Redi-Flo 2

Stainless Steel Submersible Pumps for Environmental Purge & Sampling Applications

USA Installation and operating instructions

Please leave these instructions with the pump for future reference.

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Grundfos Stainless Steel Submersible Pumps

Your Grundfos Redi-Flo2 Environmental Pump is of the utmost quality. Combined with proper installation, your Grundfos pump will give you many years of reliable service.

To ensure the proper installation of the pump, carefully read the complete manual before attempting to install the pump.

⚠ SAFETY WARNING

Electrical Work

Before beginning installation procedures, these installation and operating instructions should be studied carefully. All electrical work should be carried out by a qualified electrician in accordance with the latest edition of the National Electrical Code (NEC), local codes and regulations.

Adherence To Environmental Regulations

When handling and operating the Redi-Flo Variable Performance Pump system, all environmental regulations concerning the handling of hazardous materials must be observed. When the pump is taken out of operation, great care should be taken to ensure that the pump contains no hazardous materials that might cause injury to human health or to the environment.

Returning a Pump for Service

Only pumps that are certified as uncontaminated will be accepted by GRUNDFOS for servicing. GRUNDFOS must receive this certification prior to receiving the pump. If not, GRUNDFOS will refuse to accept delivery of the pump. In these cases, all costs incurred in returning the product to the customer will be paid by the customer. Contact your distributor for details on returning Redi-Flo products for servicing.

Electrical Hazards

The Redi-Flo Variable Performance Pump system is not approved for Class 1, Division 1, Group D locations as specified by the National Electrical Code (NEC). Consult local authorities and regulations if you have any doubt about its suitability for a specific application.

Shipment Inspection

Examine the components carefully to make sure no damage has occurred to the pump-end, motor, cable or control box during shipment.

This Grundfos Redi-Flo2 Environmental Pump should remain in its shipping carton until it is ready to be installed. The carton is specially designed to protect it from damage. During unpacking and prior to installation, **make sure that the pump is not contaminated, dropped or mishandled.**

The motor is equipped with an electrical cable. **Under no circumstance should the cable be used to support the weight of the pump.**

Pre-Installation Checklist

Before beginning installation, the following checks should be made. They are all critical for the proper installation of this submersible pump.

A. Condition of the Well

If the pump is to be installed in a new well, the well should be fully developed and bailed or blown free of cuttings and sand. Dispose of discharged materials in accordance with the specific job site requirements. The stainless steel construction of the Redi-Flo2 Environmental Pump makes it resistant to abrasion; however, no pump, made of any material, can forever withstand the destructive wear that occurs when constantly pumping sandy groundwater.

The inside diameter of the well casing should be checked to ensure that it is not smaller than the size of the pump and motor.

B. Condition of the Water

Redi-Flo2 pumps are designed for pumping cold groundwater that is free of air or gases. Decreased pump performance and life expectancy can occur if the groundwater is not cold or contains air or gases.

C. Installation Depth

Pumping sand or well sediment can occur when the pump motor is installed lower than the top of the well screen or within five feet of the well bottom. This can reduce the performance and life expectancy of the pump and should be avoided.

D. Electrical Supply

The Redi-Flo2 motor is a 3 phase 220 VAC unit designed to be driven by the Redi-Flo2 VFD.

Wire Cable Type

The wire cable used between the pump and control box or panel should be approved for submersible pump applications. The conductor insulation should have a continuous Teflon® jacket with no splices and must be suitable for use with submersible pumps.

Installation

The riser pipe or hose should be properly sized and selected based on estimated flow rates and friction-loss factors.
A back-up wrench should be used when attaching a riser pipe or metallic nipple to the pump. The pump should only be gripped by the flats on the top of the discharge chamber. The body of the pump, or motor should not be gripped under any circumstance.

If Steel Riser Pipe is Used

An approved pipe thread compound should be used on all joints. Make sure the joints are adequately tightened in order to resist the tendency of the motor to loosen the joints when stopping and starting.

After the first section of the riser pipe has been attached to the pump, the lifting cable or elevator should be clamped to the pipe. Do not clamp the pump. When raising the pump and riser section, be careful not to place bending stress on the pump by picking it up by the pump-end only. A check valve may be added to the pump to prevent fluid from flowing back into the pump after it is turned off.

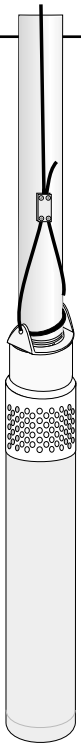
Make sure that the electrical cables are not cut or damaged in any way when the pump is being lowered in the well.

The drop cable should be secured to the riser pipe at frequent intervals to prevent sagging, looping or possible cable damage.

If Plastic or Flexible Riser Pipe is Used:

Use the correct compound recommended by the pipe manufacturer or specific job specifications. Make sure that joints are securely fastened.

Do not connect the first plastic or flexible riser section directly to the pump. Always attach a metallic nipple or adapter into the discharge chamber of the pump. When tightened, the threaded end of the nipple or adapter must not come in contact with the check valve retainer in the discharge chamber of the pump.



IMPORTANT - Plastic and flexible pipe tend to stretch under load. This stretching must be taken into account when securing the cable to the riser pipe.

Leave enough slack between tie points to allow for this stretching. This tendency for plastic and flexible pipe to stretch will also affect the calculation of the pump setting depth. If the depth setting is critical, check with the manufacturer of the pipe to determine how to compensate for pipe stretch.

When these types of pipe are used, it is recommended that a safety cable be attached to the pump to lower and raise it. A safety cable bracket is available from Grundfos (part # 001A0019)

Protect the Well from Contamination

While installing the pump, proper care should be used not to introduce foreign objects or contaminants into the well. To protect against surface water entering the well and contaminating the well, the well should be finished off utilizing a locally approved well seal.

Lowering the Pump Into the Well

Make sure the electrical motor leads are not cut or damaged in any way when the pump is being lowered into the well. Do not use the motor leads to support the weight of the pump.

Operating Conditions

To ensure the Redi-Flo Variable Performance Pumping system operates properly, follow these guidelines:

- The Redi-Flo2® pump must be installed vertically with the discharge end pointed upwards.
- The pump and motor must always be completely submerged in fluid to ensure lubrication and cooling of the motor.
- The temperature of the fluid being pumped should be according to the technical specifications.
- The installation depth of the pump should always be at least three feet below the maximum drawdown level of the well.
- Redi-Flo pumps are not recommended for well development or pumping fluid containing abrasives.
- Redi-Flo2® pumps are not recommended for continuous operation applications.
- The warranty of the Redi-Flo pumps will be void if other than the Redi-Flo VFD is used or if corrosive fluids are pumped.
- The service life of dedicated Redi-Flo pumps may be compromised if the ambient water quality exceeds one or more of the following values:
  pH<5 DO>2 ppm H2S>1 ppm CL->500 ppm TDS>1000 ppm

Electrical

WARNING: To reduce the risk of electrical shock during operation of this pump requires the provision of acceptable grounding. Refer to the Redi-Flo Variable Frequency Drive Instructions Manual (L-RF-IO-009) for proper wiring instructions.

All electrical work should be performed by a qualified electrician in accordance with the latest edition of the National Electrical Code, local codes and regulations.

Dismantling & Reassembling Pump End

The Redi-Flo2® pump can be dismantled and reassembled quickly and easily by referring to the diagram on page 12 and following these steps:

DISMANTLING

1. Shut the pump off by placing the Redi-Flo VFD in the stop position.
2. Disconnect Redi-Flo VFD from power supply or generator.
3. Disconnect the motor lead from the Redi-Flo VFD.
4. Remove the pipe or tubing connected to the pump (OPTIONAL).
5. Remove the Set Screw (position 12 in the diagram on page 12). Grasp the Inlet Screen (position 1) and slowly but forcefully pull it up over the Pump Housing (position 2).

DO NOT ALLOW THE INLET SCREEN TO SCRAPE THE INSULATION FROM THE MOTOR LEAD.

6. Unscrew and remove the Pump Housing (counterclockwise when viewed from the top). This will expose the impeller assembly (guide vanes, wear rings, etc.), which can now be removed by hand for extended cleaning or replacement.

REASSEMBLY

To reassemble the Redi-Flo2® pump, refer to the diagram on page 12 and:

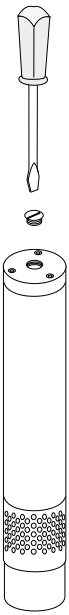
1. Make sure the motor lead is not connected to the Redi-Flo VFD.
2. Return the impeller assembly components (guide vanes, wear rings, etc.) to the shaft in the proper order per impeller assembly diagram.
3. Screw the Pump Housing (position 2) back onto the top of the pump. If all of the impellers and chambers were replaced correctly, the Pump Housing should screw on easily. Hand tighten.
4. Slip the Inlet Screen (position 1) back over the Pump Housing. Screw the Set Screw (position 12) back into the Inlet Screen.

MAKE SURE TO LINE UP THE MOTOR LEAD WIH THE RECESSED AREA IN THE PUMP HOUSING TO AVOID SCRAPING THE INSULATION FROM THE LEAD.

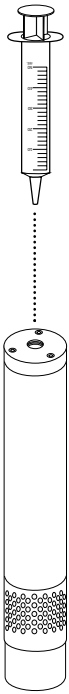
Dismantling & Reassembling Motor

If the pump is moved from well to well, it should be thoroughly decontaminated prior to being installed in the next well. In addition to cleaning the individual components inside and outside, the water in the pump motor should be replaced using the syringe that came with your pump. This can be accomplished through the following steps:

1. Shut the pump off by placing the Redi-Flo VFD in the stop position.
2. Disconnect Redi-Flo VFD from power supply or generator.
3. Disconnect the motor lead from the Redi-Flo VFD.
4. Remove the discharge tubing and the pump end (follow dismantling procedure page 5).
5. Turn the pump and motor upside down.



6. Use a flat blade screwdriver to remove the filling screw on the bottom of the motor.
7. Remove the three Allen head set screws at the bottom of the motor with a 2.5 mm Allen wrench.
8. Push gently on the motor shaft to move bearing housing out of the stator housing.
9. Continue to remove bearing housing and motor shaft from stator housing.
10. Clean motor shaft with a brush.
11. Empty the water from the motor.
12. Clean inside of stator housing with a brush.
13. Replace motor shaft into stator housing.



14. Refill motor using contaminant-free deionized water using the syringe that came with your Redi-Flo2® pump.
15. Replace bearing housing and tighten Allen screws.
16. Continue to add water until the level is even with the bottom edge of the screw hole.
17. Replace and tighten the filling screw.
18. Turn the pump over several times, then remove the filling screw again to let any trapped air escape (if air is left inside the motor, the life of the motor will be shortened). Add more water, as necessary. Fluid should overflow when the fill cap is screwed back on the motor cavity.
19. Replace and tighten the filling screw.
20. Replace pump end and piping (see reassembly page 6)

Replacing the Motor Lead

To replace the motor lead, refer to the diagram on page 12 and follow these steps:

REMOVING THE OLD MOTOR LEAD

1. Make sure the Redi-Flo VFD is turned **OFF**, and the motor lead is not connected to the Redi-Flo VFD.

2. Loosen and remove the Set Screw (position 12) from the Inlet Screen (position 1).

3. Slide the Inlet Screen off the pump. If you plan to use this motor lead again, be careful not to scrape insulation from it as the Inlet Screen is removed.

4. Loosen and remove the Pump Housing (position 2). Remove the impeller assembly (impellers, guide vanes, etc.).

5. Refer to the illustration on page 12. Use a 6mm wrench to loosen and remove the Motor Lead Screw (position 14) for the ground lead (green/yellow wire).

6. Pull up on the ground lead to remove it. Using a small screwdriver and precision electronics pliers, pry up and remove the Teflon® Washer (position 15) and Brass Washers (position 16) from inside the enlarged Ground Motor Screw (position 13). Remove the 8mm Ground Motor Screw.

7. Use an Allen wrench (2.5 mm) to remove the two Motor Screws (position 19) holding the Suction Interconnector (position 10) in place. Remove the Suction Interconnector but be very careful to note which of its slots is lined up with which motor lead -- this will be very helpful during reassembly. You may wish to scratch a mark on both the Suction Interconnector and the motor to aid in matching them up later.

8. Refer to the illustration on the next page. Use a 6mm wrench to loosen and remove the remaining Motor Lead Screws (position 14).

9. Pull up on each of the leads to remove them. Make a note which lead comes out of each hole-- **this is a MUST** when installing the new motor lead. Using a small screwdriver and precision electronics pliers, unscrew and remove the Teflon® Washer (position 15) and the Grommet (position 17).

Installing the New Motor Lead

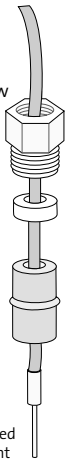
10. Ensure the motor lead holes are clean and free of moisture.

11. String the Inlet Screen (position 1) onto the motor lead.

12. String the motor lead components (shown at right) onto the end of each motor lead wire (except the striped green ground wire). Using a wire crimp tool, properly crimp each pin onto the lead wires.

13. For each wire, place the Crimped Pin (position 18) down into the motor lead hole. Press the Grommet (position 17) and Teflon® Washer (position 15) down around the lead. Be sure to reconnect the lead wires in their previous pattern described below.

Power Conducting Motor Leads



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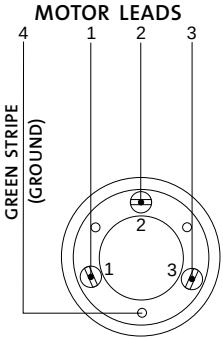


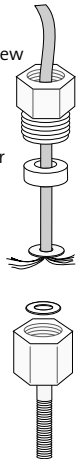
NOTE: For Tefzel motor lead, use the following wiring pattern: 1, 2, 3 clock wise from ground terminal (striped green).

14. While pushing the lead down into the motor lead hole, use a 6mm wrench to tighten the Motor Lead Screw (position 14) into place. Repeat for the other two lead wires.

15. Replace the Suction Interconnector (position 10). Replace the Ground Motor Screw (position 13). Since the ground wire will be attached to this screw, you will want to put it into the hole that will cause the least amount of twisting to the wire.

16. Replace and tighten the two Motor Screws (position 19) with an Allen wrench.

Ground Motor Load



17. String the motor ground lead through the hex lead screw, teflon washer and brass washers. Strip about 1/4 inch of insulation from the lead and fray the copper strands outward as shown. Press the washers down into the ground screw and tighten the motor lead screw in place.

18. Return the impeller assembly to the top of the Suction Interconnector (position 10). Refer to the diagram on page 12 for the proper sequence.

19. Screw the Pump Housing (position 2) back onto the Suction Interconnector.

20. Position the motor lead in the recessed area of the Pump Housing.

21. Carefully push the Inlet Screen (position 1) over the Pump Housing and the Suction Interconnector.

BE VERY CAREFUL TO AVOID SCRAPING THE INSULATION FROM THE MOTOR LEAD AS THE INLET SCREEN IS FITTED.

22. Line up the screw hole in the Inlet Screen with the screw hole in the Pump Housing. Fit and tighten the Set Screw (position 12).

23. Connect the motor lead to the Redi-Flo VFD and test the rotation of the pump. Submerge the pump in water, start it at its slowest speed and make sure the pump shaft is turning counterclockwise (when viewed from the top). If the rotation is incorrect, switching any two power leads (with POWER OFF) will correct the problem.

24. Reconnect the tubing or pipe.

Periodic Motor Inspection

If the pump is operating at a decreased capacity and the impeller assembly components (impellers, guide vanes, etc.) do not appear to be the cause, the motor should be checked. A checklist of things to examine includes:

- Check the fluid level inside the motor (refer to page 7). Replace and refill as necessary.
- Inspect the outside of the motor for cracks, dents, etc.
- Remove the Inlet Screen (position 1), Pump Housing (position 2), and the impeller assembly (guide vanes, wear rings, etc.). Try to spin the motor shaft by hand. It should spin freely. If it does not, the motor must be replaced.
- Check the winding and insulation resistance of the motor and lead as described on page 11.

Winding Resistance

Turn the power off and disconnect the motor lead from the converter. Using an ohmmeter, set the scale to R X 1. Zero-adjust the meter and measure the resistance between any two power conducting leads (prongs on the motor lead plug). If the ohm value is too low, the motor may be shorted. If too high, the motor windings or the leads may be open.

Lead Length	Ohm Value
0 ft	3.0 - 3.5 Ω
50 ft	3.6 - 4.1 Ω
75 ft	3.9 - 4.4 Ω
100 ft	4.2 - 4.7 Ω
125 ft	4.5 - 5.0 Ω
150 ft	4.8 - 5.3 Ω
175 ft	5.1 - 5.6 Ω
200 ft	5.4 - 5.9 Ω
250 ft	6.0 - 6.5 Ω
300 ft	6.6 - 7.1 Ω

Insulation Resistance

Turn the power off and disconnect the motor lead from the converter. Use a 500V megohmmeter or megger (1 Meg = 1 M = 1 million). Zero-adjust the meter and measure the resistance between any power conducting leads (prongs on the motor lead plug) and ground. If the pump has been removed from the well, a good way to test this (as shown above) is to submerge the motor lead and Redi-Flo2® pump in a bucket of water. Touch one lead of the megohmmeter to the pump and one to a motor lead.

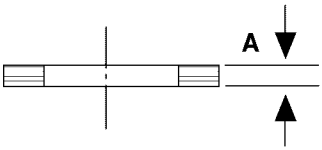
If the ohm value is lower than 1.5M Ω on any lead other than ground, the motor or lead is defective and must be replaced.

Checking Components For Wear

The pump components should be periodically checked to ensure they are still within their minimum operating tolerance (refer to the Assembly Diagram below).

Impeller (position 5) .....The impellers should show no visible wear.
Guide Vane (position 3).....The guide vanes should show no visible wear.
Wear Ring (position 4).....The minimum thickness ("A" in the illustration) should never be less than 0.04" (1.0 mm)

In addition, visually check all components for cracks, corrosion, or wear.



Storage Requirements

The pump should be thoroughly cleaned before storage to ensure no contamination is present. Both the pump and the converter should be stored in a clean and dry area in the following temperature range:

34°F (1°C) to 120°F (50°C)

Assembly Diagram — Redi-Flo2®

Pump Components

Pos. No.	Part Description	No. Used Per Pump	Part Number
1	Inlet Screen	1	1A0004
2	Pump Housing 1/2" NPT	1	1A0044
3	Guide Vane	2	see Service Kits
4	Wear Ring	2	"
5	Impeller	2	"
6	Spacer Ring	2	"
7	Wear Plate	2	"
8	Motor Lead Assembly	4	see Pos. 13 - 18
9	Shaft	1	not available *
10	Suction Interconnector	1	1A5004
11	Stator Housing	1	not available *
12	Set Screw	1	see Service Kits
13	Ground Motor Screw	1	"
14	Motor Lead Screw	4	"
15	Teflon® Washer	4	"
16	Brass Washer	2	"
17	Grommet	3	"
18	Crimped Pin	3	"
19	Motor Screw (long)	2	"
20	Motor Screw (short)	6	"
21	Filling Screw w/ O-Ring	1	"
22	Motor Thrust Washers	2	"
23	Lip Seal	1	ID5566
24	Bearing Housing O-Ring	2	see Service Kits

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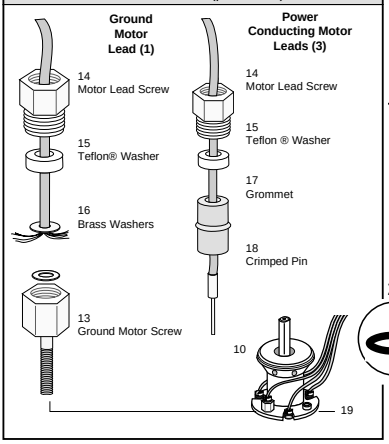
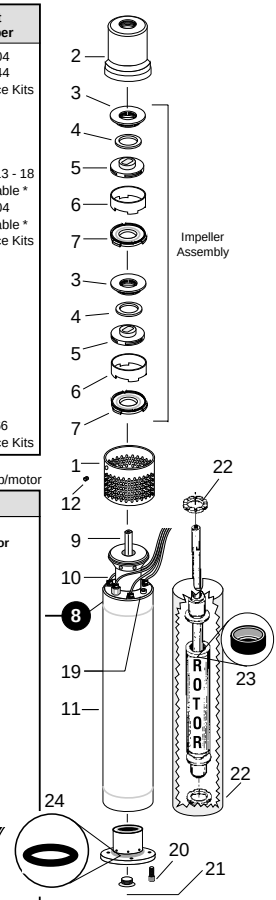
*Not economical to replace. Must purchase complete pump/motor

MOTOR LEAD ASSEMBLY (position 8)





Redi-Flo2® Pump & Motor

ELECTRIC	
Full Load Rating	.5 HP / 220V / 3 PH / 400 Hz / 5.5A
Maximum Current (SFA)	5.5 amps
Motor Protection	Thermal overload - Thermik Geratebau, Series SY6 - (176°F [80°C]) Current Overload - Incorporated into Redi-Flo VFD
PIPING CONNECTION	
Discharge Port	½" Female NPT
OPERATING CONDITIONS	
Minimum Ambient Fluid Temperature	34°F (1°C)
Maximum Ambient Fluid Temperature	80°F (28°C)
MOTOR FLUID	
Motor Lubricating Fluid	Deionized (DI) Water
STORAGE CONDITIONS	
Minimum Ambient Temperature	34°F (1°C)
Maximum Ambient Temperature	120°F (50°C)
DIMENSIONS AND WEIGHT (PUMP AND MOTOR)	
Dimensions	11.3" length x 1.81" diameter
Net Weight	5.5 lbs., excluding motor lead
LEAD LENGTHS	
Standard Lengths in Feet	30, 50, 75, 100, 125, 150, 175, 200, 250, 300
Custom Lengths	Available in 1 ft. increments from 30 to 300 ft.

Redi-Flo2® Service Kits, Tools and Motor Leads

Replacement parts, service tools and motor leads are available using the following part numbers:

Position in Diagram	Service Kits Part Description .....No. In Kit	Park Number
3 4 5 6 7	Guide Vane .....2 Wear Ring .....2 Impeller .....2 Spacer Ring.....2 Wear Plate 2	125061
4 7	Wear Ring .....4 Wear Plate 4	1A5050
13 14 15 16 17 18	Ground Motor Screw.....1 Motor Lead Screw .....4 Teflon® Washer.....4 Brass Washer .....2 Grommet.....3 Crimped Pin 3	1A00028
5 12 14 15 16 17 18 19 20 21 22	Impeller .....1.....1A00018 Set Screws .....25.....1A00038 Motor Lead Screws .....12.....1A00048 Teflon® Washer .....25.....1A00058 Brass Washer .....25.....1A00068 Grommet .....25.....1A00078 Crimped Pin.....50.....1A00088 Motor Screw (Long) .....25.....1A00098 Motor Screw (Short).....25 .....1A00108 Filling Screw with O-Ring .....5 .....1A00118 Motor Thrust Washers .....4 .....1A00128	
Teflon®	Motor Lead Replacement Kits	
	30 foot Length .....1A5100 50 " " .....1A5102 100 " " .....1A5103 125 " " .....1A5104 150 " " .....1A5105 175 " " .....1A5106 200 " " .....1A5107 250 " " .....1A5108 300 " " 1A5109	
	Accessory List	
	Redi-Flo2® Safety Cable Bracket (Placed between the top of the pump and discharged piping connector).....1A0019 Redi-Flo2® Cooling Shroud 1A004Z	

LIMITED WARRANTY

All Redi-Flo products manufactured by GRUNDFOS are warranted to the original user only to be free of defects in material and workmanship for the following periods of time. Redi-Flo2® pumps; 24 months from date of installation, but not more than 30 months from the date of manufacture, whichever comes first.

GRUNDFOS' liability under this warranty shall be limited to repairing or replacing at GRUNDFOS' option, without charge, F.O.B. GRUNDFOS' factory or authorized service station, any product of GRUNDFOS manufacture. GRUNDFOS will not be liable for any costs of removal, installation, transportation, or any other charges which may arise in connection with a warranty claim. Products which are sold but not manufactured by GRUNDFOS are subject to the warranty provided by the manufacturer of said products and not by GRUNDFOS' warranty. GRUNDFOS will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair, or if the product was not installed in accordance with GRUNDFOS' printed installation and operation instructions.

To obtain service under this warranty, contact the Distributor or Dealer from which it was purchased to obtain instructions. **Under no circumstances should defective product be returned to the Distributor, Dealer, or GRUNDFOS without a Return Materials Authorization (RMA).**

GRUNDFOS WILL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, OR EXPENSES ARISING FROM INSTALLATION, USE, OR ANY OTHER CAUSES. THERE ARE NO EXPRESS OR IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHICH EXTEND BEYOND THOSE WARRANTIES DESCRIBED OR REFERRED TO ABOVE.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages and some jurisdictions do not allow limitations on how long implied warranties may last. Therefore, the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.

BE > THINK > INNOVATE >

Being Responsible is our foundation
Thinking ahead makes it possible
Innovation is the essence

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U.S.A.
Grundfos Pumps Corporation
17100 W. 118th Terrace
Olathe, Kansas 66061
Telephone: (913) 227-3400
Fax: (913) 227-3500

Canada
Grundfos Canada, Inc.
2941 Brighton Rd.
Oakville, Ontario L6H 6C9
Telephone: (905) 829-9533
Fax: (905) 829-9512

Mexico
Bombas Grundfos de Mexico, S.A. de C.V.
Boulevard TLC #15, Parque Industrial Stiva Aeropuerto
C.P. 66600 Apodaca, N.L. Mexico
Telephone: 011-52-81-8144-4000
Fax: 011-52-81-8144-4010

www.grundfos.com