PENTAIR FG100-A1 Battery Backup System Owner's Manual

PENTAIR FG100-A1 Battery Backup System

Contents

Safety

This is the safety alert symbol. When you see this symbol on your pump or in this manual, look for one of the following signal words and be alert to the potential for personal injury!

DANGER warns about hazards that will cause serious personal injury, death or major property damage if ignored.

WARNING warns about hazards that can cause serious personal injury, death or major property damage if ignored.

CAUTION warns about hazards that will or can cause minor personal injury or property damage if ignored. The word NOTICE indicates special instructions which are important but not related to hazards.

1. To avoid risk of serious bodily injury due to electrical shock or burns and property damage due to flooding, read the safety instructions carefully before installing pump.

   WARNING Battery acid is corrosive. Do not spill on skin, clothing, or battery charger. Wear eye and head protection when working with battery. Connect and disconnect DC output terminals only after removing the charger from the AC outlet. Never allow the DC terminals to touch each other.

   WARNING Hazardous Voltage. Can cause severe or fatal electrical shock. Do not plug in or unplug battery charger while standing on a wet floor or in water. Be sure one hand is free when plugging in or unplugging charger. If basement floor is wet, disconnect power to basement before walking on floor.

   CAUTION Risk of flooding. Do not run pump dry.

   To do so will damage seals and can cause leaking and property damage.
2. Follow local and/or national plumbing and electrical codes when installing the system. A ground fault circuit interrupter (GFCI) is recommended for use on any electrical appliance submerged in water.
3. Use this system only for backup sump pump duty in a residential application. It is not designed as a primary sump pump.
4. Do not lift pump by electrical cord.

   WARNING Risk of electrical shock. Do not lift the pump by the electrical cord; lift pump only by the discharge pipe, lifting ring or handle on the pump. Lifting by the cord can damage the cord.
5. Pump clear water only with this pump.
6. Pump is permanently lubricated at the factory. Do not try to lubricate it!
7. Keep battery charger and battery box off of the floor and in a dry, cool, well ventilated area.

   NOTICE: If a Carbon Monoxide (CO) sensor is installed, it must be at least 15 feet away from battery charger in order to avoid nuisance CO alarms. Please refer to your CO detector's installation guidelines for more information.
8. To avoid danger of fire or explosion, keep sparks and flame (pilot light) away from battery.
9. Maximum vertical pumping distance is 16 feet (4.9M) for Model FG100-A1 and 18 feet (5.5M) for Model FG200-A1.
10. Make sure sump is clear of debris. Debris can damage the pump which can result in flooding.

California Proposition 65 Warning

This product and related accessories contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

GENERAL INFORMATION

The battery back-up sump system is not a substitute for your primary sump pump. It is designed to temporarily back up your primary sump pump during a power outageor other problem which prevents normal operation of the primary pump. Do not use this system to pump flammable liquids or chemicals. Pump clear water only with this pump.

Keep battery charger dry and protected from damage. In an emergency (such as an extended power outage) which depletes the system deep cycle battery, your automobile battery may be temporarily substituted. Be sure to replace the system deep cycle battery as soon as possible. Use of an automobile battery instead of a deep cycle battery in this system will significantly reduce system total performance. Automobile batteries are not designed for this type of application and will be quickly ruined by the repeated charge/discharge cycling. Do not use GEL-type batteries or maintenance-free (sealed) batteries with this charger. GEL-type batteries require a lower voltage than the charger is designed for; they may overcharge. Maintenance-free (sealed) batteries require ahigher voltage and may never reach full charge.
NOTICE: This unit is not designed for applications involving salt water or brine! Use with salt water or brine will void warranty

Installation

BATTERY BACKUP SYSTEM INSTALLATION AND OPERATION
NOTICE:

- Install this system during a time when the primary pump will not be needed. Gather all supplies before starting. Read all warnings and installation steps before you start.
- Be prepared for water to leak from the coupling or piping when disassembling or cutting the discharge pipe. Protect system components, tools and supplies from getting wet. Dry any work areas that get wet.

BASIC TOOLS AND MATERIALS NEEDED

- Channel locks or large pliers
- Tape measure
- Socket wrench or 5/16″ Nut driver
- Side cutters
- Hacksaw (to cut PVC pipe)
- Medium size pliers
- Pencil
- PTFE pipe thread sealant tape
- PVC glue (solvent weld)
- PVC pipe cleaner
- Cloth towel
- Size 24M Marine Deep Cycle Battery (sold separately)
  or a
- Size 27M Marine Deep Cycle Battery (sold separately)

Required Battery Capacity:
FG100-A1 – 100 ampere-hour maximum.
FG200-A1 – 130 ampere-hour maximum.

Warning: Personal injury and flood hazard. Do not turn the pump on until all the fittings are glued and the glue has dried. Loose fittings can explode off of pipes and cause personal injury and flooding.

Remove Primary Pump From Sump Pit:

1. Locate the “on” water level of the primary sump pump. Mark this location on the discharge pipe with a pencil. See Figure 1.
2. Drain the sump pit. The water level must be pumped down as low as possible before going on to the next step. To drain the sump pit follow either step “2A” or “2B” (below).

   2A. Raise the float on the float switch until the pump turns on. Use a wooden broom handle or a stick to do this.

   2B. If the sump pump has a piggy-back type power cord, remove the float switch power cord plug from the outlet and plug the pump power cord plug directly into the outlet. See Figure 2.

   Warning: Electrical shock hazard. Shock can burn or kill. Do not use metal or any other electrical conducting material to raise the float. Do not make contact with the water in the sump pit. Failure to follow this warning can result in personal injury or death.
3. Drain the sump.

   NOTICE: Do not let the pump run dry. This will damage the pump.
4. Unplug the pump.

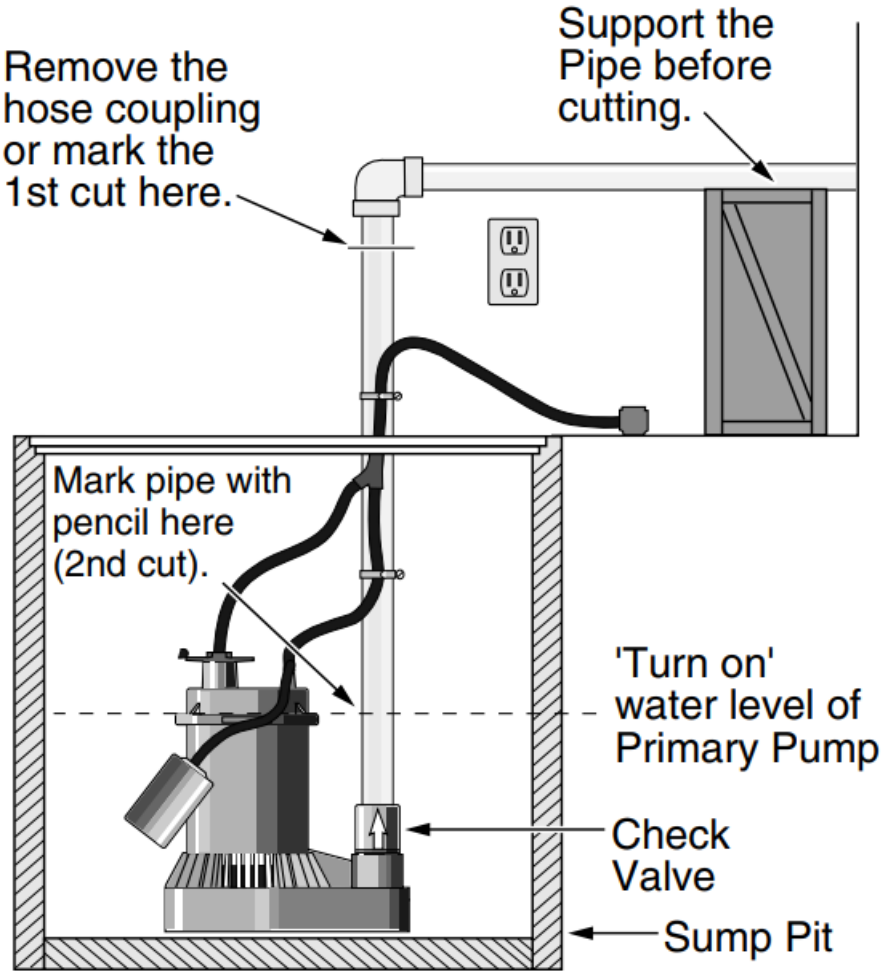
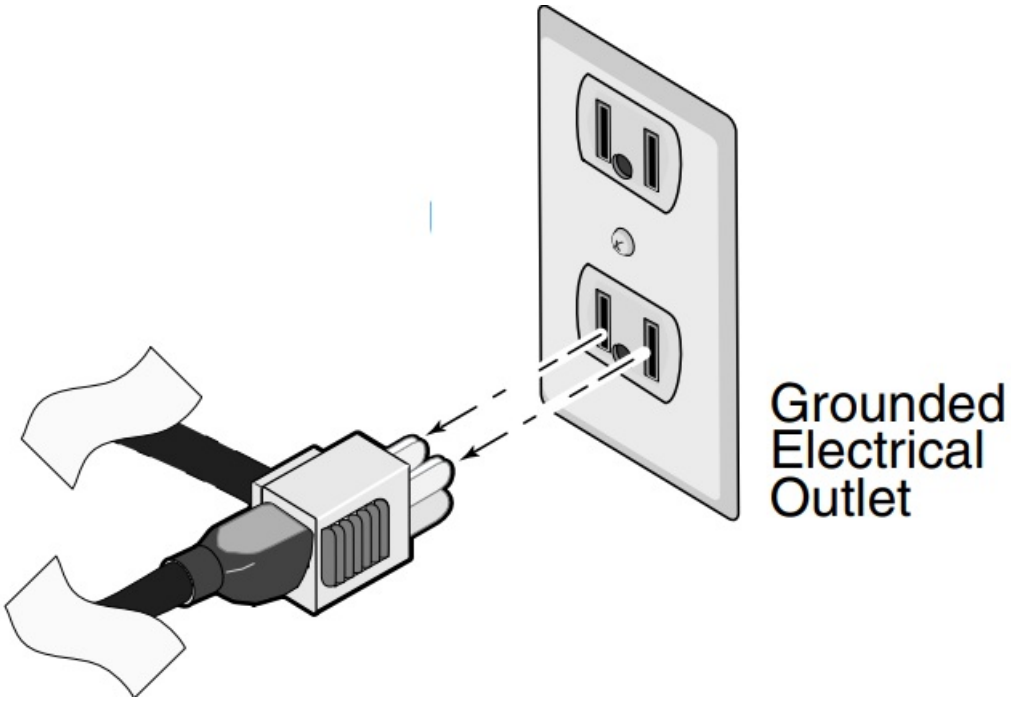
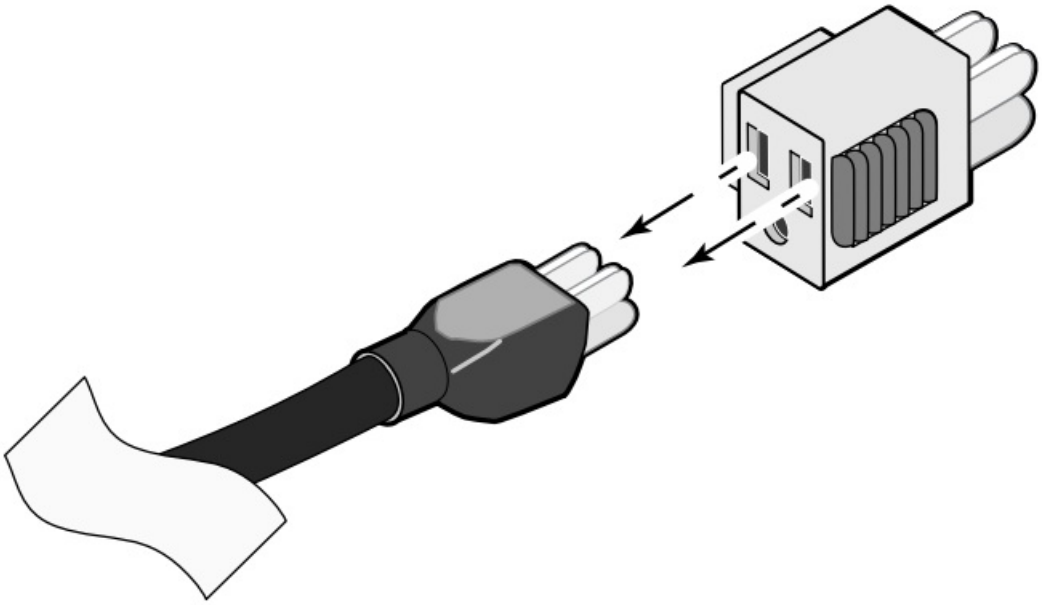


Figure 1 – Mark and cut pipe as show

1. Unplug the “Piggy-back” float switch cord plug and the pump power cord plug from the grounded electrical outlet.



2. Separate the float switch cord plug from the sump pump cord plug.



3. Plug the pump power cord plug directly into the outlet.

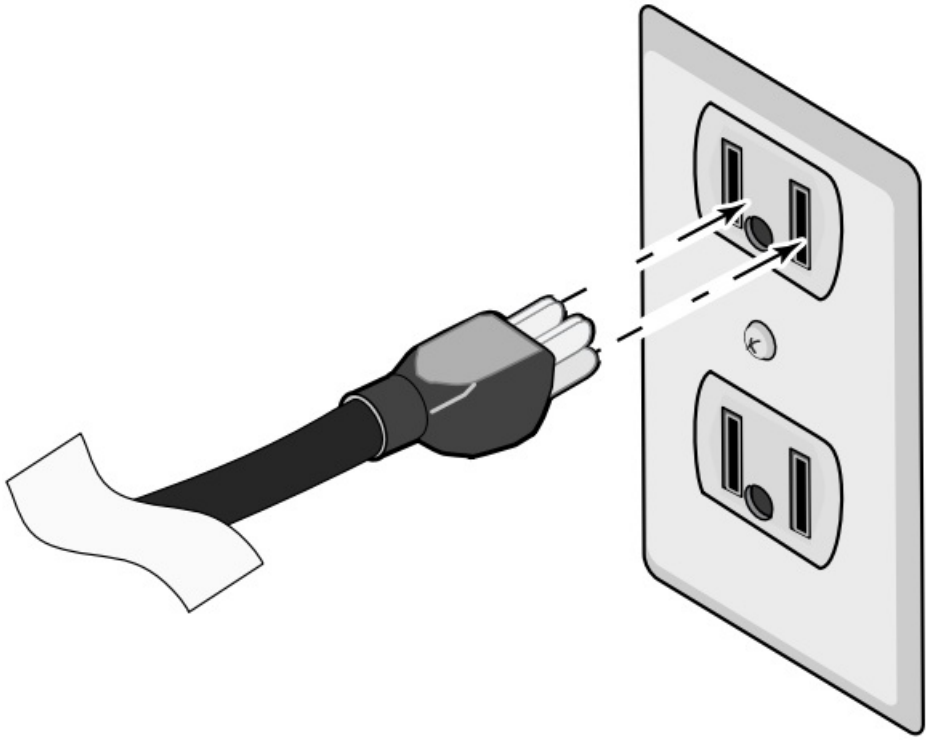


Figure 2 – To bypass the float switch

5. To separate the primary pump from the discharge pipe:

   5A. For applications with hose couplings: remove the coupling clamps with a nut driver.

   5B. For applications without rubber couplings: cut the PVC discharge pipe with a hacksaw above the basement floor, at a comfortable level. New rubber couplings are included for reassembly. See Figure 1 on Page 4.

   NOTICE: The discharge pipe is filled with water. Drain the water from the discharge pipe assembly. Keep the work area dry.

   Caution Risk of pinching hands or fingers. To avoid a hand injury from a collapse of plumbing, support the pipe above the separation before cutting or disassembly. See Figure 1.

6. Lift the primary pump and discharge pipe assembly out of the sump.

   Warning: Risk of electrical shock. Do not lift the pump by the electrical cord; lift pump only by the lifting ring, discharge pipe, or handle on the pump. Lifting by the cord can damage the cord.

Install Backup Pump

There are two ways to install the Battery Back-up Pump. Method A and Method B. See Figure 3 to determine which method to use. Both methods are acceptable.

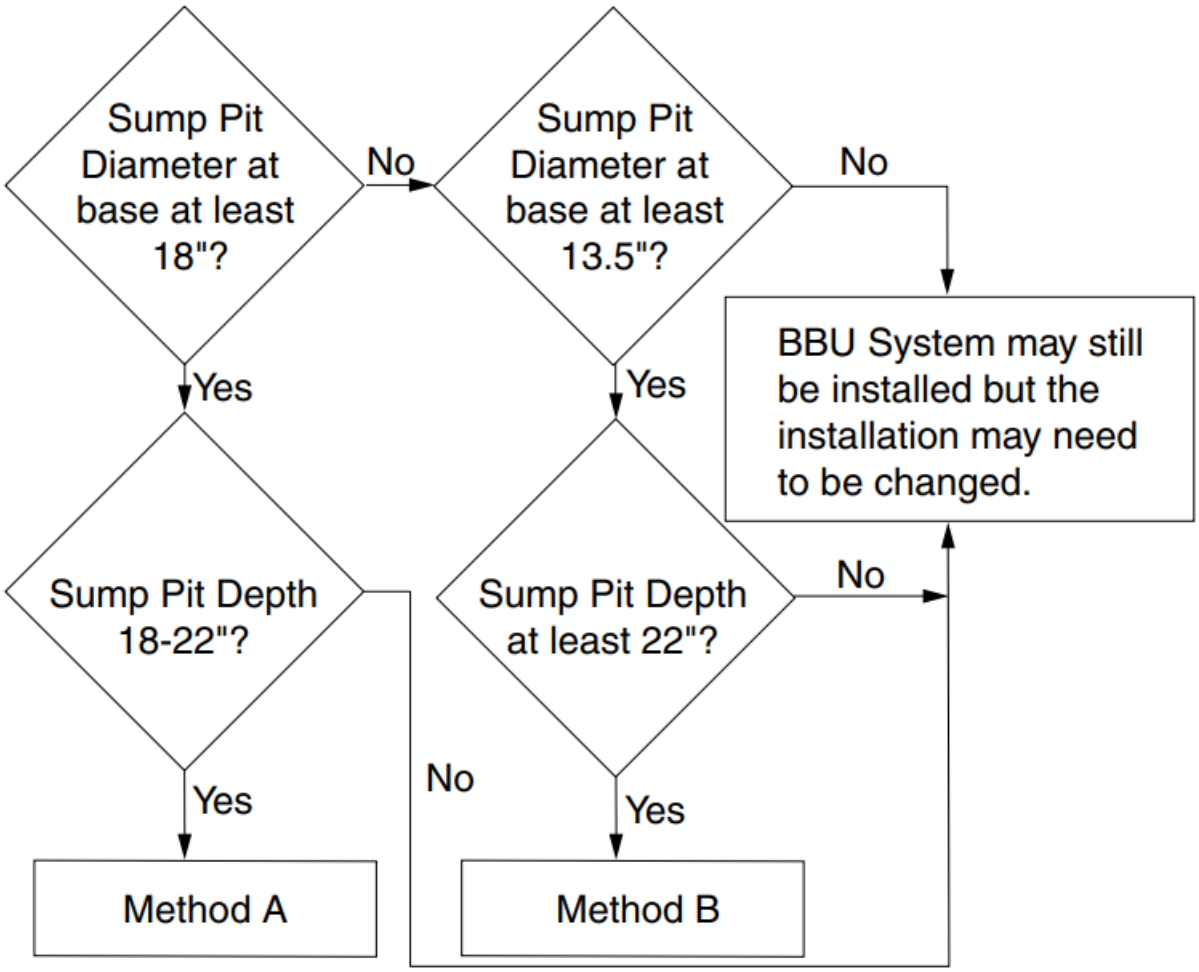


Figure 3 – Choose an installation method

Method A
Method A suggests installing both of the pumps on the floor of the sump pit. See Figure 4. The minimum required sump basin diameter, at the bottom of the pit and the recommended depth of the sump basin is 18″. Some additional materials you will need are 2 1-1/4″ 90° elbows and 2 1-1/4″ close pipe nipples.

Backup Pump Installation
(Method A)

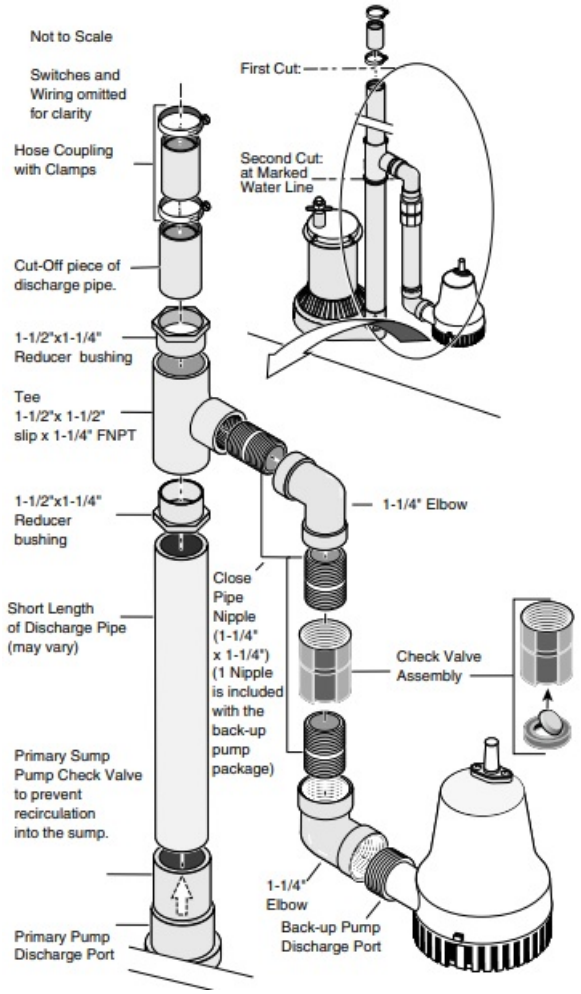


Figure 4 – Method A installation diagram

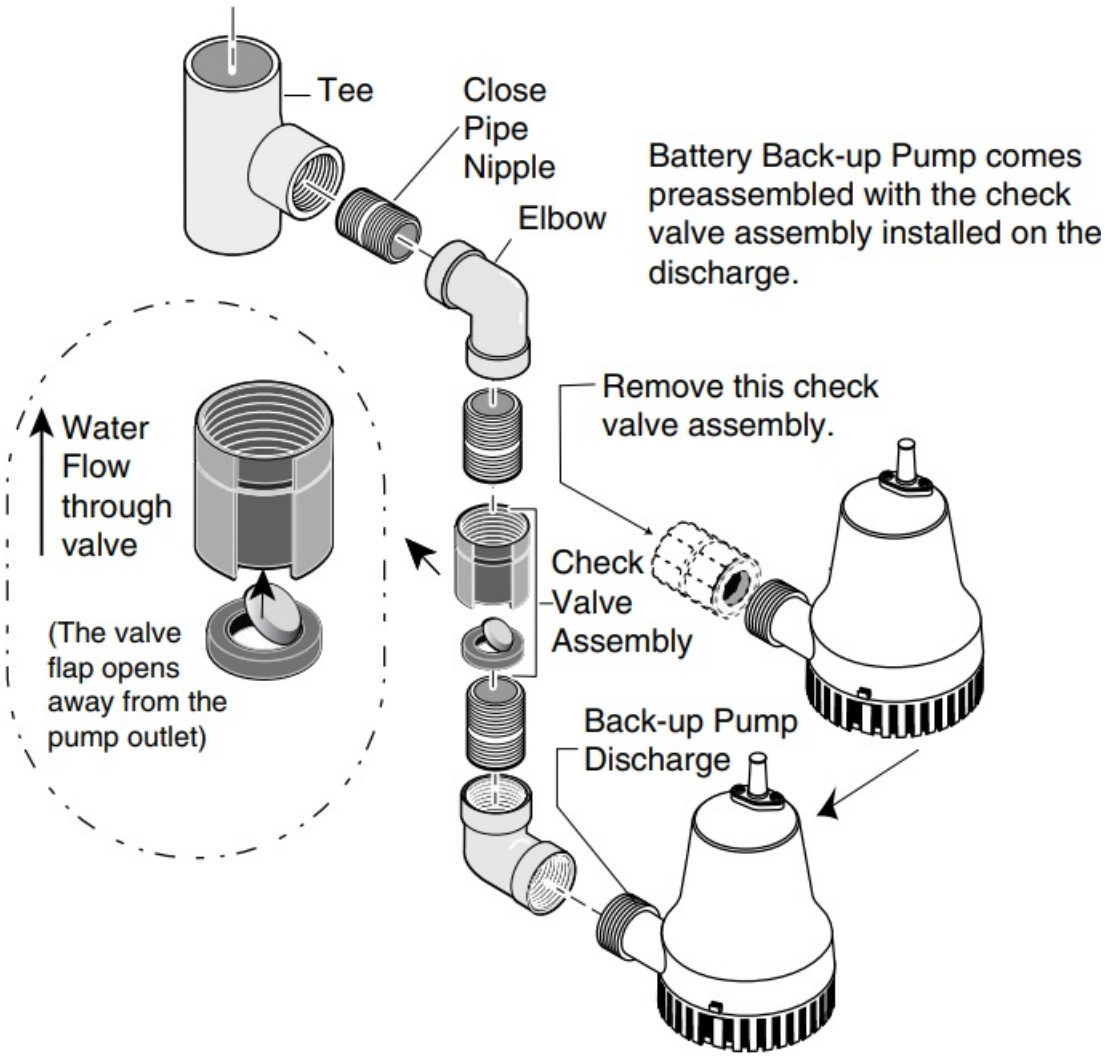


Figure 5 – Remove the pre-assembled check valve

1. Make the second cut in the discharge pipe at the pencil mark as shown in Figure 1 on page 4, and in Figure 4, on Page 5. Clean the pipe ends with a cloth towel and set the cut-off piece of discharge pipe aside.
2. Remove the check valve assembly (Key No. 4 on Page 15) from the battery back-up pump (Key No. 5) discharge and set it aside. See Figure 5. The check valve assembly will be used later, during assembly.
3. Thread a 90° elbow (purchased locally) onto the discharge of the back-up pump.
4. Wrap the threads of all 3 of the close pipe nipples (Key No. 3) with 2 turns of PTFE pipe thread sealant tape and thread one of them into the elbow. Set the other 2 aside.
5. Thread the check valve assembly, removed back in step 2, onto the close pipe nipple.
   NOTICE: Make sure the check valve is installed in the correct direction. See the inset drawing in Figure 5.
6. Thread a close pipe nipple into the other end of the check valve.
7. Thread the second 90° elbow onto the pipe nipple.
8. Thread the last pipe nipple into the elbow.
9. Thread the tee onto the pipe nipple and set this assembly aside.
10. Install a short length of pipe into the top of the check valve in the primary pump discharge. See Figure 6.
    NOTICE: There must be a check valve installed in the Primary Sump Pump discharge pipe between the tee and the Primary Sump Pump. This will prevent recirculation into the Primary Pump when the Backup Sump Pump comes on.

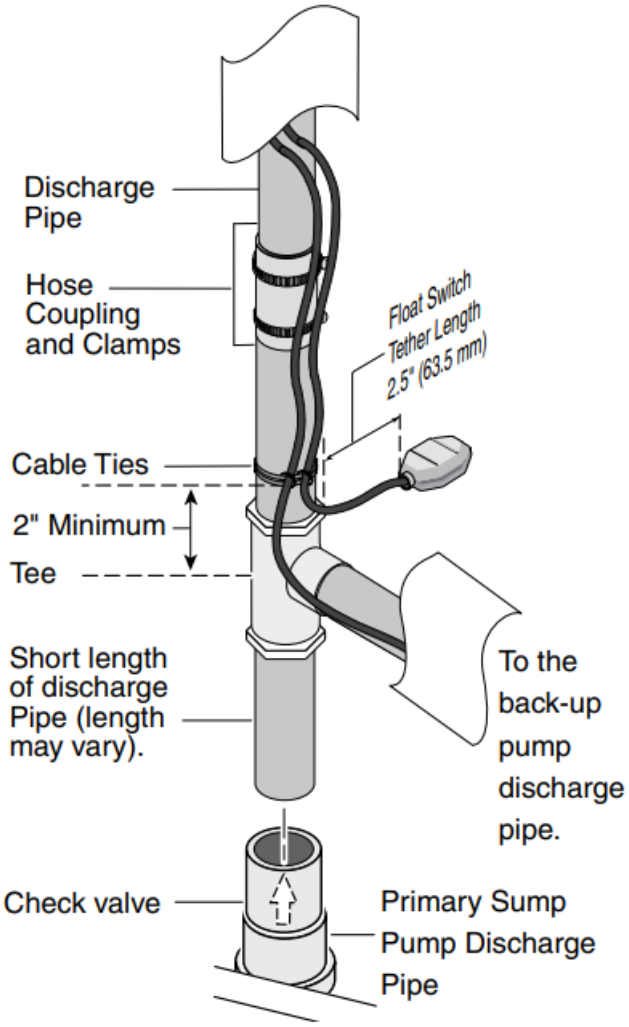


Figure 6 – Back-up pump float switch tether length and discharge pipe

11. Slip a reducer bushing (Key No. 2A) onto the end of the pipe coming from the primary pump discharge. Do not glue this connection yet. NOTICE: If your discharge pipe diameter is 1-1/4″,you will need to glue the reducer bushings into the tee first and then slip the cut off piece of discharge pipe into the bushing.
12. Slip the tee and the back-up pump subassembly onto the reducer bushing.
13. Glue the cut off piece of pipe into the top of the reducer bushing in the top of the tee.Mount the float switch assembly (KeyNo. 7) loosely to the discharge pipe with the cable ties (Key Nos. 7A & 7B). See Figure 6. Approximately 2.5” (63.5 mm) of cord length should be left between the float and the clamp. Do not tighten the cable ties. Adjustments may be needed later.
14. Skip to the section “Cut the Discharge Pipe”, Page 7.

Method B

Method B suggests installing the back-up pump above the primary sump pump. See Figure 7. The minimum required sump basin diameter for this type of installations 13.5″ at the bottom of the pit, and the minimum recommended depth of the basin is 22″.

1. Make a second cut in the discharge pipe at the pencil mark made in step 1, on Page 4, and set the cut-off piece of discharge pipe aside. See Figures 1 and 7.

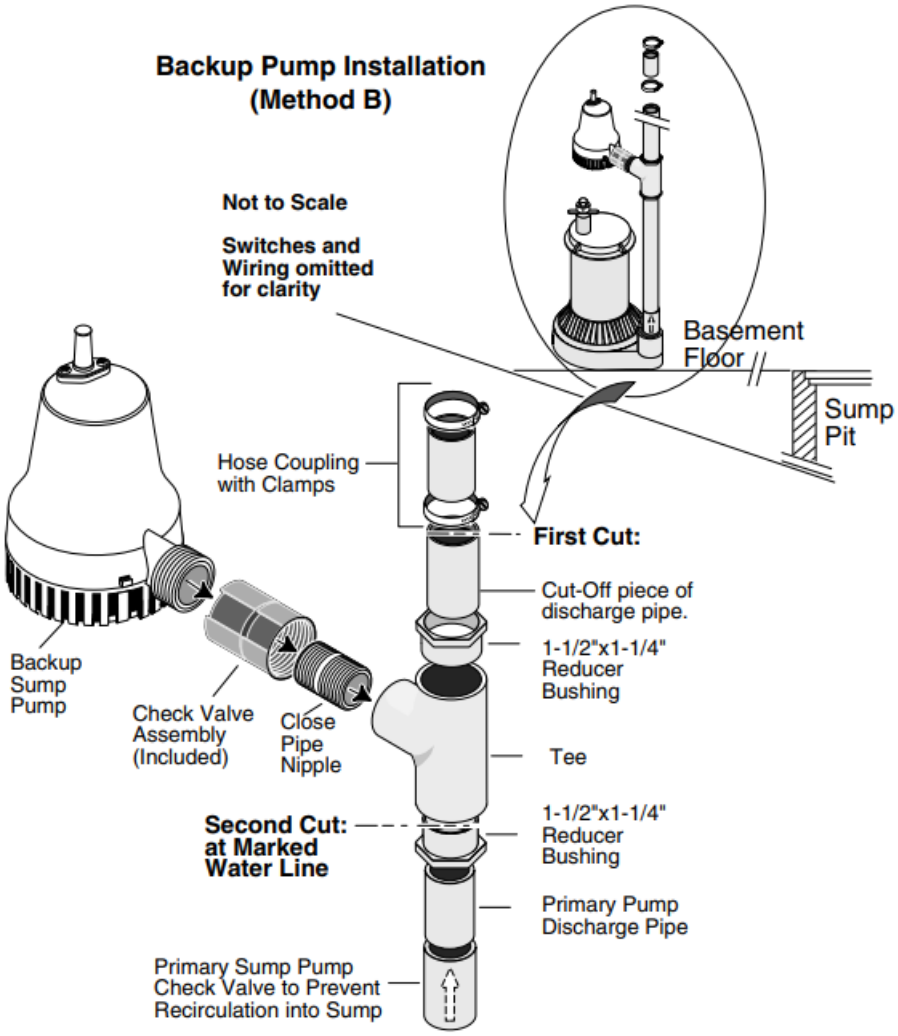


Figure 7 – Method B installation diagram

2. Wrap the threads of the close nipple (Key No. 3 on Page 12) counterclockwise with 2 turns of PTFE pipe thread sealant tape and set aside.

   NOTICE: There must be a check valve installed in the Primary Sump Pump discharge pipe between the tee and the Primary Sump Pump. This will prevent recirculation into the Primary Pump when the Backup Sump Pump comes on.
3. The backup pump (Key No. 6) and check valve assembly (Key Nos. 4 and 5) come preassembled. Thread the close pipe nipple into the check valve.
4. To thread the tee (Key No. 2B – also included reducer bushings) into the close nipple: Hold the check valve assembly with the channellocks, insert the screwdriver into the tee for leverage, and tighten the tee with the screwdriver. Finish with the tee in a straight up and down (vertical) position.
5. Clean the pipe ends with the cloth towel.
6. Glue the cut-off piece of discharge pipe into the top of the tee.

   NOTICE: If your pipe is 1-1/4″, you will need to glue the reducer bushings into the tee and glue the pipe into the bushing. Place the assembly onto the primary discharge pipe. Do not glue the tee onto the primary pump discharge pipe.
7. Mount the back-up pump float switch assembly (Key No. 7) loosely to the discharge pipe with the cable ties (Key Nos. 7A & 7B). See Figure 6, on Page 6. Approximately 2.5″ (63.5 mm) of cord length should be left between the float and the clamp. Do not tighten the cable ties. Adjustments may be needed later.

Cut the Discharge Pipe:

1. Put the double pump assembly into the sump pit.

   NOTICE: The discharge pipe now overlaps the discharge pipe that leads outside.

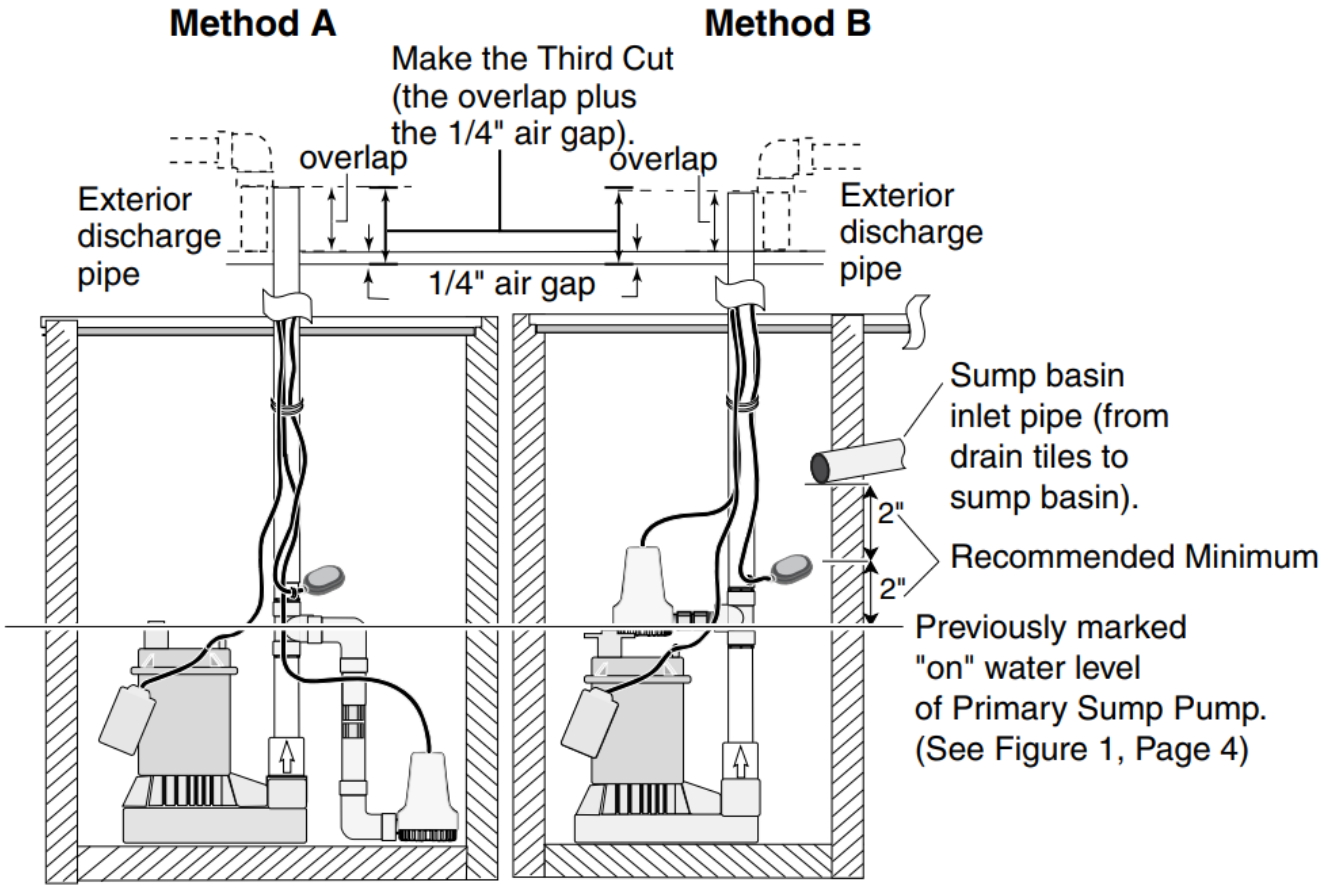


   Figure 8 – Make the third cut to remove the excess discharge pipe

2. Mark the discharge pipe where it should be cut. Be sure to leave a 1/4″ air gap between the ends of the pipes. This gap will absorb the noise from vibration and allow for flexibility.
3. Make the third cut. See Figure 8.

Trial Assembly of Double Pump Assembly in the sump pit:

1. Connect the discharge pipe to the exterior discharge pipe with the rubber coupling and clamp kit (Key No. 1). Do not tighten the clamps until all the final adjustments are complete.
2. Make the final adjustments. Make sure the pumps and the switches do not interfere with each other. Make sure there is plenty of room for the float switches to either swing or to move up and down from their “off” to their “on” positions.

Mark and Glue Assembly:

1. Mark the pipe and the fittings at all the connections with a pencil. These marks will be used as a reassembly guide while gluing to be sure everything is still in the right place and nothing has moved.
2. Loosen the rubber coupling and clamp connection.
3. Carefully pull the double pump assembly back out of the pit.
4. Take the tee assembly off of the primary discharge pipe. Do Not unscrew any of the PTFE pipe thread sealant taped pipe nipple connections.
5. Clean all the PVC pipe ends with the PVC cleaner.

Warning

6. Hazardous fumes. Follow the cement and cleaner manufacturers instructions. Use the PVC cement in a well ventilated area away from fire or flames.
7. Glue the PVC fittings where indicated by the pencil marks. Wait 10 minutes for the glue to cure.

Final Assembly:

1. Put the double pump assembly back into the pit.
2. Install and tighten the rubber coupling and clamp kit.
3. Make the final float switch adjustments and tighten the cable ties.

ELECTRICAL CONNECTIONS

Warning

Hazardous voltage. Can cause serious or fatal electrical shock. Review safety instructions before operating charger. Do not modify cord or plug.
Figure 9 – Wiring Connections FG100-A1

Table I – FG100-A1 Wiring Connections

Connect the	**To the Junction Box's**
Positive (+) lead from the battery Negative (–) lead from th e battery Positive lead from the charger Negative lead fro m the charger Backup sump pump	Positive battery connection Negative battery connection Positive charger connection Negative c harger connection Float switch
float switch (2 wires)	connection (2 wires)
Positive lead from the pump Negative lead from the pump	Positive pump connection Negative pump connecti on

CHARGER/BATTERY INSTALLATION

NOTICE: An alarm, located in the junction box,automatically sounds when the system runs if the alarm is in the "Enable" position. The alarm is silenced when the alarm switch is in the "Disable" position.

Model Number FG100-A1:

1. Apply two pieces of two-sided tape (provided, Key No. 9) to the back of the junction box. Press the junction box onto the battery box as illustrated in Figure 9 and on Page 15 (Exploded View).
2. Connect the charger as shown in Table I and Figure 9.
3. Plug the charger into a 115-120 Volt AC outlet delivering at least 15 amps. Do not use a switch controlled outlet. Mark circuit in main power panel "Backup sump pump power supply; do not turn off".
4. With the charger properly connected and plugged in the panel on the front of the charger will show one of the conditions illustrated in Figure 10.

Red LED – AC power is present

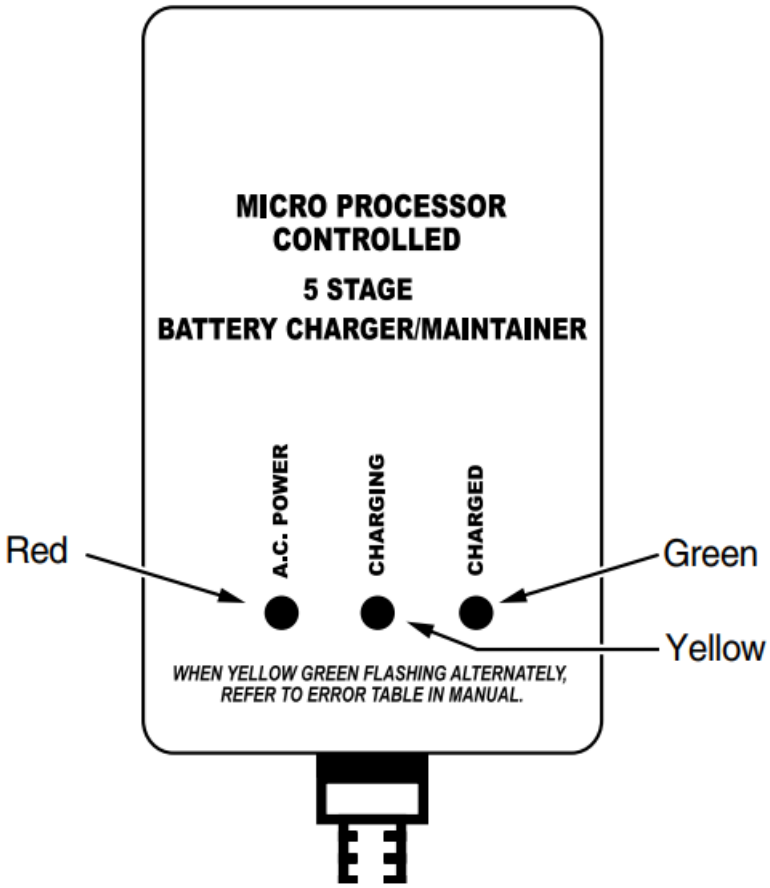


Figure 10 – FG100-A1 LED Panel

Yellow LED – Prequalification test stage is complete and testing or charging in process
Green/Occasional Yellow – Charger turns on intermittently to maintain proper charge
Green LED – Charging complete
Green/Yellow LEDs Alternately Flashing – System is in Error Mode (see Table II, Page 9)
NOTICE: For more detailed information, see “Charger Operation” on Page 13.

Table II – 800 mA Charger Error Table (Green and Yellow LEDs will flash alternately)

Error Description	**Possible Causes**	**Fix**
The Battery Failed	The battery is highly sulfated	Replace the battery with a 12-Volt deep-cycle
Pre-Qualification Test		marine battery

	The charger is connected to a	Replace the battery with a 12-Volt deep-cycle
	six-volt battery	marine battery
Battery Over-Voltage	The Charger is connected to a 24 Volt Battery	Replace the battery with a 12-Volt deep-cycle marine battery
Charge Time Monitor	Battery took too long to complete its ch arge: A. Load applied (e.g. the pump motor started) during charging B. The battery ampere-hour rating is too large (Max. 96 ampere-hours)	Be sure pump cannot start during charging; r eset the charger Replace with correct size battery (see Page 4)
Excessive Battery Dr ain	Pump motor ran during charging (that is, with the main A.C. power ON), causing the system to shut down	Check primary sump pump. The BBU generall y runs only when the main A.C. power is out. If there has not been any power outage and th e BBU has run, the primary pump itself may h ave failed
Reverse Battery Con nection	Charger is connected backwards to the battery. (That is, Charger (+) to B attery (-) and vice versa)	Reconnect Charger (+) to Battery (+)/(-) to (-)
Battery Overheated	Cells in an old battery may deteriorate with age	Replace battery with a 12-Volt deep-cycle mar ine battery

Table III – 800 mA Charger Light Indications

Charger Light	On/Off/Flashing	Indicates
All Lights	Off	System is not receiving AC power
Power (Red Light)	On Off	System is receiving AC power System is NOT receiving AC power or battery leads are reversed
Charging (Yellow Light)	Flashing 1x/Second On, steady Flashing alternately with green light	Charger is running “Pre-Qualification” test (this lasts 45 seconds to 6 hours) Charger is either in “Constant Current” or “Constant Voltage” stage. This may last up to 96 hours System is in an ERROR mode (see Table II, above)
Charged (Green Light)	On, yellow light Off Flashing alternately with yellow light	Battery is fully charged System is in an ERROR mode (see Table II, above)

Model Number FG200-A1:

1. Connect charger as shown in Table IV and Figure 11.

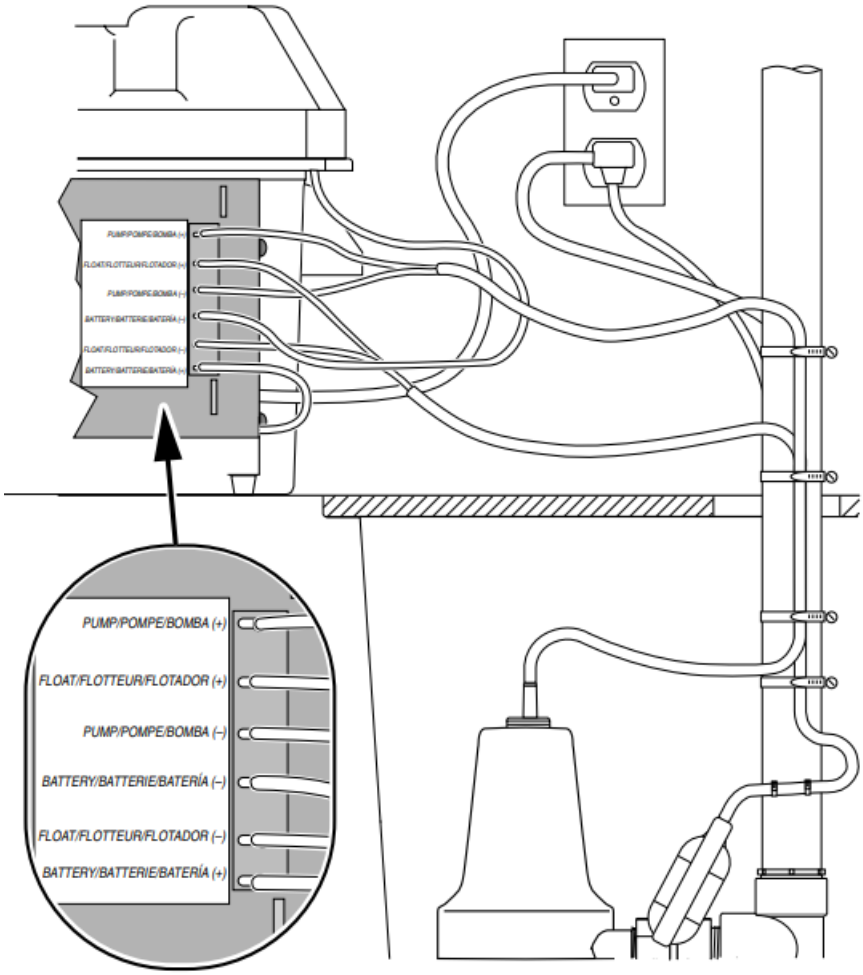


Figure 11 – Wiring Connections FG200-A1

Table IV – FG200-A1 Wiring Connections

Connect the	**To the position indicated below, on the charger**
Positive (+) lead from the battery Negative (–) lead from the battery Positive (+) “Backup sump Pump” lead (BROWN wire) Negative (–) “Backup sump Pump” lead (BLACK wire) Positive (+) Float switch Lead (WHITE wire) Negative (–) Float Switch Lead (BLACK wire)	Positive battery terminal (leads are provided) Negative battery terminal (leads are provided) Positive pump lead terminal Negative pump lead t erminal Positive float switch terminal Negative float switch terminal

2. Plug the charger into a 115 Volt AC outlet delivering at least 15 amps. Do not use a switch controlled outlet. Mark the circuit in the main power panel “Backup sump pump power supply; do not turn off”.
3. With the charger properly connected and plugged in,the panel on the front of the charger will show one or more of the following conditions (See Figure 12).

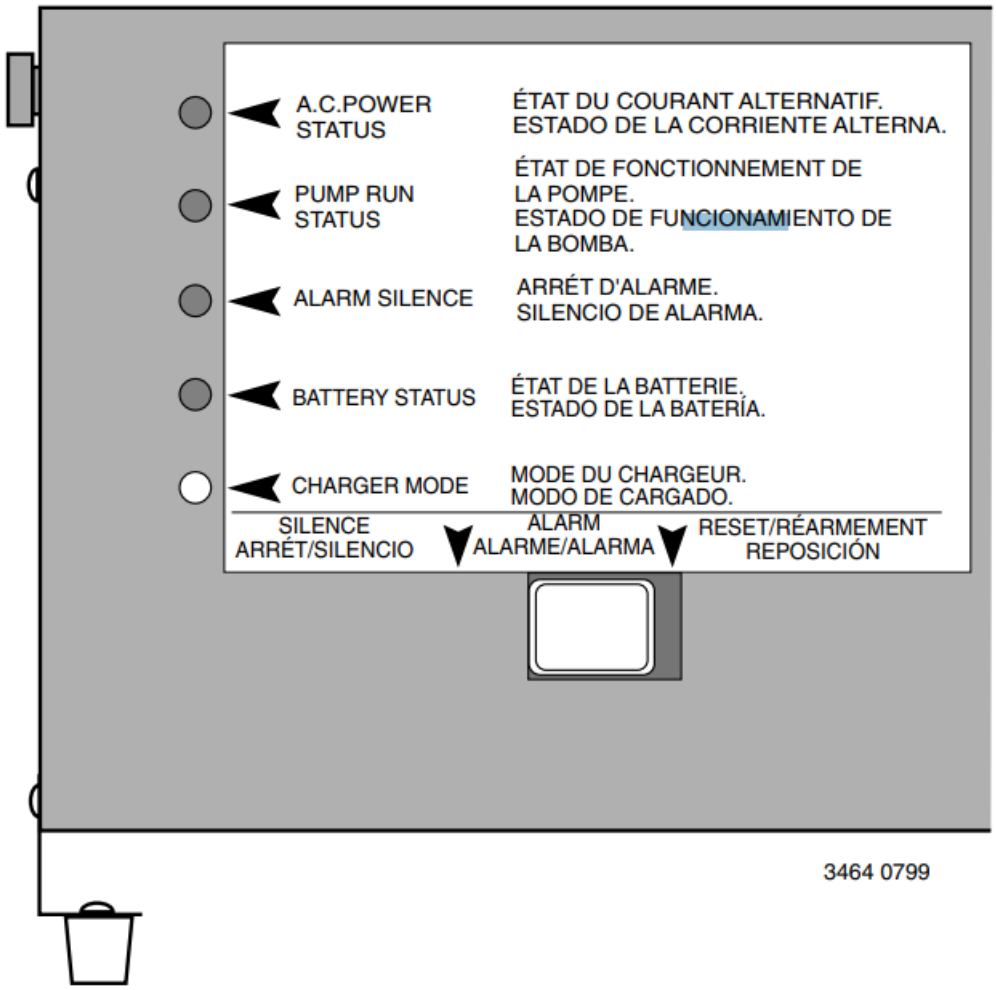


Figure 12 – FG200-A1 LED Panel

Red "AC Power Status" LED – AC power is present
Yellow (bicolor) LED on continuously – Prequalification test is complete and charging is in process
Yellow "Charging" LED flashing on and off quickl y – Equalization charge stage
Green (bicolor) LED is on – Battery is being maintained at full charge
Bicolor LED flashing yellow/green alternatively – See Error Charge Table (Table VI, Page 11)

Test the Assembly:

1. Plug the primary pump into a properly grounded 3-prong outlet.
2. Fill the sump with water to start the primary pump. Check for leaks.
3. Unplug the primary pump and fill the sump with water to start the backup system pump. Check for leaks.
4. Plug the primary pump back into a properly grounded 3-prong outlet. The system is now ready for operation.

Table V – 8 Amp Charger Error Table

Error Description	Possible Causes	Fix

The Battery Failed	The battery is highly sulfated	Replace the battery with a 12-Volt deep-cycle
Pre-Qualification Test		marine battery
	The charger is connected to a	Replace the battery with a 12-Volt deep-cycle
	six-volt battery	marine battery
Battery Over-Voltage	The Charger is connected to a 24 Volt Battery	Replace the battery with a 12-Volt deep-cycle marine battery
Charge Time Monitor	Battery took too long to complete its ch arge: A. Load applied (e.g. the pump motor started) during charging B. The battery ampere-hour rating is too large (Max. 130 ampere-hours)	Be sure pump cannot start during charging; r eset the charger Replace with correct size battery (see Page 4)
Excessive Battery Dr ain	Pump motor ran during charging (that is, with the main A.C. power ON), causing the system to shut down	Check primary sump pump. The BBU generall y runs only when the main A.C. power is out. If there has not been any power outage and th e BBU has run, the primary pump itself may h ave failed
Reverse Battery Con nection	Charger is connected backwards to the battery. (That is, Charger (+) to B attery (-) and vice versa)	Reconnect Charger (+) to Battery (+)/(-) to (-)

Battery Overheated	Cells in an old battery may deteriorate with age	Replace battery with a 12-Volt deep-cycle mar ine battery
Charging Error	An internal error occurred in the charge r during one of the charging stages	Unplug the charger for 10 seconds and then p lug it in again. If error occurs again, refer to Ta ble VI, below

Table VI – 8 Amp Charger Error Light Indications

NOTE: This chart identifies light codes indicating various charger error modes. It only applies when the 'Charger Mode' light flashes YELLOW/GREEN alternately. The light codes listed here DO NOT relate directly to the legends on the charger housing (A.C. Power Status, Pump Run Status, Alarm Silence, etc.). The legends on the charger apply ONLY when the 'Charger Mode' light is NOT flashing yellow/green.

LED Status				
A.C. Power Status	**Pump Run Status**	**Alarm Silence**	**Charge Mode**	**Error Mode**
Flashing	Off	Off	Flashing Yellow/Green	Battery Overheated
Flashing	Off	Flashing	Flashing Yellow/Green	Charge Time Monitor
Flashing	Flashing	Off	Flashing Yellow/Green	Excessive Battery Drain
Flashing	Flashing	Flashing	Flashing Yellow/Green	Failed Pre-Qualification Test
Off	Off	Flashing	Flashing Yellow/Green	Battery Over-Voltage
Off	Flashing	Off	Flashing Yellow/Green	Reverse Battery Connection
Off	Flashing	Flashing	Flashing Yellow/Green	Output Over-Current

"Silence Alarm/Reset" Rocker Switch:
Push the LEFT side of the rocker switch on the front of the charger to silence the alarm. **NOTE:** This will **NOT** silence the alarm when the battery is below 8.2 volts or the system is in **ERROR** mode.

Push the **RIGHT** side of the rocker switch to reset the 'Pump System Status' **LED** after the pump has run, or to reset the system from an error mode. When you reset the system, the charger will start its diagnostic procedure (pre-qualification test,
etc.) from the beginning. If the cause of the **ERROR** mode is not corrected, the system will go into the **ERROR** mode again.

Table VII – 8 Amp Charger Light Indications

Charger Light	**On/Off/Flashing**	**Alarm Buzzer**	**Indicates**
All LEDs	Flash ONCE	Off	Connected system to AC power or to battery; or, pressed 'Reset' when in ERROR mode
AC Power Status	On Very Slow Flash	Off Off	System is receiving AC power System is not receiving AC power
Pump Run Status	Fast Flash (2x/second)	Beep in sync h with LED flash	Pump is running. Press LEFT side of rocker switch to silence alarm
	Slow Flash (1x/2 seconds)	Off	Pump has run, but is not running now
	Off	Off	Pump has not run
Alarm Silence	On Off		Alarm is silenced Alarm is active

Battery Status	On Slow Flash Fast Flash Off	Off On On Off	System is not connected to a battery or is connected to a battery charged to less than 1 volt DC Battery voltage less than 10.9 volts. Alarm can be silenced Battery voltage is less than 8.2 volts Alarm CANNOT be silenced System is properly connected to a battery
Charger Mode	Slow YELLOW Flash	Off	System is in the “pre-qualification” stage. This will last from 1 minute to 5 hours, depending on the condition of your battery
	Solid YELLOW	Off	System is in the “Constant Current Charge” stage. This will continue until the battery voltage reaches approximately 14.3 volts
	Fast YELLOW Flash	Off	System is in the “Constant Voltage Charge stage”. This could last up to 14.5 hours
	Solid GREEN	Off	Battery is fully charged
	Flashing alternately YELLOW/GREEN	On – Beeping	System is in an ERROR mode. Alarm will beep in synch with one or more of the ‘AC Power Status’, ‘ Pump Run Status’, or ‘Alarm Silence’ LEDs. See Tables V and VI, Page 11, for more information

Table VIII – 8 Amp Charger Audio Alarm Indications

Audio Alarm	Mode	Indicates	Action
On – Beeping	Slow Beep in Synch with 'Battery Status' LED	Battery is down to about 10.9 Volts	Investigate cause; battery is very low. You have limited pump run time left. Press and release LEFT side of toggle switch to silence alarm
On – Beeping	Fast Beep in Synch with 'Battery Status' LED	Battery is down to about 8.2 Volts	Investigate cause; battery is nearly dead. You have almost no pump run time left. Alarm CANNOT be silenced
On – Beeping	Fast Beep in Synch with one or more of the 'AC Power Status', 'Pump Run Status', or 'Alarm Silence' LEDs and with the 'Charger Mode' LED flashing alternately YELLOW/GREEN	System is in ERROR mode	Refer to ERROR Mode Charts, Page 11 for more information
On – Beeping	Fast Beep in Synch with 'Pump Run Status' LED	Pump is running	None. Alarm will stop when pump stops running. To silence alarm, press and release LEFT side of toggle switch

CHARGER OPERATION

The backup pump will activate automatically when the backup sump water level rises far enough to trip the float switch.

If the power to the charger circuit is interrupted, the length of time that the backup pump will run depends on the Ampere-hour capacity of the battery used, the battery charge level, and the required vertical pumping distance. Extended periods of operation (for example, during an extended power outage) may exhaust the battery. The battery charger will begin charging the battery as long as the battery has a voltage differential of 3 Volts or more.

Recharge Time:
FG100-A1: Approximately 100+ hours to fully recharge a 27M battery in a "dead battery condition". The approximate recharge time for a 24M battery is 75 hours. FG200-A1: Approximately 19 hours to fully recharge a 27M battery in a "dead battery condition". The approximate recharge time for a 24M battery is 15 hours. Industrial standards define a "dead battery condition" as 9 Volts or less.

The 5 Stages of the Charging Process for Model Number FG100-A1:
Notice: The LED's will only illuminate once the AC power has been applied. They will not light up if the charger is not plugged in.

1. **Yellow LED light flashing on and off indicates:**

   Prequalification test stage is in progress. Normal duration of this stage ranges from 18 minutes to 27 hours. If a

battery has been left in a state of discharge for long periods this stage may require 27 hours to determine if the battery will even accept a charge.

2. **Yellow LED light continuously on indicates:**
   Constant current charge stage. Charger is charging battery at the full rated output. This stage ends when the battery terminal voltage reaches the factory preset voltage level.
3. **Yellow LED light continuously on also indicates:**
   Constant voltage charge stage. Battery cells are being equalized.
4. **Green LED light on indicates:**
   Float charge stage. Battery is charged and ready for use. Charging has stopped. To maintain a full charge on the battery, the yellow and green LED may alternately turn back on. This means the charger is briefly turning back on to keep the battery voltage from falling below a preset voltage level.
5. **Recycle charge stage:**
   The charger automatically initiates a charge cycle that begins with the prequalification test stage. This occurs once the battery has been in the float charge stage for 84 days.

The 5 Stages of the Charging Process for Model Number FG200-A1:
Notice: The LED's will only illuminate once the AC power has been applied. They will not light up if the charger is not plugged in.

1. **Yellow "charging"(bicolor) LED flashing slowly indicates:**
   A. Prequalification test stage is in progress. The normal duration of this stage is 20 seconds to 3 minutes. However, if a battery has been left in a state of discharge for long periods or if the initial voltage is less than 10.5 volts, this stage may require 5 hours to determine if the battery will even accept a charge.
2. **Yellow (bicolor)"charging" LED continuously on indicates:**
   Constant current charge stage. Charger is charging battery at full rated output.
3. **Yellow (bicolor)"charging" LED flashing quickly indicates:**
   Constant voltage charge stage. Battery cells are being equalized. This could last up to 14.5 hours.
4. **Green (bicolor) "charging" LED indicates:** Float charge stage. Battery terminal voltage is reduced to a regulated voltage and battery is being maintained at full charge.

TABLE IX – Capacity Ratings with 27M Marine Battery

Model Numbers	VERTICAL PUMPING DISTANCE					
	8 FEET		10 FEET		12 FEET	
	FG100-A1	FG200-A1	FG100-A1	FG200-A1	FG100-A1	FG200-A1
Gallons Per Hour	1,440	2,088	1,200	1,770	840	1,380
Hours Available	10	6.8	11	6.0	13	6.0
Total Gallons Pumped	8,500	8,500	7,000	7,000	5,000	5,000

These flow rates were obtained with a constant 12.7 VDC battery source. The actual GPH will vary due to a reduction in output voltage from battery

Operation / Troubleshooting

Recycle charge stage:
The charger automatically initiates a charge cycle that begins with the prequalification test stage. This occurs once the battery has been in the float charge stage for 84 days.

Special Features:

- The chargers are equipped with reverse battery, short circuit, and “run-away charge” protection.
- A built-in safety timer starts when the charger enters the Constant Current/Constant Voltage Charge stage (Yellow LED is continuously on). The FG100-A1system has a 90 hour safety timer and the FG200-A1 system has a 20.5 hour safety timer.
  NOTICE: To reset the charger unplug it from the 120V outlet for 10 seconds and then plug it back in.

BATTERY REQUIREMENTS

Warning Hazardous electrical current. Can cause severe burns and start a fire if battery terminals are short circuited. Install the battery in a battery box (See Key No. 8, Page 15). To prevent accidental shorting across battery terminals, strap cover securely (See Figure 13) on the battery box. Do not leave battery uncovered. Do not allow children to play around the battery backup system installation.
Figure 13 – Battery Hold-down Strap Threading 3340 1198

Your backup sump pump depends on the battery used with it for power. The better the battery, the better the performance of the pump. We recommend the use of a size 27M Marine Deep Cycle Battery or a size 24M Marine Deep Cycle Battery. They will perform as indicated in Table IX, on Page 13, and they stand up well to long periods of little or no use.

NOTICE: A 24M battery will provide the same performance as a 27M, but for a shorter length of time. Use of a standard automobile battery, GEL type, or a Maintenance Free (sealed) battery with this charger is not recommended. An automobile battery may require charging after only 1-2 hours of continuous use, and the repeated charging cycles may cause early plate failure in the battery. GEL-type batteries require a lower voltage than the charger is designed for; they may overcharge. Maintenance-free (sealed) batteries require a higher voltage; they may never reach full charge Use only the recommended battery or one of the same type and size so it will fit in the battery box (maximum size 12-5/8″ long, 7″ wide and 9-3/8″ high [320.7mm x 177.8mm x 238mm] including terminals) and supply enough voltage for full performance.

BATTERY MAINTENANCE

Warning
Severe burn hazard. A filled battery contains sulfuric acid. Avoid contact with skin, eyes or clothing.
NOTICE: To protect battery case from chipping and gouging, do not let battery sit on concrete floor. Install battery on a shelf or protective pad (plywood, 2x4s, etc.). Always install battery in a dry location that is protected from flooding.
Follow the battery manufacturer's recommendations for maintenance and safe use of battery.

TROUBLESHOOTING

Pump won't run.

1. Check all wiring connections.
2. Check for low or defective battery.
3. Check that automatic switch is free to swing up and down.
4. Check for a blown fuse in the junction box of the FG100-A1 system or in the charger of the FG200-A1 system.

Motor hums but pump won't run:

1. Check for low or defective battery.

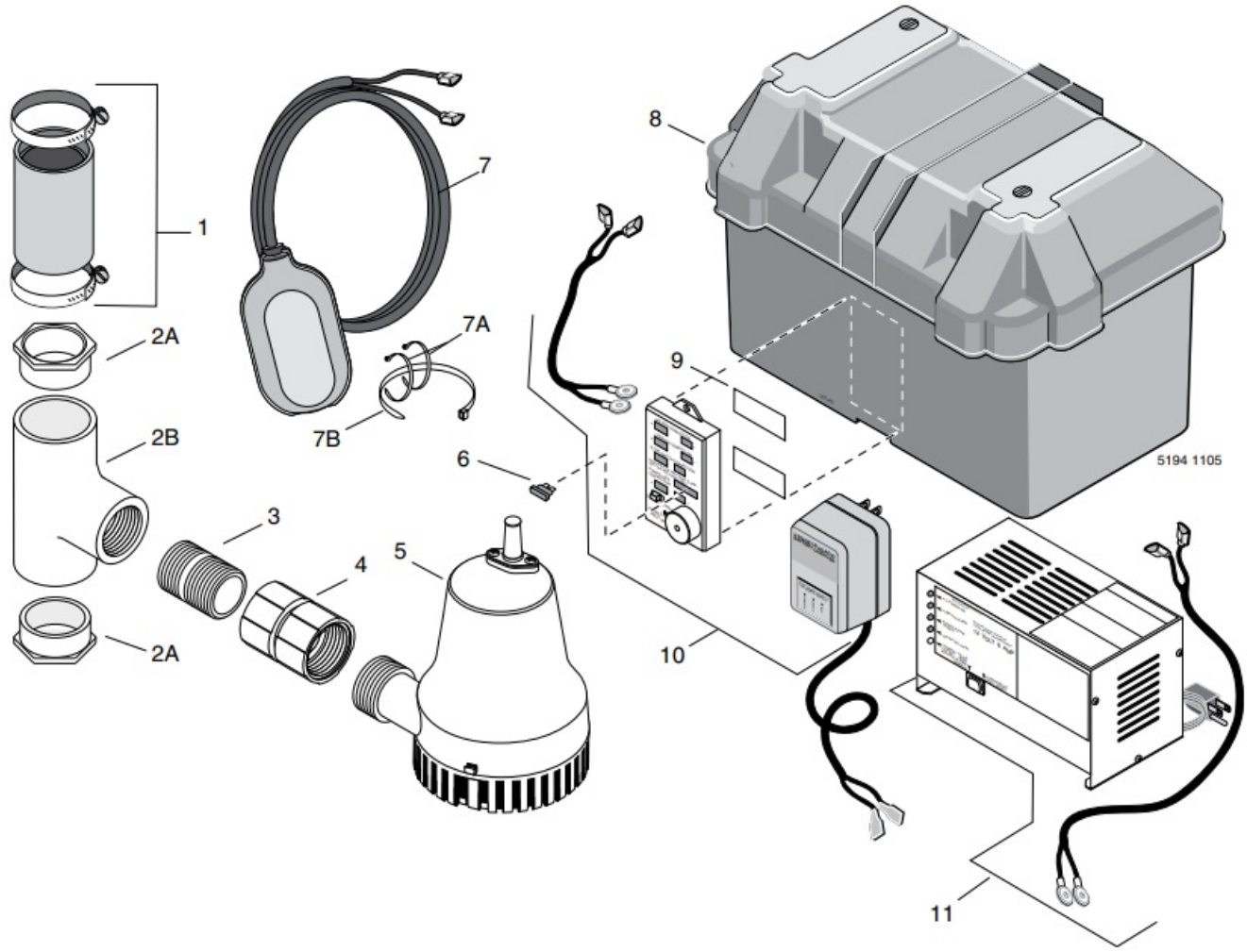
Pump runs but pumps very little or no water:

1. Make sure a check valve is installed and functioning between primary pump discharge and Backup Sump Pump tee.
2. Check for obstruction in discharge pipe.
3. Discharge pipe length and/or height exceeds capacity of pump. See Table IX, Page 13, for pump capacity.
4. Check for low or defective battery.
5. Positive (+) and negative (–) wires are reversed.

Pump cycles too frequently:

1. Tether length too short on automatic float switch. Make sure that tether is at least 2.5″ (63.5mm); see Figure 6, Page 6.
2. Main check valve located between discharge of primary pump and the Backup Sump Pump tee is not installed or is not working properly. Install or repair as required.

Repair Parts

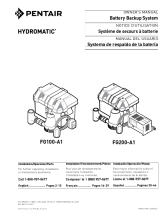


Key No.	Part Description	FG100-A1	FG200-A1
1	Rubber Hose Coupling and Clamps (†)	U74-68	U74-68
2A	1-1/2 x 1-1/4 PVC Slip Reducer Bushing (†)(2)	U78-876P	U78-876P
2B	PVC Tee 1-1/2 x 1-1/2 Slip x 1-1/4 FNPT (†)	U78-846P	U78-846P
3	PVC Pipe Nipple, 1-1/4 NPT x Close (†)	U37-66P	U37-66P
4	Coupling/Check Valve Assembly, 1-1/4 FNPT x 1-1/4 FNPT	ZB902110	ZB902110

5	DC Backup Pump	PS17-118	PS17-115
6	Replacement Fuse, – ATO 20 Amp, 12 Volt	*	*
7	Float Switch – 1/2HP, 8', 16 Gauge	PS17-161	PS17-161
7A	Small Cable Ties (2)	*	*
7B	Large Cable Tie	*	*
8	Battery Case (Complete)	24963B504B	24963B504B
9	Two Face Tape, 1/2″ x 1″ (†)(2)	PS97-5	–
10	Charger Kit (FG100-A1) (includes wires, junction box)	PS217-156	–
11	Charger Kit (FG200-A1)	–	PS217-119
•	Fittings Package	PS198-10	PS198-11

† Included in Fittings Package.
†† Includes 1-1/2 x 1-1/4 Reducer Bushings (2).
††† Included with Key No. 10.
§ Included with Key No. 13.
• Not illustrated.
† Included in Fittings Package.
†† Includes 1-1/2 x 1-1/4 Reducer Bushings (2).
††† Included with Key No. 10.
§ Included with Key No. 13.
• Not illustrated.
* Purchase locally. Purchase locally.

Documents / Resources



PENTAIR FG100-A1 Battery Backup System [pdf] Owner's Manual
FG100-A1 Battery Backup System, FG100-A1, Battery Backup System, Backup System