

## Solar Control Box

3A5083B

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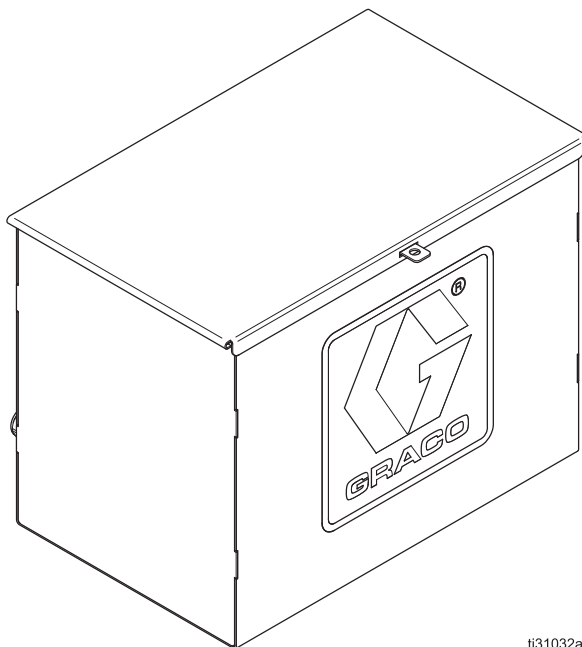
*For accurately metering and injecting chemicals at well sites. For professional use only.*

See page 3 for model information.

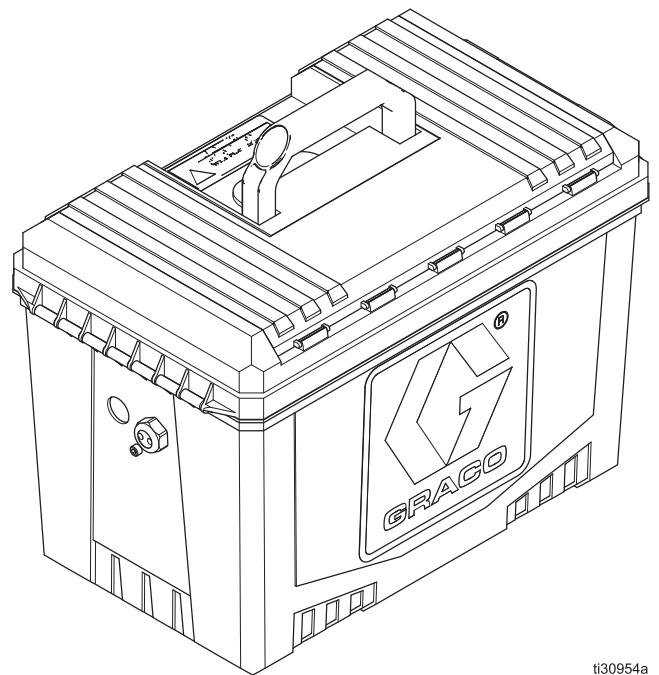


### Important Safety Instructions

Read all warnings and instructions in this manual and other related manuals on page 2. Save these instructions.



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## Related Manuals

Manual No.	Description
334513	Wolverine™ Chemical Injection Pump
3A5028	G-Chem™ Chemical Injection Pump
3A4700	Harrier™ EZ Chemical Injection Controller
3A5131	Mongoose Chemical Metering Pump
3A5025	Stand Kits
--	Charge Controller manual (provided by manufacturer)
--	Solar Panel manual (provided by manufacturer)

# Box Configuration Number Matrix

Check the identification plate (ID) for the 12-digit Configuration Number of your box. Use the following matrix to define the components of your box.

**NOTE:** Not all possible configurations are available.









**Sample Configuration Number: CI-112-1111-00**

<b>CI</b>	<b>1</b>	<b>12</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>
Chemical Injection Box	Box Style	Voltage	Solar Charge Controller	Pump Controller	Number of Batteries	Number of Solar Panels	Option #1	Option #2

Box Style		Voltage		Solar Charge Controller		Pump Controller		Number of Batteries		Number of Solar Panels		Option #1		Option #2	
1	One Battery Metal	12	12 VDC	1	ASC 12/12	0	None	1	1	1	1	0	None	0	None
P	One Battery Plastic			8	ASC 12/8	1	Harrier EZ								

# Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 <h1 style="margin: 0;">WARNING</h1>	
 	<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>When flammable fluids are present in the work area be aware that flammable fumes can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> <li>• Use equipment only in well ventilated area.</li> <li>• Eliminate all ignition sources, such as cigarettes and portable electric lamps.</li> <li>• Ground all equipment in the work area.</li> <li>• Keep work area free of debris, including rags and spilled or open containers of solvent.</li> <li>• Do not plug or unplug power cords or turn lights on or off when flammable fumes are present.</li> <li>• Use only grounded hoses.</li> <li>• <b>Stop operation immediately</b> if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem.</li> <li>• Keep a working fire extinguisher in the work area.</li> </ul>
    	<p><b>BATTERY HAZARD</b></p> <p>Batteries contain sulfuric acid and produce explosive mixtures of hydrogen and oxygen. Improper installation or maintenance may result in electric shock, chemical burns, or explosion. Self-discharge action generates hydrogen gas even when the battery is not in operation. Battery maintenance must only be performed by personnel knowledgeable of batteries and the required precautions.</p> <ul style="list-style-type: none"> <li>• Always wear proper eye, face, and hand protection.</li> <li>• Keep all sparks, flames, and cigarettes away from the battery.</li> <li>• Never try to open a battery with non-removable vents.</li> <li>• Keep removable vents tight and level except when servicing electrolyte.</li> <li>• Use and store only in a well-ventilated area.</li> <li>• Never Lean over battery while boosting, testing, or charging.</li> <li>• Exercise caution when working with metallic tools or conductors to prevent short circuits and sparks.</li> </ul>

# WARNING



## EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Specifications** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Specifications** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheet (SDS) from distributor or retailer.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment regularly. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.



## PERSONAL PROTECTIVE EQUIPMENT

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. Protective equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

# Installation

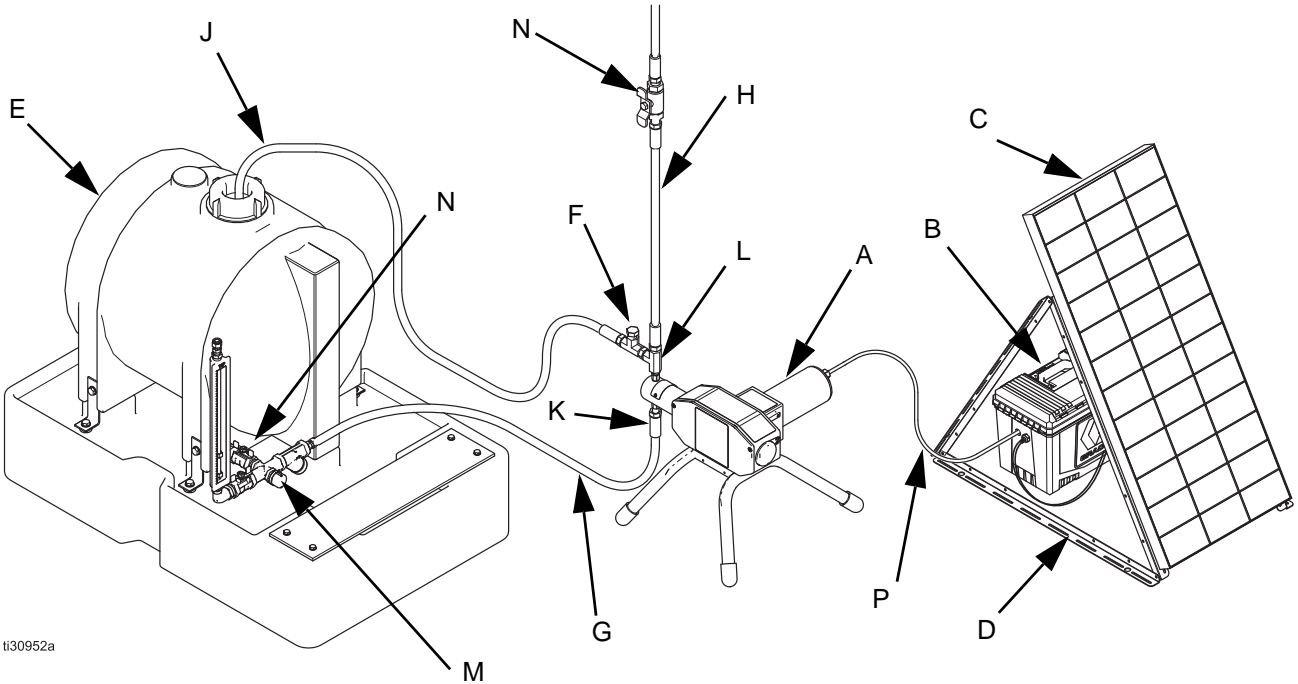
## Grounding



The equipment must be grounded to reduce the risk of static sparking and electric shock. Electric or static sparking can cause fumes to ignite or explode. Improper grounding can cause electric shock. Grounding provides an escape wire for the electric current.

**Box:** Contains ground lug (see **Parts** on page 13). Connect box to earth ground. You can connect to earth ground through motor wires. See **Pump Installation** on page 10.

# Typical Installation



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**FIG. 1 Chemical Injection System Layout**

FIG. 1 is an example of solar system installation with a chemical injection system. Your installation may differ from what is shown here.

### Components Supplied by Graco

The following components, see FIG. 1, are supplied by Graco with the Modular System DC control box:



- B** Control Box (batteries provided by customer)

### Additional Modular System Components

The following components, see FIG. 1, are available from Graco or supplied by the customer:

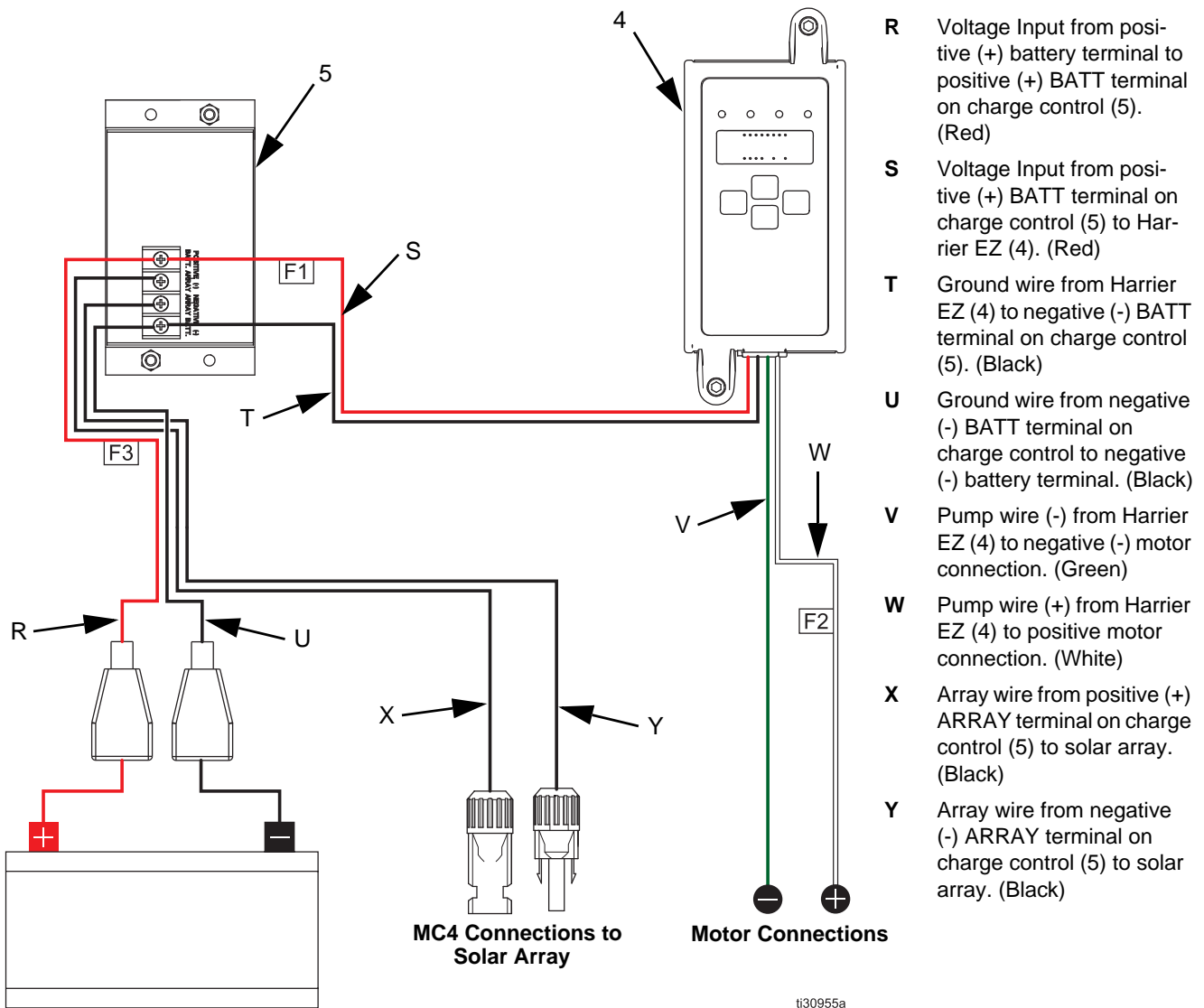
- A** Pump (includes Inlet (K) and Outlet (L) ports)
- C** Solar Panel
- D** Stand Unit
- E** Tank
- F** Pressure Relief Valve
- G** Inlet Line
- H** Outlet Line
- J** Pressure Relief Line
- K** Inlet Port
- L** Outlet Port
- M** Manifold Assembly [includes y-strainer and fluid shutoff valve (N)]
- N** Fluid Shutoff Valve (inlet & outlet)
- P** Conduit from Control Box to the Pump
- Power Cable from Solar Panel to Control Box (not shown)

## Wiring and Fuse Diagram

				
<p>Incorrect wiring to the charge controller or battery may result in an electrical or fire risk, and can damage the equipment.</p>				

The following wiring diagram shows the locations of the fuses (F1, F2, and F3) used with the Harrier EZ controllers. See **Fuse Ratings** on page 11 for fuse identification and current ratings.

**NOTE:** The F3 fuses are only on the cables leading to the positive terminals of the batteries.



**FIG. 2** Wiring and Fuse Diagram



# Setup and Operation

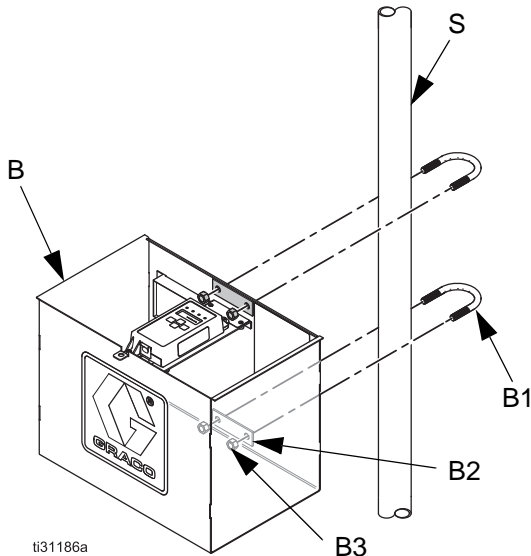
Incorrect wiring to the charge controller or battery may result in an electrical or fire risk, and can damage the equipment.				

## Before Installing

<b>LIFTING HAZARD</b> The battery is heavy. To avoid injury or possible damage to equipment, remove battery before handling the control box.				

Place box on the ground before installing battery. Do not move box with a battery installed.

## Attach Metal Box to Stand Unit (Optional)



**FIG. 3 Control Box Attachment**

1. Set the control box (B) on the base of the stand unit.

2. Using two u-bolts (B1), and their corresponding mounting plates (B2) and nuts (B3), loosely attach the control box (B) to the stand unit (S). See FIG. 3.

**NOTE:** It is recommended that the control box (B) be mounted facing the opposite direction as the solar panel (C), and that the control box (B) be mounted before the battery is placed inside.

3. Slide the control box (B) up the to the desired height and tighten the nuts (B3) so that the control box is securely attached to the stand unit (S).

## Solar Panel Installation

Incorrect wiring to the charge controller or battery may result in an electrical or fire risk, and can damage the equipment.				
<ul style="list-style-type: none"> <li>• Do not reverse positive (+) and negative (-) battery or array connections on the charge controller.</li> <li>• Do not reverse positive (+) and negative (-) connections on the battery.</li> <li>• Do not use a jumper across array negative (-) and battery negative (-) terminals.</li> </ul>				

Refer to Stand Kits manual for panel installation. (See **Related Manuals** on page 2.)

Connect the solar panel cable to the MC4 connectors (not shown) extending from the grommet at the back of the control box, ensuring the positive and negative leads are connected as labeled. See FIG. 2.

## Pump Installation

Refer to your pump manual for pump installation. (See **Related Manuals** on page 2.)

Verify that the fuses are removed before attaching pump wires. See **Wiring and Fuse Diagram** on page 8.

Crimp included connectors on positive and negative pump leads. Plug into controller wires as shown in FIG. 2.

## Controller Installation and Operation

Refer to your controller manual for controller installation and operation. (See **Related Manuals** on page 2.)

## Battery Installation



To reduce the risk of fire and explosion, keep battery terminal covers in place at all times, except for when necessary during battery maintenance.

Unexpected activation could occur when power is applied to the controller. Power to the controller comes from the battery and solar panel. To reduce the risk of serious injury, including skin injection, do not wire the battery or solar panel until all fluid lines are connected.

**NOTE:** Batteries are provided by customer. See **Technical Specifications** on page 15 for recommended battery size.

1. Ensure all fuses are removed. See **Wiring and Fuse Diagram** on page 8.
2. Leave the battery terminal covers installed, if included from the battery manufacturer, until the battery is in place and ready to be wired.
3. Carefully lift the battery up and into the control box (1).



Battery acid could leak out if the system tips over. To reduce the risk of injury, handle the system with care and wear appropriate Personal Protective Equipment.

4. Connect the red battery cable from charge controller Batt + to the positive battery terminal, and the black battery cable from charge controller Batt - to the negative battery terminal.

# Maintenance

## Pump Maintenance

Refer to your manual (see **Related Manuals** on page 2) for pump maintenance.

## Solar Panel and Charge Controller Maintenance

Refer to the manuals supplied with the solar panel and charge controller.

## Replacing the Fuses

See **Wiring and Fuse Diagram** on page 8 for fuse location.

<b>NOTICE</b>	
Fuses are supplied, and are required on all models. To avoid equipment damage:	
<ul style="list-style-type: none"> <li>• Never operate the pump or system without a fuse installed.</li> <li>• A fuse of the correct voltage and amperage must be installed in line with the power entry to the system.</li> <li>• See <b>Fuse Ratings</b> on this page for current ratings.</li> </ul>	

Replacement fuses are available from Graco.

- Voltage Rating: 32 VDC
- Current Rating: See **Fuse Ratings** on this page
- Style: Automotive Mini (ATM); UL 248 approved

## Fuse Ratings

The battery and controller fuses are determined by the pump controller. The motor fuse size is determined by the motor type.

<b>F1</b>	<b>Pump Controller</b> (See pg 3 for identification)	
	Harrier EZ	20 A
<b>F2</b>	<b>Motor</b>	
	120% of current rating on motor.	
<b>F3</b>	<b>Solar Charge Controller</b> (See pg 3 for identification)	
	ASC 12/12	20 A
	ASC 12/8	20 A

# Troubleshooting



Problem	Cause	Solution
System stops running	Battery charge too low	Charge battery. Replace if problem persists.
	Fuse blown	Replace fuse with like kind. Find short if problem persists.

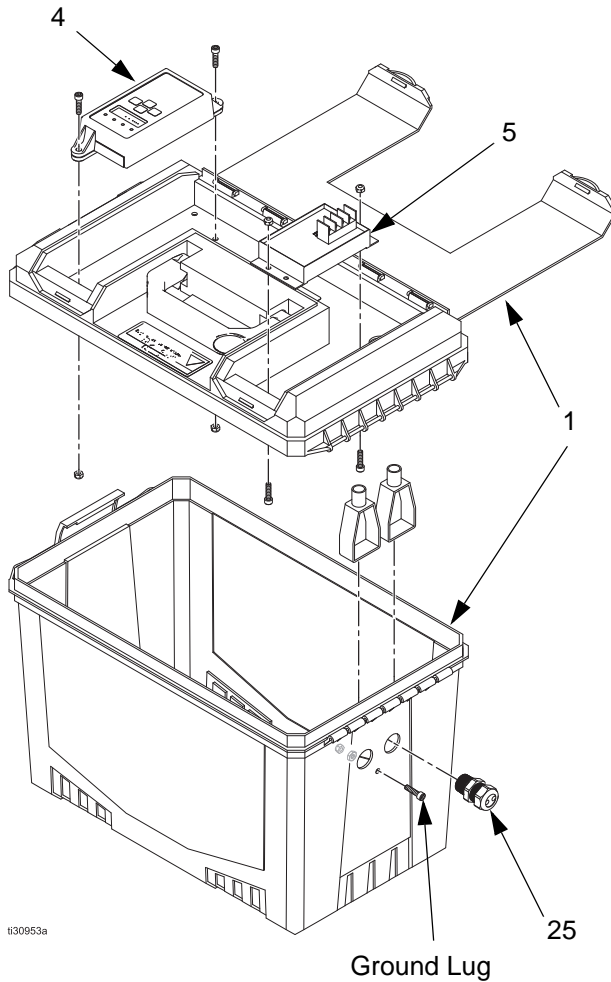
## NOTES:

- Refer to your pump manual (see **Related Manuals** on page 2) for troubleshooting specific to the pump.
- Refer to your controller manual (see **Related Manuals** on page 2) for troubleshooting specific to the controller.
- Refer to the stand manual (see **Related Manuals** on page 2) for troubleshooting specific to the stand.
- Refer to the included charge controller manual for troubleshooting specific to the charge controller.

# Parts

## Plastic Control Box

Part No. B52100 is shown

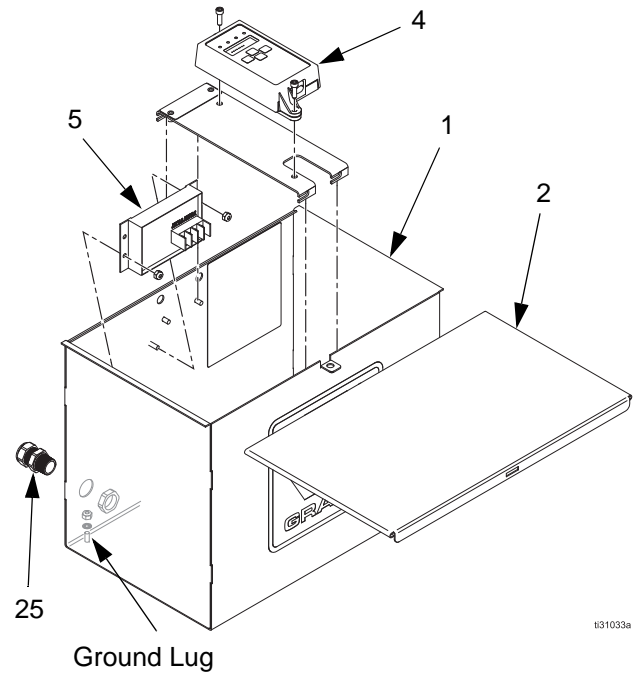


### Plastic Control Box Parts List

Ref.	Part	Description	Qty
1	--	Control Box	1
4	B32110	Harrier EZ	1
5	B32012	Charge Control, 12 Amp	1
	B32010	Charge Control, 8 Amp	1
25	B32614	Solar Cable w/MC4 Connectors	1
32	--	Designation Plate (not shown)	1

## Metal Control Box

Part No. B52150 is shown



### Metal Control Box Parts List

Ref.	Part	Description	Qty
1	--	Control Box	1
2	--	Box Lid	1
4	B32110	Harrier EZ	1
5	B32012	Charge Control, 12 Amp	1
	B32010	Charge Control, 8 Amp	1
6	--	DIN Rail Assembly (not shown)	1
25	B32614	Solar Cable w/MC4 Connectors	1
32	--	Designation Plate (not shown)	1

## Kits and Accessories

<b>Part No.</b>	<b>Description</b>
<b>B32016</b>	50 W Solar Panel, ordinary location
<b>B32014</b>	100 W Solar Panel, ordinary location
<b>B32021</b>	160 W Solar Panel, ordinary location
<b>B32018</b>	50 W Solar Panel, C1D2
<b>B32017</b>	90 W Solar Panel, C1D2
<b>B32751</b>	150 W Solar Panel, C1D2
<b>B32729</b>	Solar Panel Stand, 50-100 W, 3 ft Pole
<b>B32730</b>	Solar Panel Stand, 150-180 W, 3 ft Pole
<b>B32731</b>	Solar Panel Stand, 50-100 W, 6 ft Pole
<b>B32732</b>	Solar Panel Stand, 150-180 W, 6 ft Pole
<b>B32020</b>	Battery, Lead-Acid
<b>B32019</b>	Battery, AGM
<b>B32754</b>	Battery, Premium AGM
<b>B32756</b>	16" MC4 Cable Extension
<b>B32757</b>	5' MC4 Cable Extension
<b>B32758</b>	10' MC4 Cable Extension
<b>B32759</b>	15' MC4 Cable Extension
<b>B32074</b>	10A Mini Fuse (10 pack)
<b>B32070</b>	15A Mini Fuse (10 pack)
<b>B32071</b>	20A Mini Fuse (10 pack)
<b>B32739</b>	A-Frame Stand

# Technical Specifications

Solar-Powered Chemical Injection Systems		
	US	Metric
Nominal Voltage	12 V	
Maximum Solar Input Current		
ASC 12/8	8 A	
ASC 12/12	12 A	
Maximum Load Current	16 A	
Battery Size	Designed for a maximum of one Group 31 battery.	
Operating Temperature Range		
Plastic Control Box	32 - 131°F	0 - 55°C
Metal Control Box	-40 - 131°F	-40 - 55°C
Overall Dimensions (L x W x H)		
Plastic Control Box	10.5" x 17.5" x 12.25"	26.7 cm x 44.5 cm x 31.1cm
Metal Control Box	10.0" x 14.0" x 11.0"	25.4 cm x 35.6 cm x 27.9 cm
<b>Weight</b>		
Control Box (without battery), Plastic	5.5 lbs.	2.5 kg
Control Box (without battery), Metal	16.0 lbs.	7.3 kg

# Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

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Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

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In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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For the latest information about Graco products, visit [www.graco.com](http://www.graco.com).

For patent information, see [www.graco.com/patents](http://www.graco.com/patents).

**TO PLACE AN ORDER**, contact your Graco distributor or call to identify the nearest distributor.

**Phone:** 612-623-6921 **or Toll Free:** 1-800-328-0211 **Fax:** 612-378-3505

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