction Cup	4

Part	Description	Qty
10	Water Outlet	1
11	Pump Housing	1
12	Motor	2
13	Magnet Wire	2
14	Cord Clamp	1
15	String Block	1
16	Power Cord	1
17	Back Cover	1
18	Plug	1

Assembly Diagram



Record Product's Serial Number Here: _____

Note: If product has no serial number, record month and year of purchase instead.

Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

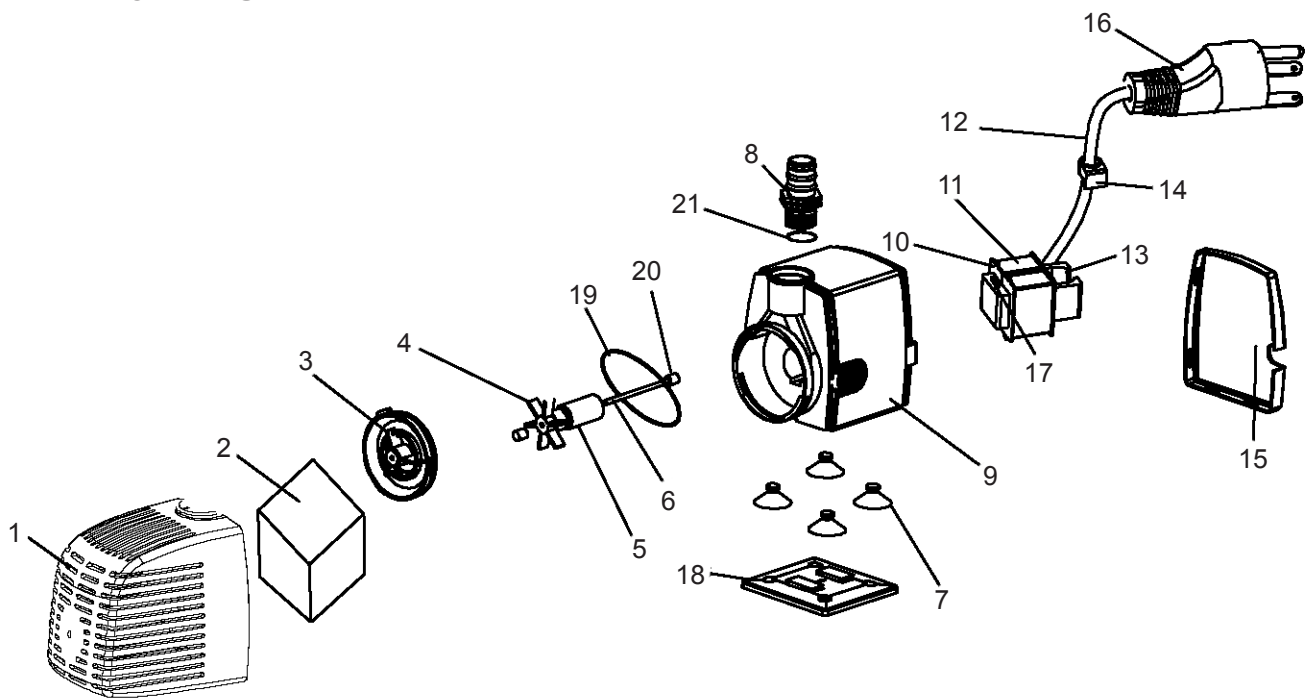
68393 Parts List and Assembly Diagram

Parts List

Part	Description	Qty
1	Front Cover	1
2	Filter	1
3	Water Seating	1
4	Impeller Head	1
5	Impeller	1
6	Impeller Shaft	1
7	Suction Cups	4
8	Water Outlet	1
9	Pump Body	1
10	Motor	2
11	Magnet Wire	2

Part	Description	Qty
12	Power Cord	1
13	Cord Clamp	1
14	String Block	1
15	Back Cover	1
16	Plug	1
17	Grounded Terminal	1
18	Frame	1
19	Sealing Ring	1
20	Shaft Cover	1
21	Sealing Ring	1

Assembly Diagram



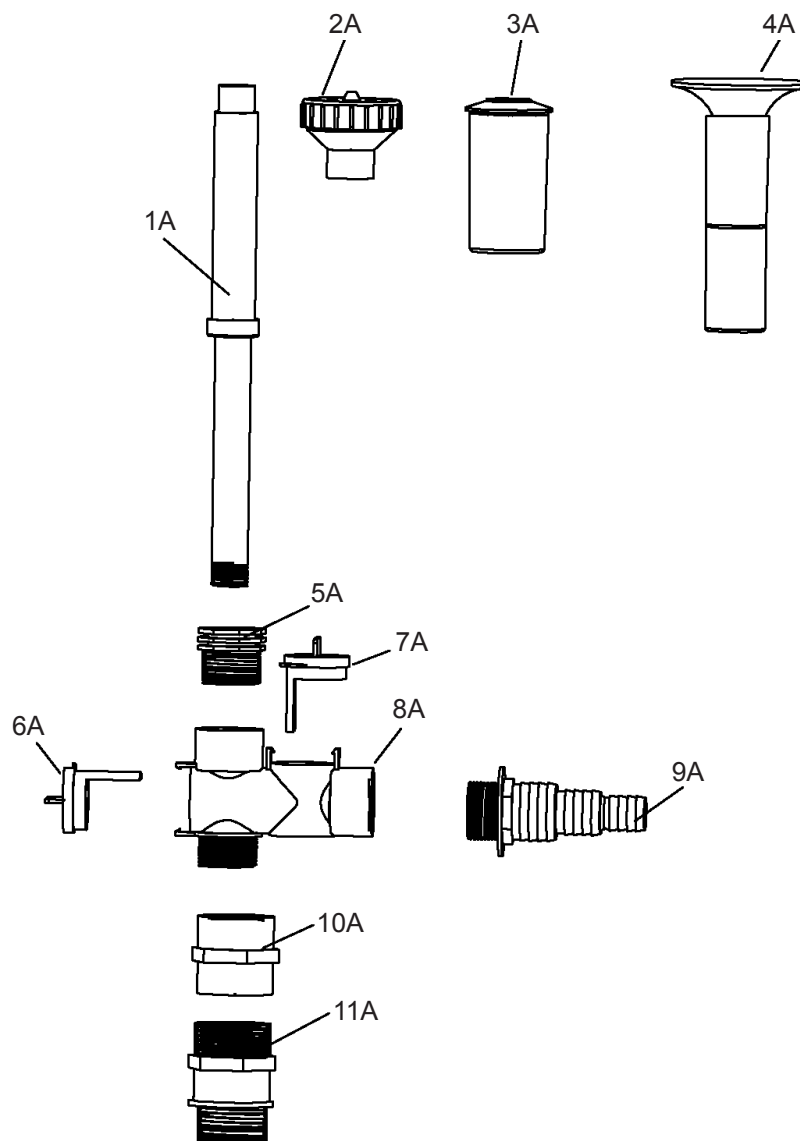
68393 Parts List and Assembly Diagram

Parts List

Part	Description	Qty
1A	Extension	1
2A	Star Outlet	1
3A	Foam Outlet	1
4A	Bell Outlet	1
5A	Top Connector	1
6A	Left Adjustment Lever	1

Part	Description	Qty
7A	Right Adjustment Lever	1
8A	Extension Valve	1
9A	Main Outlet	1
10A	Lower Connector	1
11A	Adapter	1

Assembly Diagram



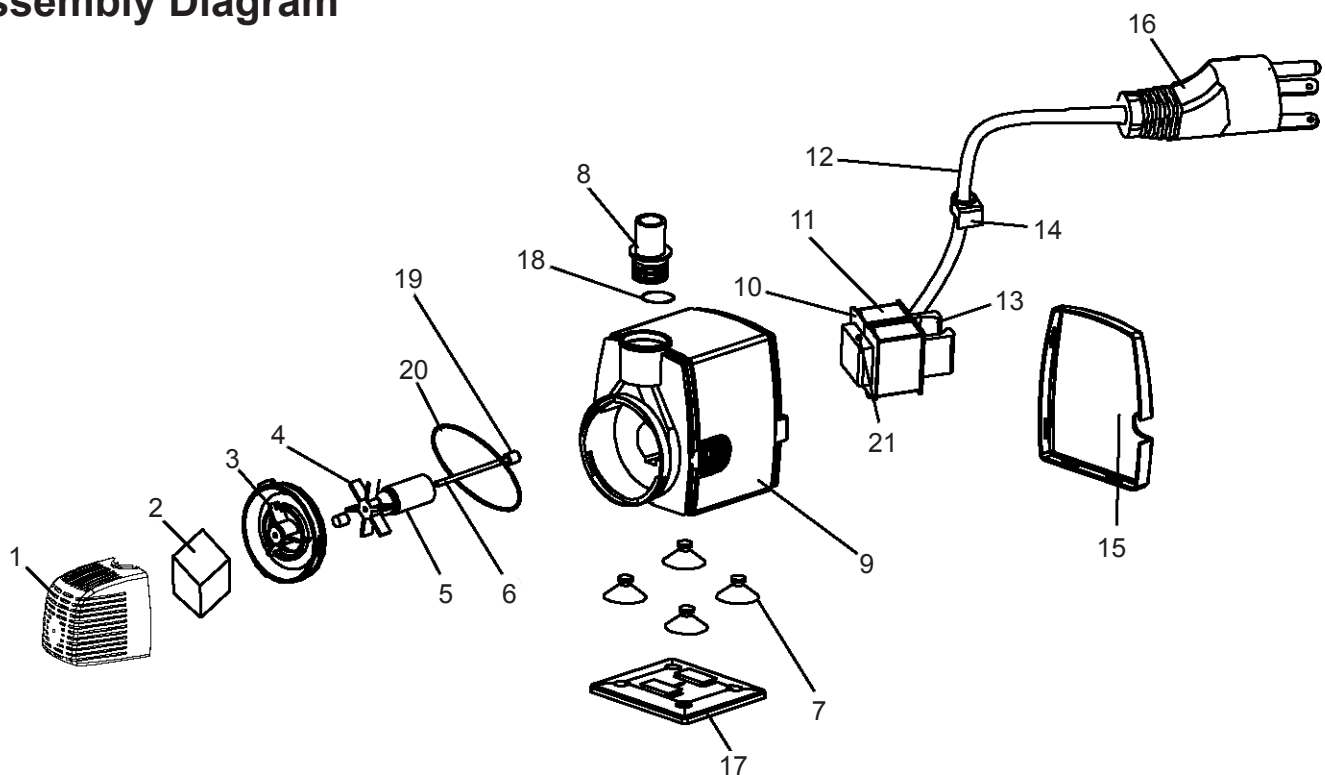
68395 Parts List and Assembly Diagram

Parts List

Part	Description	Qty
1	Front Cover	1
2	Filter	1
3	Water Seating	1
4	Impeller Head	1
5	Impeller	1
6	Impeller Shaft	1
7	Suction Cups	4
8	Water Outlet	1
9	Pump Body	1
10	Motor	2
11	Magnet Wire	2

Part	Description	Qty
12	Power Cord	1
13	Cord Clamp	1
14	String Block	1
15	Back Cover	1
16	Plug	1
17	Suction Cups Holder	1
18	Sealing Ring	1
19	Shaft Cover	1
20	Sealing Ring	1
21	Grounded Terminal	1

Assembly Diagram



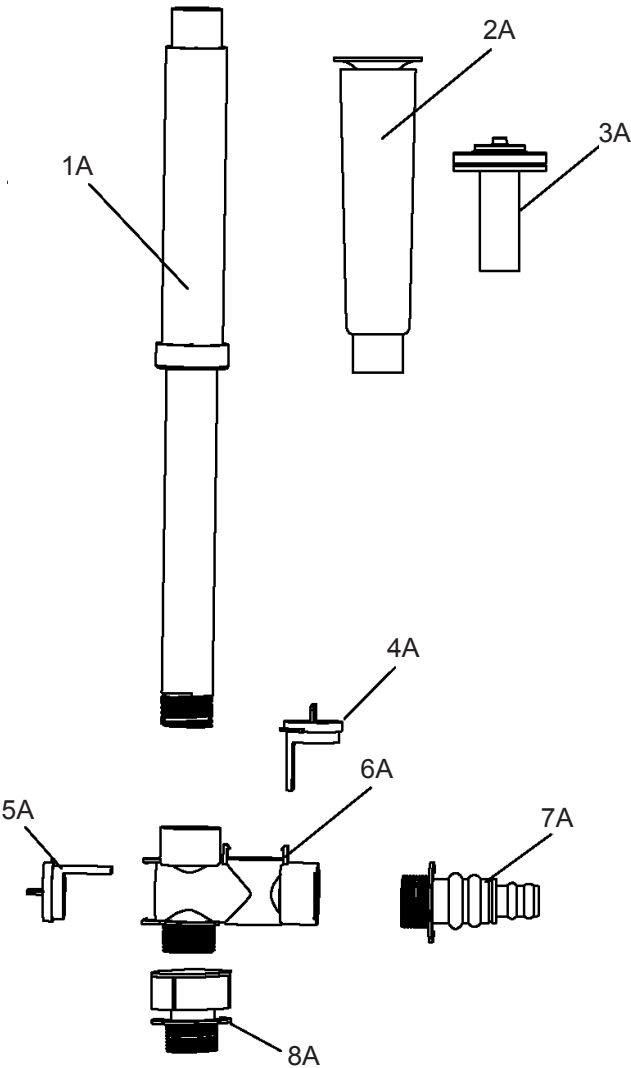
68395 Pump Extension Parts List and Assembly Diagram

Parts List

Part	Description	Qty
1A	Extension	1
2A	Bell Outlet	1
3A	Star Outlet	1
4A	Left Adjustment Lever	1

Part	Description	Qty
5A	Right Adjustment Lever	1
6A	Extension Valve	1
7A	Main Outlet	1
8A	Adapter	1

Assembly Diagram

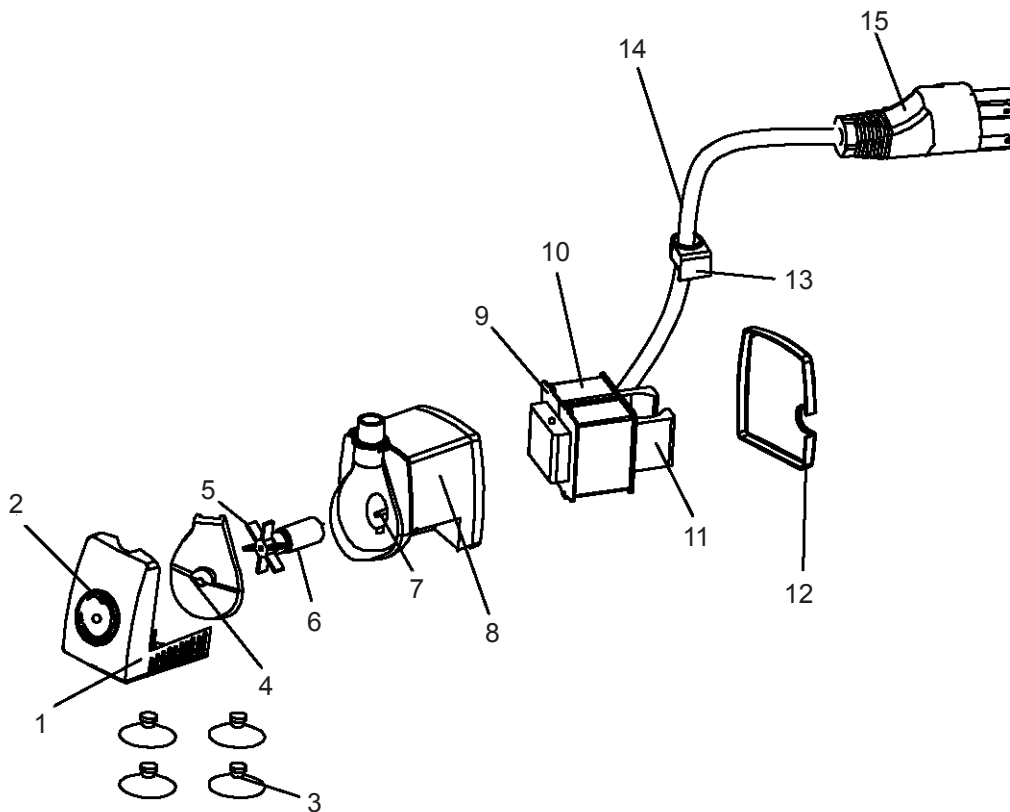


Parts List

Part	Description	Qty
1	Front Cover	1
2	Regulator	1
3	Suction Cup	4
4	Water Seating	1
5	Impeller Head	1
6	Impeller	1
7	Impellor Shaft	1
8	Pump Body	1

Part	Description	Qty
9	Motor	2
10	Magnet Wire	2
11	Cord Clamp	1
12	Back Cover	1
13	String Block	1
14	Power Cord	1
15	Plug	1

Assembly Diagram



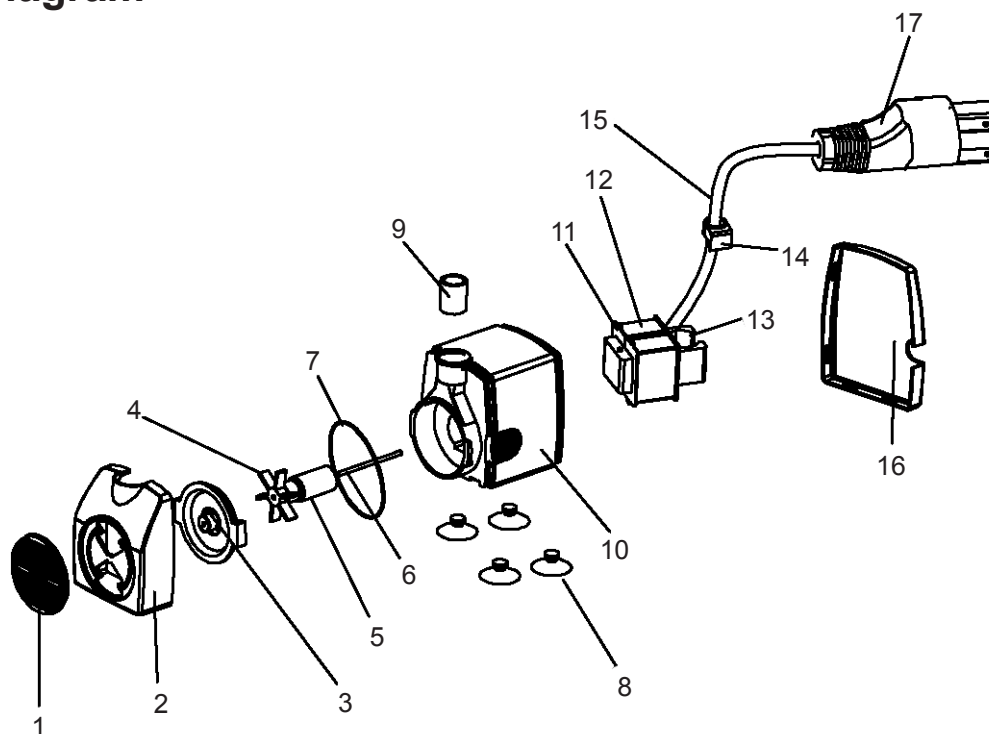
68389 Parts List and Assembly Diagram

Parts List

Part	Description	Qty
1	Regulator	1
2	Front Cover	1
3	Water Seating	4
4	Impeller Head	1
5	Impeller	1
6	Impeller Shaft	1
7	Sealing Ring	1
8	Suction Cup	4
9	Water Outlet	1

Part	Description	Qty
10	Pump Housing	1
11	Motor	2
12	Magnet Wire	2
13	Cord Clamp	1
14	String Block	1
15	Power Cord	1
16	Back Cover	1
17	Plug	1

Assembly Diagram



Items 68372, 68393 and 68395: Limited 90 Day Warranty

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for the period of 90 days from the date of purchase. This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, criminal activity, improper installation, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

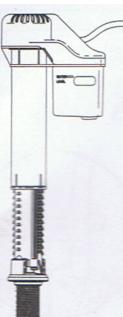
3491 Mission Oaks Blvd. • PO Box 6009 • Camarillo, CA 93011 • (800) 444-3353



3491 Mission Oaks Blvd. • PO Box 6009 • Camarillo, CA 91302 • (800) 444-3353

www.harborfreight.com

LIT024 (528) Instructions 4.14



korky

QuietFILL®

Need: Bucket
May need: Wrench

À utiliser : Seau,
À utiliser, au besoin : Clé
Nécessaire: Cubeta
Necesita: Llave de tuercas

Scan for install video

Recherchez une vidéo sur l'installation
Escanee para ver un video de instalación



www.korky.com/528.html

Required / Obligatorio

 **Metal clip**
Attache en métal
Sujetador de metal

 **Mounting nut**
Ecrou de montage
Tuerca de montaje

 **Tube**
Tuyau
Tubo

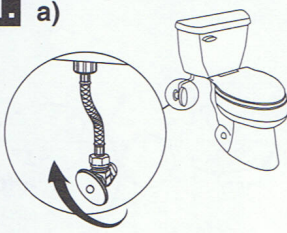
May be left over
À laisser de côté, au besoin.
Puede sobrar.

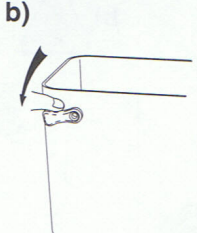
 **Cone washer**
Rondelle conique
Arandela cónica

 **Coupling nut**
Ecrou d'accouplement
Tuerca de acoplamiento

 **Tamp proof accessory**
L'accessoire inviolable
El accesorio a prueba de forcejeos

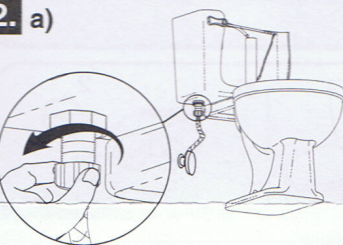
1.

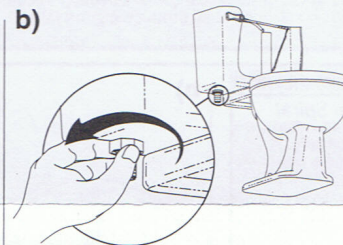
a)  Turn off water supply.
Fermez l'alimentation en eau.
Corte el suministro de agua.

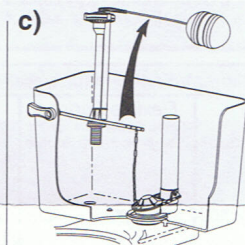
b)  Flush to drain water.
Actionnez la chasse d'eau.
Descargue.

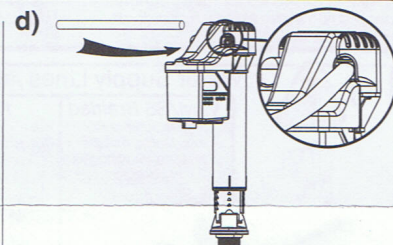
c)  Place bucket.
Placez le seau.
Coloque la cubeta.

2.

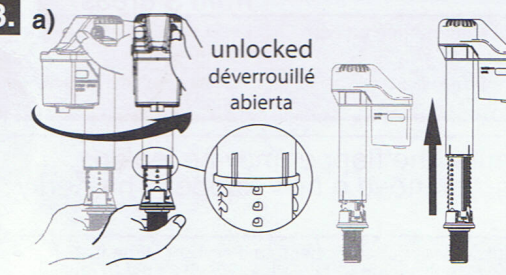
a)  Disconnect water supply.
Coupez l'alimentation en eau.
Desconecte el suministro de agua.

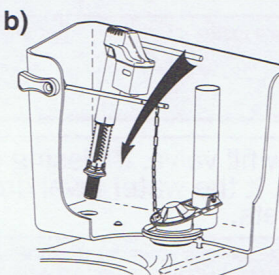
b)  Remove mounting nut.
May need wrench.
Retirez l'écrou de montage.
Utilisez une clé, au besoin.
Retire la tuerca de montaje.
Necesita una llave de tuercas.

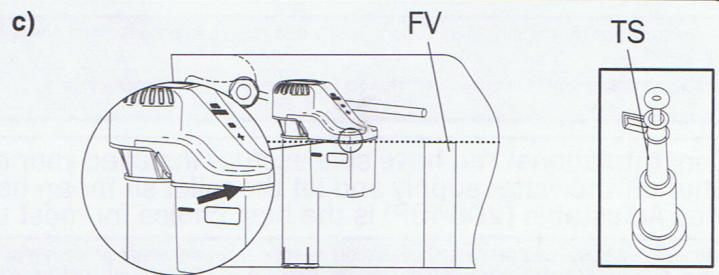
c)  Remove old valve.
Retirez la vieille soupape.
Retire la válvula antigua.

d)  Attach tube.
Fixez le tube.
Fije el tubo.

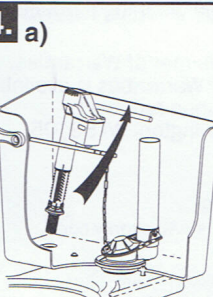
3.

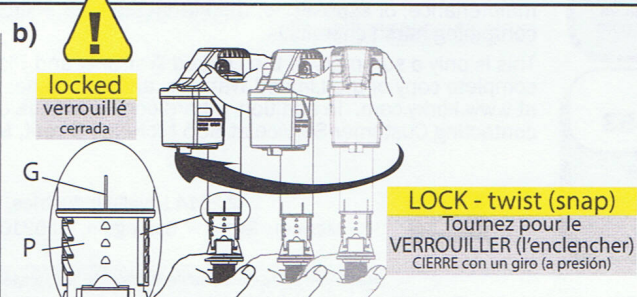
a)  Turn top of new valve counterclockwise to unlock and pull up to fully extend.
Tournez le dessus de la nouvelle soupape dans le sens contraire des aiguilles d'une montre pour le déverrouiller, puis tirez-le complètement.
Gire la parte superior de la válvula nueva en dirección contraria a las manecillas del reloj y jale para extender completamente.

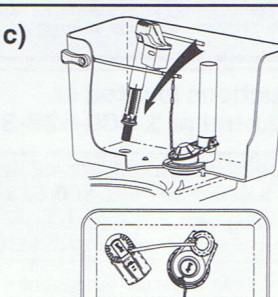
b)  Place valve in tank.
Placez la soupape dans le réservoir.
Coloque la válvula en el tanque.

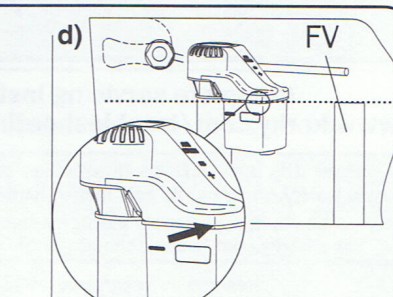
c)  Press down until corner of white cover and top of flush valve (FV) line up. Note: If tower style flush valve (TS), match fill valve water line to water line marked in tank (stain line).
Enfoncez la soupape jusqu'à ce que le coin du couvercle blanc et le dessus de la soupape de chasse (FV) soient alignés. Remarque : Si votre toilette est munie d'une soupape de chasse (TS) de style tour, alignez la ligne d'eau de la soupape de remplissage avec celle du réservoir.
Presione la válvula hasta la esquina de la cubierta blanca y la parte superior de la válvula para descarga de inodoro (FV). Nota: Si la válvula para descarga de inodoro es estilo torre (TS), haga coincidir la línea del agua de la válvula de llenado con la línea del agua marcada en el tanque (línea con mancha).

4.

a)  Remove valve.
Retirez la soupape.
Retire la válvula.

b)  **locked**
verrouillé
cerrada
LOCK - twist (snap)
Tournez pour le
VERROUILLER (l'enclencher)
CIERRE con un giro (a presión)
Twist upper half of valve clockwise to lock (snap). Groove (G) lines up with pegs (P). **Keep locked.**
Verrouillez (enclenchez) la soupape en tournant sa partie supérieure dans le sens des aiguilles d'une montre. Alignez la rainure (G) avec les taquets (P). Garder verrouillé.
Gire la mitad superior de la válvula en dirección de las manecillas para cerrar (a presión). Haga ranuras (G) con las espigas (P). Mantenga cerrado.

c)  Place locked valve in tank so refill tube has direct path to flush valve.
Placez la soupape dans le réservoir, en respectant l'un des angles indiqués.
Coloque la válvula en el tanque en uno de los ángulos que se muestra.

d)  Verify corner of white cover and flush valve (FV) line up.
Assurez-vous d'aligner le coin du couvercle blanc et la soupape de chasse (FV).
Verifique la esquina de la cubierta blanca y descargue la válvula (FV).



TJERNLUND PRODUCTS, INC.

1601 Ninth Street • White Bear Lake, MN 55110-6794
PHONE (800) 255-4208 • (651) 426-2993 • FAX (651) 426-9547
Visit our web site • www.tjernlund.com



CRAWL SPACE VENTILATOR MODELS V1, V1D, V2D

**READ OWNERS INSTRUCTIONS CAREFULLY PRIOR TO INSTALLATION.
THESE INSTRUCTIONS MUST REMAIN WITH EQUIPMENT. DO NOT DESTROY.**



MODEL V1



MODEL V1D



MODEL V2D

DESCRIPTION

The Tjernlund UnderAire™ Series Crawl Space Ventilators are designed to circulate fresh outdoor air underneath homes and porches. Excessive humidity levels in Crawl Spaces is the leading cause of premature rotting of support columns, joists, floors and beam supports. Humidity can promote fungus growth and increased termite activity. Humidity may also cause plumbing failures due to rust and corrosion. Constant operation helps vent radon gases, treated wood off-gassing and other odors that might migrate into living areas.

All Ventilator models are equipped with a factory installed and pre-wired thermostat which will prevent operation of the fan below 35°F. Deluxe models (V1D & V2D) are controlled by a dehumidistat which actuates the fan if the relative humidity rises above the selected set-point.

SPECIFICATIONS

MODEL V1 Ventilator:

Capacity: 110 CFM
Motor: 115 Volts ~ 50/60 Hz
0.30 amps maximum
Thermostat: On at 50°F
Off at 35°F
Dimensions: 14 3/8" x 6 7/8" x 2"

MODEL V1D Ventilator:

Capacity: 110 CFM
Motor: 115 Volts ~ 50/60 Hz
0.30 amps maximum
Thermostat: On at 50°F
Off at 35°F
Dehumidistat: 20% - 80% RH Range
Dimensions: 18" x 9" x 2"

MODEL V2D Ventilator:

Capacity: 220 CFM
Motors: 2 @ 115 Volts ~ 50/60 Hz
0.60 amps maximum
Thermostat: On at 50°F
Off at 35°F
Dehumidistat: 20% - 80% RH Range
Dimensions: 18" x 9" x 2"

GENERAL INFORMATION

Each UnderAire™ Crawl Space Ventilator is electrically factory line tested before shipment.

After opening carton, inspect thoroughly for shipment damage. Fan should rotate freely and all electrical wires and connections should be secured. If any damage is found, notify freight carrier and your distributor immediately and file a concealed damage claim.

RECOMMENDED VENTILATION RATE

Calculate the cubic area of the crawl space by multiplying the length x width x height. Divide this number by 15 to determine the minimum CFM necessary to fully ventilate the space in 15 minutes. Example: 20' wide x 40' long x 3' high crawl space = 2,400 cubic ft. 2400 cubic ft. divided by 15 minutes = 160 CFM of ventilation. Choose two V1 or V1D ventilators or one V2D ventilator.

INSTALLATION

WARNING

The Crawl Space Ventilator must be installed by a qualified installer in accordance with these instructions and all local codes or in their absence in accordance with the latest editions of the International Residential Code and International Electrical Code. Improper installation can create a hazardous condition such as fire, electric shock or personal injury. To reduce these risks significantly, use this unit only in the manner intended by the manufacturer. If you have questions, contact Tjernlund Products. Always disconnect the Crawl Space Ventilator from its power source before installation and servicing.

CAUTION: For general ventilation use only. Do not use to exhaust hazardous or explosive materials and vapors.

WARNING: To reduce the risk of fire or electric shock, do not use this fan with any solid-state speed control device.

TOOLS REQUIRED

- 5/16" Nut Runner or Flat Head Screw Driver
- Drill with 5/16" Masonry Bit if mounting on brick or foundation block
- Grounded Electrical Outlet within 6 feet of Ventilator location (Models V1D & V2D). Model V1 must be hard wired.

INSTALLATION

LOCATION

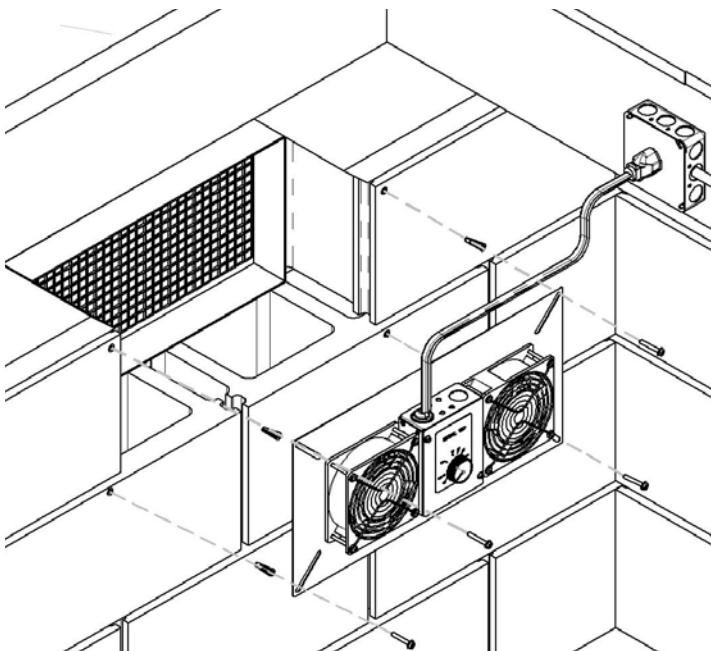
Mount Crawl Space Ventilator inside the crawl space behind existing foundation ventilation openings. Ventilation openings shall be within three feet of each corner of the building.

NOTE: Crawl Space Ventilator must be mounted with the electrical control box and motor facing the interior of the crawl space.

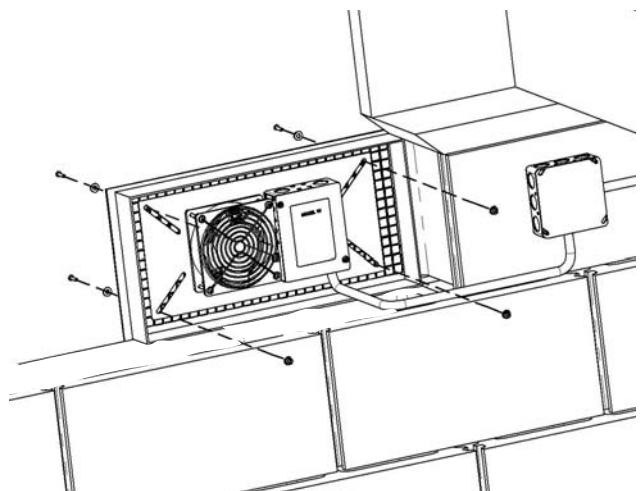
1. Remove existing doors or covers on ventilation openings around the perimeter of the building.
2. Position the Crawl Space Ventilator over the ventilation opening.
3. If installing on foundation block or brick, mark location in the four corners of the metal face plate and drill 5/16" holes with masonry bit. Install wall anchors into openings and secure Crawl Space Ventilator to the wall with four screws.

If installing on a wood header, rim joist or mesh on existing crawl space vent, secure Crawl Space Ventilator with screws, washers and nuts in the four corners of the Ventilator metal face plate.

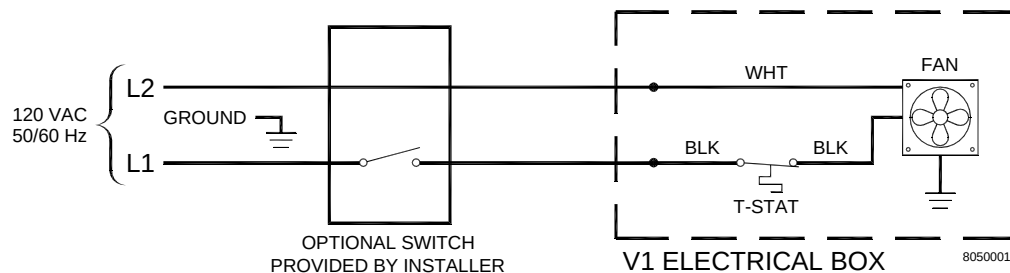
TYPICAL MODEL V1D & V2D MOUNTING
(Model V2D Shown)



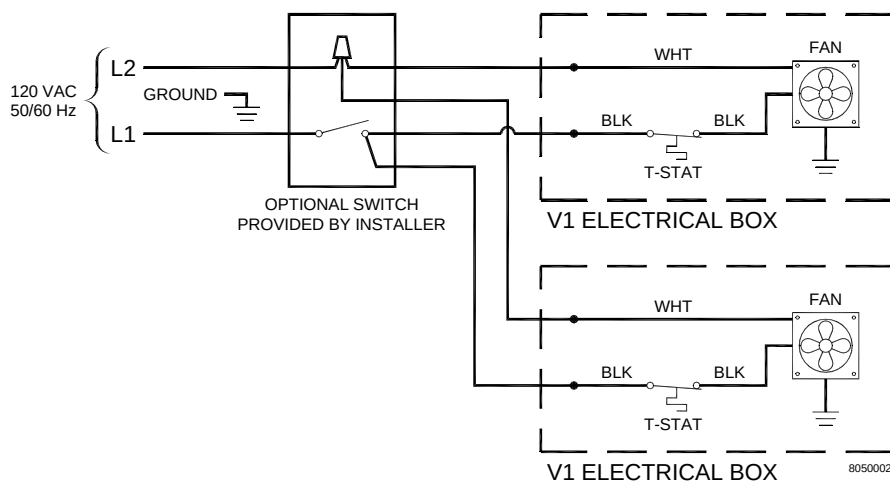
TYPICAL MODEL V1 MOUNTING



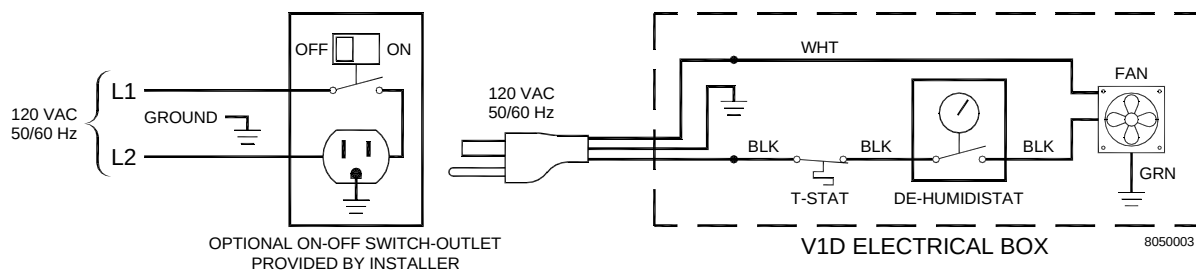
WIRING A SINGLE MODEL V1



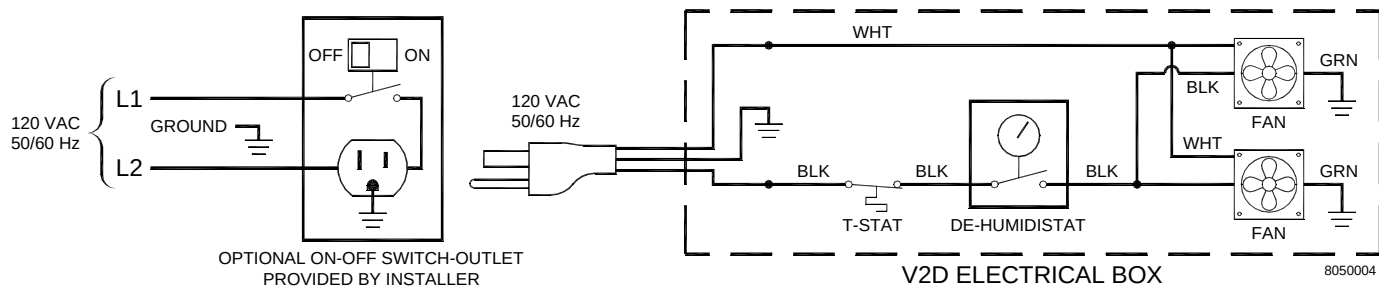
WIRING MULTIPLE MODEL V1's



MODEL V1D INTERNAL WIRING



MODEL V2D INTERNAL WIRING



REPLACEMENT PARTS

Component	Part Number
Dehumidistat	DH10
Thermostat	950-8302
Fan	950-0020

WARRANTY

TJERNLUND LIMITED ONE YEAR WARRANTY

Tjernlund Products, Inc. warrants to the original purchaser of this product that the product will be free from defects due to faulty material or workmanship for a period of (1) year from the date of original purchase or delivery to the original purchaser, whichever is earlier. Remedies under this warranty are limited to repairing or replacing, at our option, any product which shall, within the above stated warranty period, be returned to Tjernlund Products, Inc. at the address listed below, postage prepaid. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF, AND TJERNLUND PRODUCTS, INC. EXPRESSLY DISCLAIMS LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OF THIS PRODUCT. THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS WARRANTIES AND NO AGENT IS AUTHORIZED TO ASSUME FOR US ANY LIABILITY ADDITIONAL TO THOSE SET FORTH IN THIS LIMITED WARRANTY. IMPLIED WARRANTIES ARE LIMITED TO THE STATED DURATION OF THIS LIMITED WARRANTY. Some states do not allow limitation on how long an implied warranty lasts, so that limitation may not apply to you. In addition, some states do not allow the exclusion or limitation of incidental or consequential damages, so that above limitation or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which may vary from State to State. Send all inquiries regarding warranty work to Tjernlund Products, Inc. 1601 9th Street, White Bear Lake, MN 55110-6794. Phone (651) 426-2993 • (800) 255-4208 • Fax (651) 426-9547 • Email fanmail@tjfans.com.