

DVS300/330 IP55/400 and MVS330/400 Operation & Maintenance Manual

GSE Intelligent Fast Charging System



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A NOTE ABOUT CUSTOMER SUPPORT

Please write down the unit serial number in the Owner's Record below to ensure superior service, and have it available when contacting Ampure Customer Service. The serial number can be found on the nameplate rating label on the left side of the unit.

<p>Owner's Record</p> <p>Model: PosiCharge™</p> <p>Serial Number (SN):</p> <p>Purchase date:</p> <p>Output power:</p>
--

Customer Support: service@posicharge.com
1-866-767-4242

Parts: orders@posicharge.com

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1 – SAFETY PRECAUTIONS – READ BEFORE USING

The ground support equipment (GSE) (charger power station[s] and power server: the unit) is designed with user safety as the highest priority. Operation and maintenance, however, must comply with all local codes; and the following safety precautions must be read and observed.

1.2 – Symbol Usage

Take special note of the information marked with the following symbols throughout this manual:



DANGER

Indicates information about safety practices necessary to prevent personal injury or death.



WARNING

Indicates information about safety practices necessary to prevent fire or equipment overheating.



CAUTION

Indicates information about safety practices necessary to prevent shock hazard or possible damage to the equipment during installation and service.



NOTE

Indicates helpful information for installation or usage but does not contain personnel or equipment safety-related information.

1.3 – Safety Instructions



CAUTION

BEFORE YOU BEGIN

- Read all instructions and cautionary markings on the Industrial PosiCharge Assembly.
- Make sure that you also read the IMPORTANT SAFETY INSTRUCTIONS on pages 2 and 3.
- Be sure to leave these instructions with the installed unit for future reference.
- Only qualified personnel should install, use, or service the unit.
- Read and understand these manufacturer's instructions and your employer's safety practices manual.

**DANGER****ELECTRIC SHOCK CAN KILL**

- Touching live electrical parts can cause fatal shocks or severe burns.
- The battery terminals are always electrically live, and the output circuit is live whenever the battery is connected or being charged.
- The input power circuitry and internal circuits are live whenever input power is on.
- An incorrectly installed or improperly grounded charger is a hazard.
- The unit must be grounded properly with a grounding conductor of a size equal to or larger than that recommended by local electrical codes or the Intelligent Fast-Charging System Ground Support Equipment (GSE) Installation Guide.
- Do not touch the uninsulated portion of the output battery connector or an uninsulated battery terminal.
- Do not remove the cover(s). Only qualified service personnel may remove the cover(s) on the unit. There are no user serviceable parts inside. Refer all servicing to qualified service personnel. Opening, or attempting to install or repair, the system by anyone other than qualified service personnel voids the warranty.
- Disconnect the battery charger from the input power and battery connections before servicing the unit. Lock out/tag out input power according to OSHA 29 CFR 1910.147.
- Do not use/service/repair it when it is in standing water.
- Before disconnecting the battery, stop charging by pressing the Stop button on the front panel of all power stations. Power stations are designed to stop an electric charge automatically, in the event of a hot disconnection, to minimize arcing or burning of the charger connections.
- The charging leads must be capable of the full-rated current of the DVS, and inspected frequently for wear, cuts, and abrasion. Do not use worn, damaged, undersized, or poorly spliced cables.
- The DVS power connector may be damaged by misuse or abuse. Frequently inspect the connector for cracking, pitting of contacts, fraying of wires, or signs of connector fatigue. Should any indication be present, immediate replacement of the connector will be necessary.
- Do not wear rings, watches, necklaces, tie clips, or conductive jewelry when working with batteries, as a short circuit through conductive jewelry may cause severe burns.

**DANGER****BATTERY GASES AND ELECTROLYTES CAN BE HAZARDOUS**

- Charging batteries produces fumes and gases that may be hazardous.
- Charging batteries may leak corrosive electrolytes that can cause skin and eye irritation, and damage equipment and clothing. Avoid contact, and follow the battery manufacturer's recommended practices for cleaning the battery pack.
- Thoroughly wash all items brought into contact with the battery electrolyte with a solution of baking soda and water.
- Batteries produce explosive gases. Do not smoke, perform operations that cause sparking, or have an ignition source near batteries.
- Ventilate the area to prevent the buildup of fumes and gases.

**WARNING****IMPROPER INSTALLATION CAN CAUSE FIRE**

- Do not place the unit on, over, or near combustible surfaces.
- Do not place the unit near flammable items.
- Do not block the air intake to, or exhaust from the unit. Allow a minimum of 6" of clearance around the unit.
- Do not block airflow to the unit.
- Replace blown fuses only with the same type and rating of fuse.
- Do not overload the building wiring. Be sure that the utility power service is properly sized, rated, and protected to handle this unit. Use the unit only with the circuits provided, with the minimum wire size specified in the installation guide.

**CAUTION****ELECTROSTATIC DISCHARGE PRECAUTIONS**

Electronic circuits are sensitive to damage from electrostatic discharge (ESD). Persons servicing this equipment should be trained in proper techniques for avoiding ESD damage to electronic circuits.

Wear an appropriate ESD wrist strap connected to the equipment chassis, as a minimum, when handling circuit boards.

2 – GENERAL INFORMATION

2.1 – Technical Support

Call PosiCharge technical support any time a procedural question arises. DO NOT perform a procedure you do not understand. PosiCharge Customer Service can be contacted during normal working hours (Pacific Standard Time) at the following e-mail address and phone number. Please have the information ready below to ensure superior service.

service@posicharge.com
866–POSICHARGE (866–767–4242)

For ProCore Chargers	For Other PosiCharge Chargers
<ol style="list-style-type: none"> 1. Problem description, including any fault codes 2. Data download from the charger, including charge logs and fault logs 3. Failed charger SKU number and serial number 4. Failed module SKU number and serial number 5. Customer name, for our reference 6. Ship to company name 7. Ship to company address 8. Ship to contact name 9. Ship to contact phone number 	<ol style="list-style-type: none"> 1. Charger model, SKU #, and serial number 2. Problem description, including any fault codes 3. How you diagnosed the problem 4. Customer name, for our reference 5. Ship to company name 6. Ship to company address 7. Ship to contact name 8. Ship to contact phone number

2.2 – Applicable Documents

Title	Part Number
BMID I Installation Manual	11717-W-03
BMID III (Battery Rx) Installation Manual	16672-W-03
BMID Programming Manual, Battery RX, SVS/ELT	06701-W-03
Intelligent Fast-Charging System Ground Support Equipment (GSE) Installation Guide for the DVS300/330/400 and MVS330/400	31504-76

2.3 – Acronyms, Abbreviations and Symbols

Acronym, Abbreviation or Symbol	Meaning
A	Amp(s) or Ampere(s)
BMID	Battery Monitor and Identifier
CC	Constant Current (Charging Mode)
CV	Constant Voltage (Charging Model)
DC	Direct Current
DIP	Dual In-Line Package
DVS	Dual Vehicle System
ESD	Electrostatic Discharge
EQ	Equalization / Equalize
GSE	Ground Support Equipment
IPC	Industrial PosiCharge
LED	Light Emitting Diode
MVS	Multi-Vehicle System
OSHA	Occupational Safety and Health Administration
PN	Part Number
RCI	Rapid Charging Intelligence
SBX®	Storage Battery Connector with Auxiliary Contacts
SOC	State of Charge
VAC	Volts Alternative Current
VDC	Volts Direct Current
V	Volt(s)
°C	Degrees Celsius

3 – OVERVIEW

3.1 – System Description

The Dual Vehicle System (DVS) 300/330/400 (Figure 1) and the Multi-vehicle System (MVS) 330/400 (Figure 2) are advanced transistor-based, fast-charging systems. These systems can charge industrial batteries quickly and safely, providing all the battery charging and equalizing required for your application.



Figure 1 – DVS300 / 330 / 330 IP55 / 400



Figure 2 – MVS330 / 400

Fast Charging

- Dramatically reduces the time it takes to recharge a battery to a high state of charge (SOC).
- Makes opportunity charging possible during available breaks, shift changes, and other idle times; and keeps a vehicle running all day long without changing batteries.
- Can eliminate the need for a battery changing room, in most two- and three-shift operations, freeing up floor space and personnel for productive activities and reducing battery inventory by up to 65%.
- Increases productivity by eliminating down time for battery changing and avoiding low-voltage operation that can reduce vehicle performance.

Rapid Charging Intelligence

- Makes the system capable of charging much more quickly than a conventional charger without damage to the battery.
- Precisely monitors the battery voltage and temperature, allowing charging to be as rapid as possible without exceeding the manufacturers' recommendations.
- Tracks the charge history of the battery pack.
- Automatically performs equalization on the battery pack, according to a preset schedule. This automation results in better use of the batteries with minimal effort on the user's part.

Rapid Charging Intelligence (RCI) is built into the system to make charging extremely simple. Just connect any IPC-compatible battery, and the system starts charging it correctly. There is no need to be concerned about which charger (power station) is designed or programmed for which battery. The system shuts off automatically after completing a charge.

3.2 – System Function

Charge Profile

The DVS provides a constant current–constant voltage–constant current (I-E-I) charge profile that precisely controls the charge rate, and optimally charges the batteries by precisely adjusting the current in response to the capacity, temperature, and age of the batteries.

Battery Monitor and Identifier

The DVS works with a battery monitor and identifier (BMID), which is a small monitoring device mounted on the battery. The BMID enables the charger (power station) to adjust the charge automatically to match the requirements of all of the batteries in the fleet, eliminating mismatching batteries and chargers (power stations).

User Interface

The keypad and display on the front of the DVS (Figure 3) provide the user interface to the charger (power station). The alphanumeric display panel constantly updates the charger (power station) and battery status, and allows access into the programming menus through the keypad. Four status light-emitting diodes (LEDs) allow the user to determine, from a distance, when the charge is in progress; at 80% complete, fully charged, or in equalization. A Fault/Warning LED serves to alert the user to fault conditions.

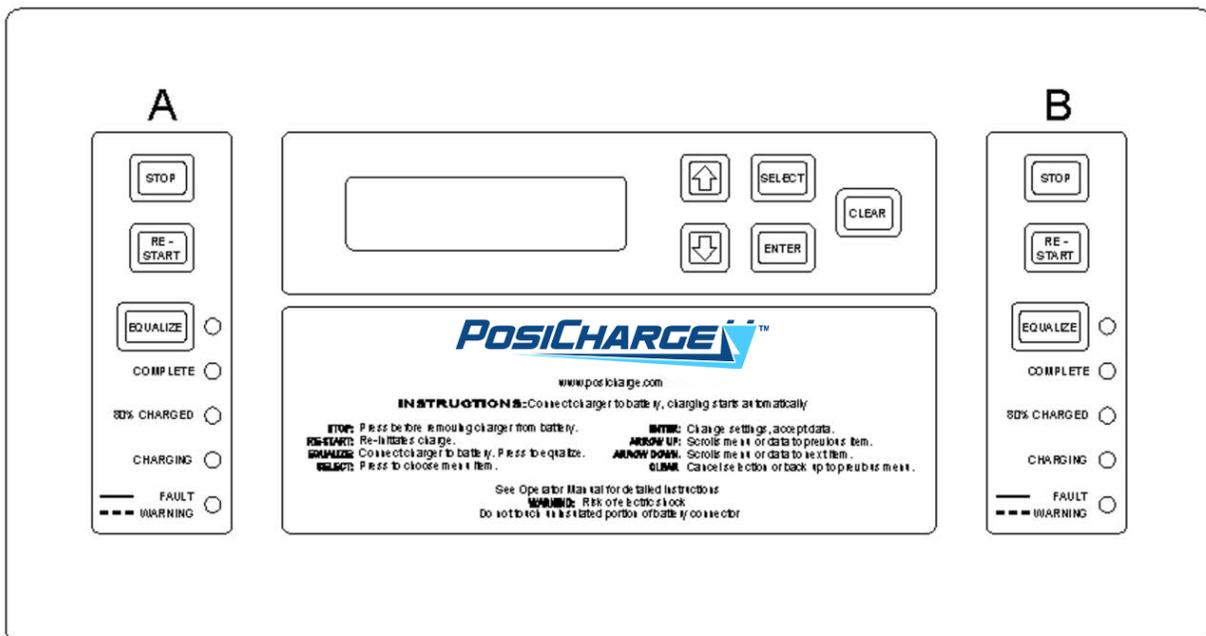


Figure 3 – Front Panel Layout

3.3 – Options and Accessories

The following options and accessories are available through your authorized Industrial PosiCharge DVS Fast-Charging System dealer. Contact PosiCharge customer service directly for any other replacement parts.

Battery Monitors and Identifiers

Many different sizes and types of industrial battery packs may be charged with the DVS Fast-Charging System. Choose the correct BMID for the nominal voltage of your pack.

24V BMID	P/N 08660-W
36V - 48V BMID	P/N 08661-W
72V - 80V BMID	P/N 08662-W

Contact Customer Service for Dual SBX or Euro cable kits.

Thermistor Options

Choose the correct thermistor type for your battery. Submersible thermistors are designed for installation through the battery case into the battery electrolyte of flooded battery cells. Exterior thermistors are designed to be glued onto the exterior of sealed batteries. DO NOT submerge exterior thermistors into electrolyte as corrosion will result in erroneous readings.

Submersible (flooded battery) thermistor	P/N 09525-xxx
Exterior (sealed battery) thermistor	P/N 08664

4 – OPERATION

4.1 – Getting Started

Take the time before you begin to familiarize yourself with section 1.2 Safety Instructions. Perform the following steps to get your system up and running quickly.

1. Ensure that the Fast-Charging DVS installation and utility power requirements are followed. Refer to the Intelligent Fast-Charging System Ground Support Equipment Installation Guide PN 31504-76.
2. Install the BMID onto the battery pack. Refer to the BMID I Installation Manual PN 11717-W-03 or BMID III Battery Rx Installation Manual PN 16672-W-03.

The battery dealer or other authorized service technician, however, typically will install the BMID on the battery pack and configure it before delivery to the customer.

Each BMID is pre-configured with the following information:

- An identification number, which can help track the charging history of a specific battery.
 - A type code, which indicates the manufacturer and type of battery.
 - The number of cells in the battery.
 - The ampere-hour capacity of the battery.
 - The start current limit of the battery pack for optimal charging.
 - The battery SOC limit, which determines when the charging will stop.
 - The internal resistance.
 - The maximum ampere-hours between equalizations.
 - The maximum days between equalizations.
 - The equalization day of the week.
 - The voltage limit for fast charging and equalization.
 - The battery temperature foldback.
 - The BMID initialization.
3. The battery pack may be connected to the charger (power station) once the BMID is installed.
 4. Initialize the BMID if it (is new and) does not come pre-configured.

Refer to the BMID Programming Manual, Battery RX, SVS/ELT [PN 06701-W-03].)

BMIDs also may be reconfigured on site through the charger (power station) front panel. (Refer to the BMID Programming Manual, Battery RX, SVS/ELT [PN 06701-W-03].)

5. The battery pack is ready to begin charging once the BMID has been initialized.

4.2 – Only for MVS Setups: Configuring the Main Station and Support Stations.

The MVS Intelligent Fast-Charging System is very flexible. It requires each new installation to be configured for the total number of power stations in the system.

1. Install the system.
2. Set the maximum port current configuration for each of the power stations. Each power station contains a control board that is mounted on the inside surface of the door (Figure 4).

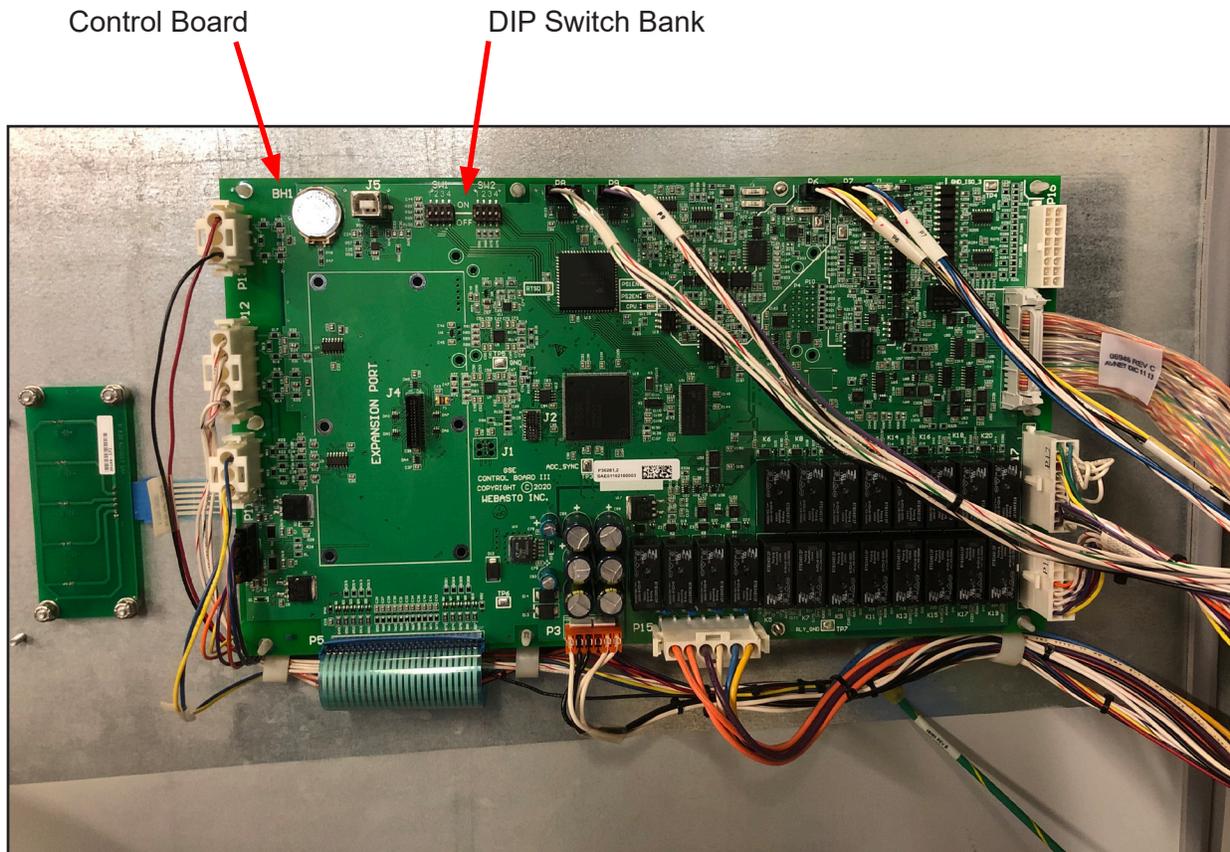


Figure 4 – Power Station Control Board Location

3. Remove the three Phillips screws on the right-hand side of the power station door to open the door.

4. Set the control board SW1-4 DIP switch in the DIP switch bank (Figures 4 and 5) to the ON position to enable the parallel-mode operation.
 - Figure 5 shows a detailed view of the [SW1-4] DIP switch in the parallel configuration. When parallel operation is enabled and only one vehicle is connected to the power station then both power sections in the charger are combined to deliver maximum power.
 - The installation software utility program then sets the maximum port current configuration. If the SW1-4 switch is set to the OFF position, then this configuration is limited based on the model design.

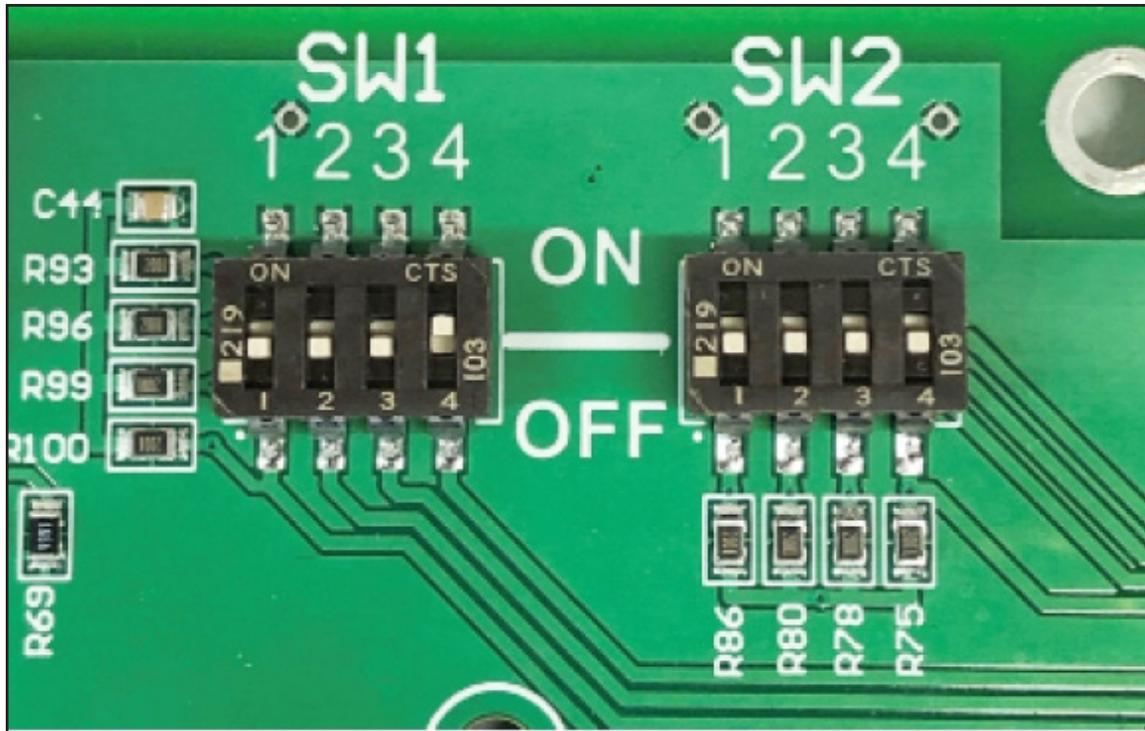


Figure 5 – Detailed View of the DIP Switch in Parallel Configuration

5. Apply the power.
 - The power station installed and wired nearest to the power server must be configured as the main station of the system and all other power stations as support stations. This configuration is accomplished through the use of the front-panel configuration menus (Figure 3).
 - The factory default setting for all power stations is the support setting.

6. Set the main/support configuration as follows:

- A) Power ON the system and wait for it to complete initialization tests. The display shows the startup windows (Figure 6).
- B) Enter the key code down-arrow+Enter on the front panel (Figure 3) to display the Charger Configuration Menu.
- C) Use the SELECT button to scroll to the Network Config. Setup menu, and press the ENTER button. The next sub-menu allows the user to select the type of power server to be used with the system.
- D) Select from the following options: COMM VARIABLE POWER, FIXED POWER 80 KW, FIXED POWER 60 KW, FIXED POWER 40 KW, and FIXED POWER 33 KW.

Earlier versions of the power server use the COMM VARIABLE POWER mode. The NGPS power server uses the FIXED POWER modes.

- E) Enter the number of ports to be configured in the system, once the desired power server mode is configured. The number of ports in a system is twice the number of power stations, since each power station in the system has two ports (A and B). The main power station is included in the total port count. A system with 5 power stations (1 main and 4 support), therefore, would be configured for 10 ports.
- F) Reboot the entire system by cycling the system power once the main station has been properly configured (see section 4.2 System Startup). This step is necessary to complete the system configuration.

Refer to the Intelligent Fast-Charging System Ground Support Equipment Installation Guide PN 31504-76 for complete descriptions of the main/support station configuration

4.3 – System Startup

The DVS is ready to be powered on once it has been properly installed (mechanically and electrically). The system performs a lamp test when first powered on. The display then shows the initial status window containing the model number and software version. The system then sequences through two more status windows before reaching the Charger Ready Connect Vehicle window (Figure 6). The windows for each charge port alternate when initialization is complete.

**NOTE**

An arrow in the upper-left or -right corner of the window indicates which channel data currently are being displayed.

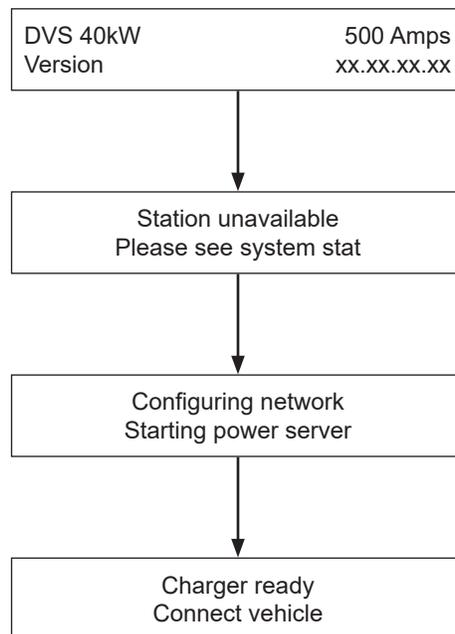


Figure 6 – Startup Windows

4.4 – Charging



NOTE

The numbers shown as part of the window display in this section of the manual are only for illustration purposes. The actual numerical combination of voltage, current and temperature will vary with the type of battery pack being charged.

1. Connect the battery to the charger (power station).

Simply connect the battery to either charge port of the charger (power station) to start charging. The charger (power station) establishes communication with the BMID, calculates the current SOC, identifies the correct charging profile, and starts charging. The charger (power station), at each step, displays the corresponding status window (Figure 7).

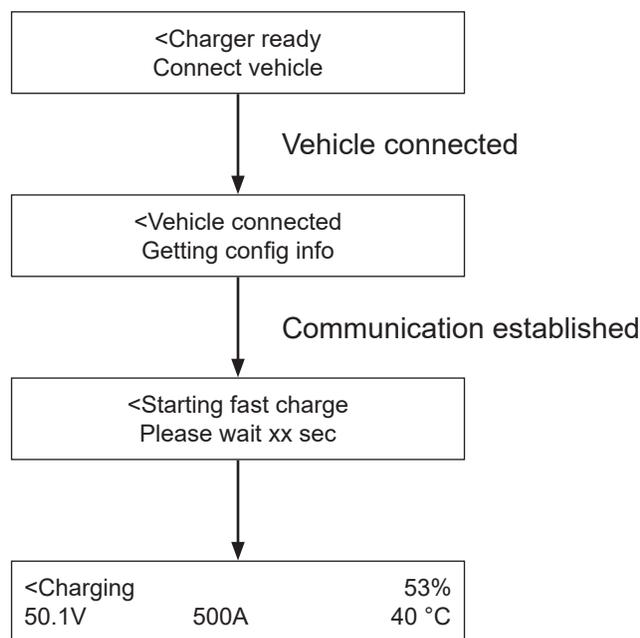


Figure 7 – Connecting status Windows

The DVS during the Preparing to Charge step counts down while preparing to charge. Charging preparation includes measuring the open circuit voltage (OCV) of the battery pack and calculating the SOC to determine what the initial current should be to charge the pack properly. The current is ramped up from zero to the target initial current once the charge starts and the Charging window is displayed, while the charger (power station) monitors the pack voltage.



NOTE

The window examples (in Figure 7) have a left-facing arrow at the left of line 1. This arrow indicates that the display applies to charge port A. A right-facing arrow at the right of line 1 indicates that the display applies to charge port B. The display window periodically will update the charging data as the charge progresses. The front panel (Figure 3), in addition, has several status LEDs that indicate the current status of the vehicle under charge and whether it is scheduled for an equalization (Table 1).

LED Label	Color	When Steadily Lit	When Flashing
Equalize	Green	The battery is undergoing equalization.	The equalization is scheduled.
Charge Completed	Green	The charge is completed and stopped.	NA
80% Charged	Green	The battery SOC is $\geq 80\%$.	NA
Charging	Amber	The battery is connecting and charging.	NA
Fault / Warning	Red	Fault (The charge is stopped.)	Warning (Check the log.)

2. Stop Charging.

The DVS stops the charge and illuminates the Charge Completed LED once the battery has been fast-charged to the SOC preset in the BMID. If an equalization is scheduled for this battery pack then the Charge Completed LED will not be illuminated until the equalization has been completed. The operator may stop charging at any time without waiting for the charge to be completed, by pressing the STOP button.

A window indicates the method in which the charge was stopped and displays the data values just before the end of charging (Figure 8) after a charge has been stopped by the operator or completed.

<div style="display: flex; justify-content: space-between;"> <Chg Completed 81% </div> <div style="display: flex; justify-content: space-between;"> 62.2V 50.0A 55 °C </div>	OR	<div style="display: flex; justify-content: space-between;"> <Chg Stopped 62% </div> <div style="display: flex; justify-content: space-between;"> 60.1V 500A 50 °C </div>
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Figure 8 – Charge Completed / Stopped Windows

3. Disconnect the battery cables from the charger (power station).



NOTE

If the operator disconnects the cables without pressing the STOP button then the charger (power station) immediately will stop charging and prevent any arcing or damage to either the charger (power station) or battery. It is strongly recommended, however, that operators first press the STOP button.

4.5 – Equalization

Proper equalization is necessary for the health of the battery pack. Too little equalizing may lead to sulfation and decreased capacity, whereas excessive equalizing may lead to high-water loss and more maintenance. PosiCharge recommends equalizing at least once per week; but twice per week is optimal for pack life under continuous use.

Scheduling or Starting an Equalization

The equalization schedule is stored in the BMID and run automatically (refer to the BMID Programming Manual, Battery RX, SVS/ELT [PN 06701-W-03] for information on how to modify the preset equalization schedule). Simply press the Equalize button at any time during a charge, to schedule an equalization manually during a charge. The Equalize LED starts flashing indicating that an equalization is scheduled and that the battery pack will be equalized following the fast charge.

1. Press and hold the Equalize button for three (3) seconds to bypass the fast charge and start an equalization on a battery pack, at any SOC. The Equalize LED illuminates without flashing, and the charger (power station) starts a full equalization on the pack, without a fast charge.
2. Press the Equalize button to cancel a requested equalization. The Equalize LED dims.



CAUTION

Always run a full equalization prior to a fast charge on any battery pack that has had a cell replaced to ensure that the pack is balanced.

Full Charging and Overcharging

The Full Charging and Overcharging feature allows the user to charge a battery fully to 100% and then overcharge the battery for a predetermined period of time. This feature resembles the equalization procedure in that overcharging utilizes the Finish Current setting of equalization. This feature, however, enables the user to set a time window during which full charging and overcharging can take place. It also allows the user to control the length of time that the battery is overcharged. If the charger (power station) is actively charging during the time window set by the user, and the feature is enabled then full charging and overcharging will be performed. The time window as well as the duration of the overcharging is set through the Full Charging and Overcharging Setup sub-menu of the Charger Configuration menu

Reduced Charging

The Reduced Charging feature allows the user to set a predetermined rate of charging current during a user-defined time window. The charging current as well as the time window is set through the Reduced Charge Rate Setup Sub-menu of the Charger Configuration menu. If the charger (power station) is actively charging during the time window, and the feature is enabled then the charging current will be reduced to the user-selected value. The charging current will remain at this level as long as the charge occurs within the specified time window.

Viewing Charging Data and Fault and Warning Windows

The display window is periodically updated during charging with the latest charging data; which includes the SOC, voltage, charging current, and temperature of the battery (Figure 9). A fault or warning message (Figure 10) is automatically displayed instead if there is a fault, warning, or charge termination.

<Charging		53%
50.1V	500A	40 °C

Figure 9 – Representative Charging Data Window

<Charger Power Reduced	81%	OR	<Chg Stopped	62%
62.2V	50.0A		55 °C	50 °C

Figure 10 – Representative Fault or Warning Window

Charging Date Window

The window displays “Charging” status during a charge, and the date is periodically updated.

Fault or Warning Window

The fault or warning window displays an assigned fault, warning, or charge termination code and corresponding fault, warning, or charge termination message. Refer to sections 6.2 Fault and Warning Codes and Messages, Descriptions, and Action Codes and 6.4 Charge Termination Codes and Messages for complete listings.

4.6 – Data Logs, Charger Configuration, and Advanced Programming Features

The DVS user interface allows a trained user to configure many of the charging parameters and review recorded data stored in the internal data logger of the system. All configuration programming is performed through menus that are accessible directly through the front panel and keypad.

Press the Select key to display the top-level of the Advanced Features menu (Figure 11 and Table 2).

Details for accessing advanced features and configuration menus are in the BMID Programming Manual, Battery RX, SVS/ELT PN 06701-W-03.

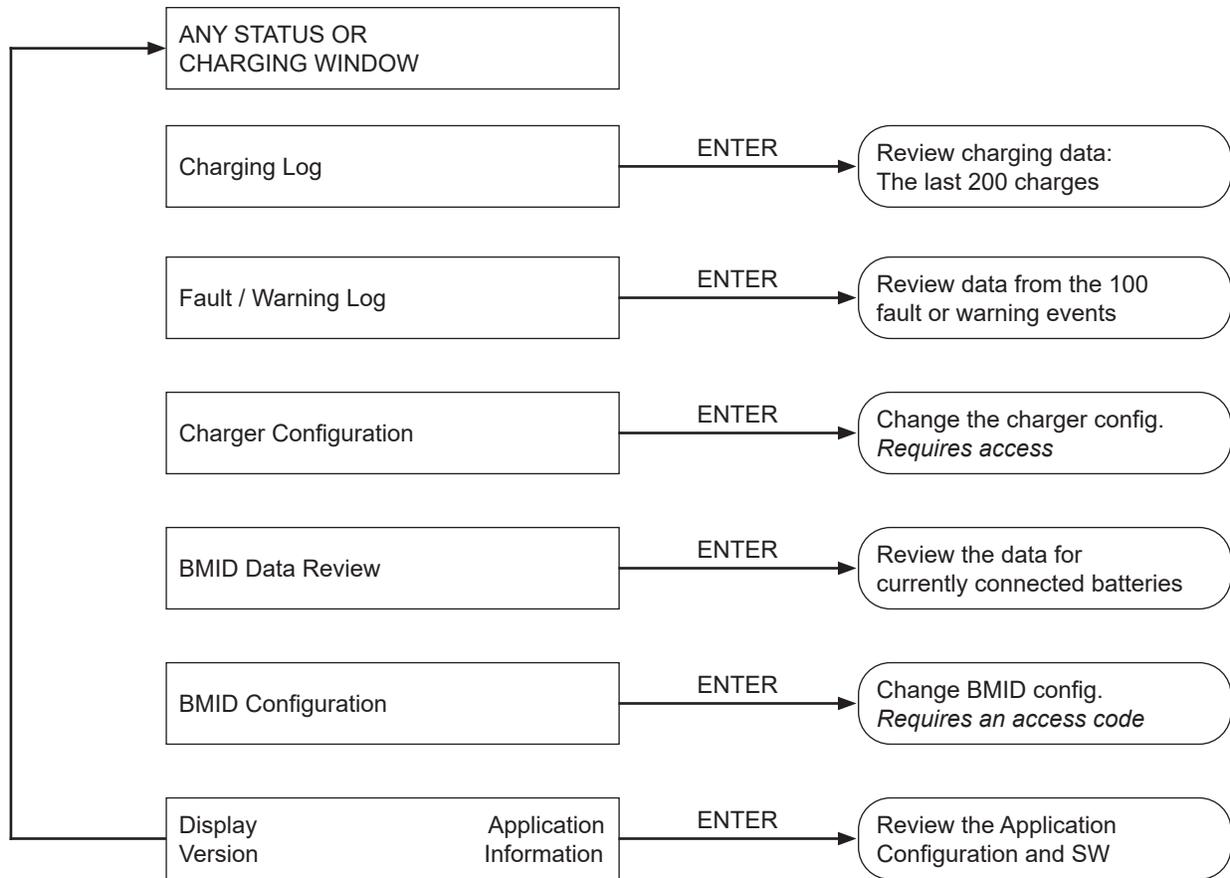


Figure 11 – Top Level Menu for Advanced Features

Advanced Feature	Function / Description
Charging Log	Allows scrolling through the data from the last 200 charges
Fault / Warning Log	Allows scrolling through the last 100 fault or warning messages
Charger Configuration	A programming mode for setting the date and time, modifying charge algorithms, setting the equalization schedule, and controlling charge times. Entering this mode requires an access code.
BMID Data Review	Lists all of the BMID parameters, stored charging history, and equalization data for the presently connected charging unit(s).
BMID Configuration	A programming mode for modifying the BMID parameters of the presently connect unit(s). Entering this mode requires an access code.
Display Application Version Information	Allows the user to view the software version and hardware configuration information.

4.7 – External Status Indicator Configuration (Optional)

Assignment of light outputs will be possible for visual presentation of the current state of the charger if the DVS is configured to drive external status lights. A set of three lights per port may be controlled to alert the user to the current state of the charger. This alert is useful when the user is in a position where the front panel of the DVS is not visible. The lights will show what the charger is currently doing. The assignment of the lights is configured through the External Light Port X sub-menu of the Charger Configuration menu.

5 – MAINTENANCE

5.1 – DVS Periodic Maintenance Schedule

Item	Service	Interval
DC Power Output Cables	Inspect and Replace	As Needed
SBX Connectors	Inspect, Rework or Replace	As Needed
Air Filters (DVS330 IP55 only)	Inspect, clean and re-install	Every 3-6 Months depending on conditions

5.2 – DC Power Output Cable Service

Refer to the *Installation Manual, GSE Intelligent Fast Charging, DVS400 Document ID 31504-76* for output cable installation instructions. Use only PosiCharge replacement cable PN 07391 to ensure safe and reliable service.



WARNING

Use only connectors and cables that are rated for the full continuous current rating of the unit.

Contact Customer Service if you have questions regarding a specific cable assembly or need to obtain documents.

SBX Connector Service

The auxiliary contact pins in SBX connectors sometimes make intermittent contact when the vehicle is connected to the charger (power station). This contact results in a BMID communication fault or no recognition by the charger that a vehicle is connected.

Check the communication pins in each red and black auxiliary connector. One or more of the pins may not be properly seated, or there may be damage to the auxiliary connector housing. A correctly seated pin is all the way forward inside the housing. An incorrectly seated pin is visibly pushed back inside the housing, and the tip of the housing tongue can be seen. Damaged connector housings must be replaced. Contact PosiCharge for recommended replacement parts.



NOTE

If an SBX connector is mounted to a vehicle, it must be removed from the mount before the roll pins that retain the auxiliary contacts can be removed.

Procedure for Properly Seating an Incorrectly Seated Pin.

1. Remove the two retaining roll pins from the SBX housing.
2. Pull the red and black auxiliary housings from the SBX housing.
3. Remove the incorrectly seated pin from the auxiliary housing.
4. Rework the pin so that the tongue of the pin is in line with the pin body or at a slight downward angle. (Figure 12 shows the CORRECT alignment. Figure 13 shows the INCORRECT alignment).

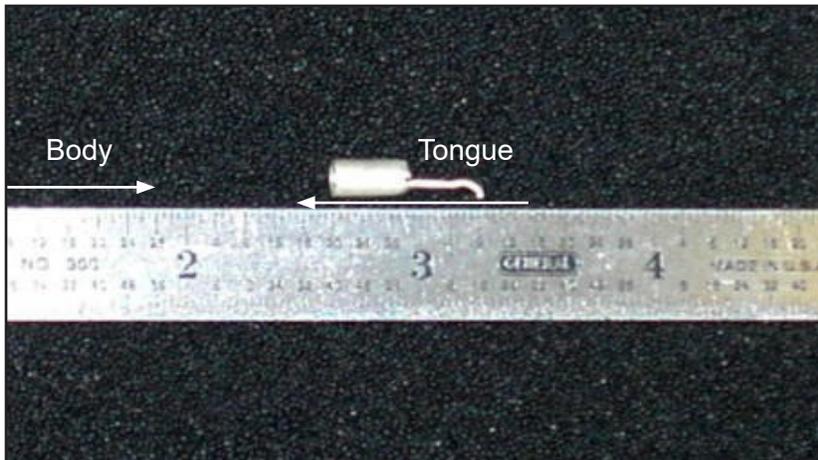


Figure 12 – Correct PIN Alignment

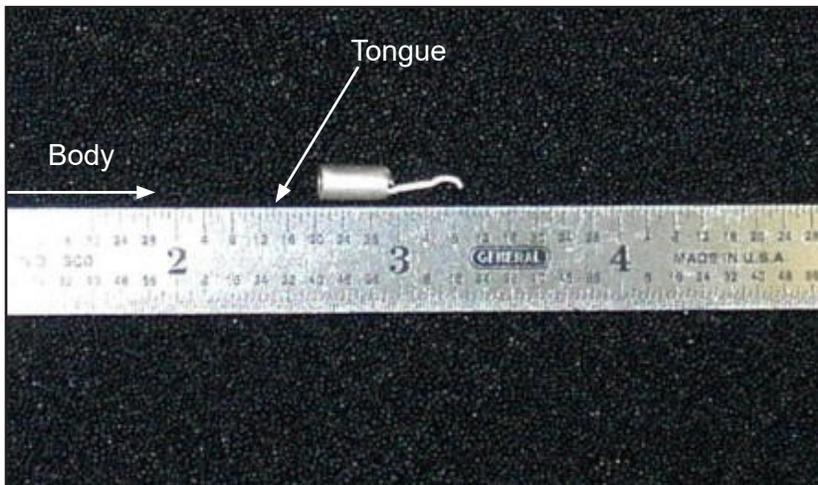


Figure 13 – Incorrect PIN Alignment

5. Insert the pin into the red and black auxiliary housing.

**NOTE**

An audible click can be heard when the pin fully engages. Pull on the wire to make certain that the pin is properly seated.

6. Re-assemble the connector assemblies and test.

Available Connector Kits

- PN 06435, Yellow
- PN 06436, Blue
- PN 07280, Green

Components of Each Kit

- (One) SBX 350A 600V Connector
- (Two) 4/0 lugs
- (Two) roll pins
- (Two) auxiliary contact pins
- (One) red auxiliary connector
- (One) black auxiliary connector

Additional kits or individual parts may be available. Contact PosiCharge Customer Service for more information.

5.3 – Air Filter Maintenance for DVS330 IP55

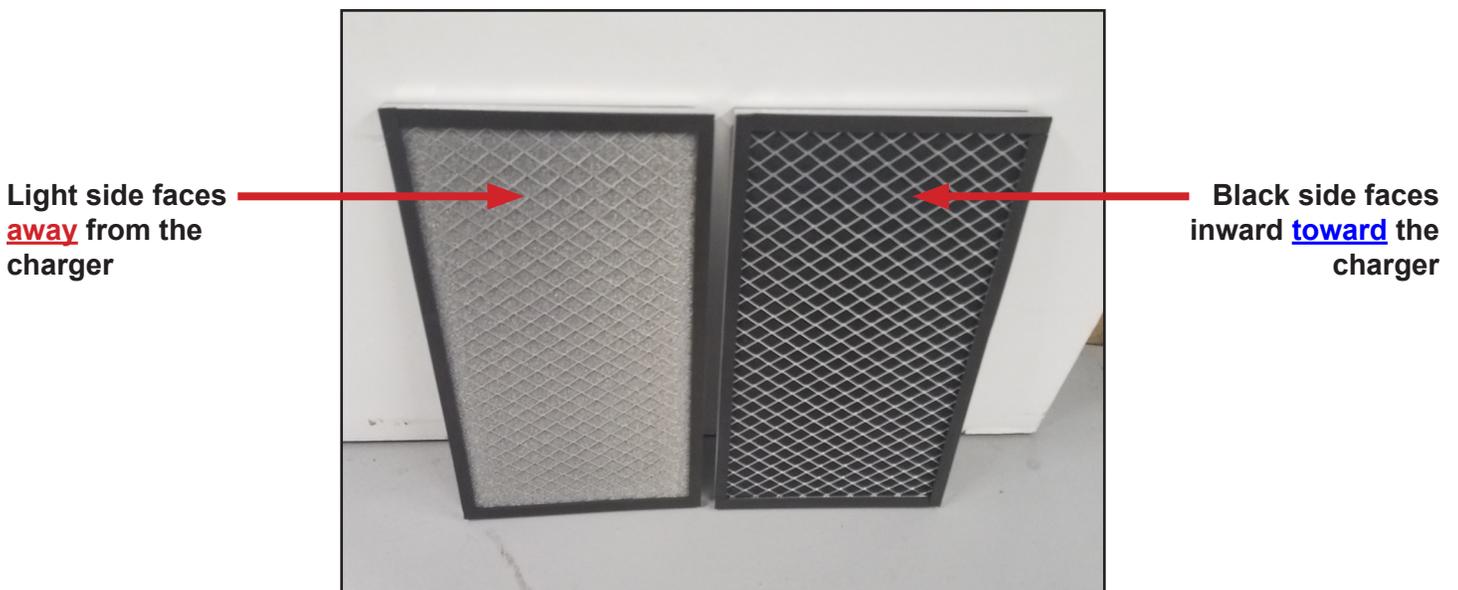
DV330 IP55 Model 09910-351 features re-usable air filters that can be removed, cleaned and re-installed on the charger. These filters meet the IP55 Standard for preventing dust and water intrusion into the charger.

The filters are designed to last several years, depending on the environment, and Ampure recommends that the filters be cleaned every three to six months (3-6 months) depending on the operating conditions.

For example, if your DVS330 IP55 operates in exceptionally dusty conditions, the filters should be cleaned every three months.

Please note the following:

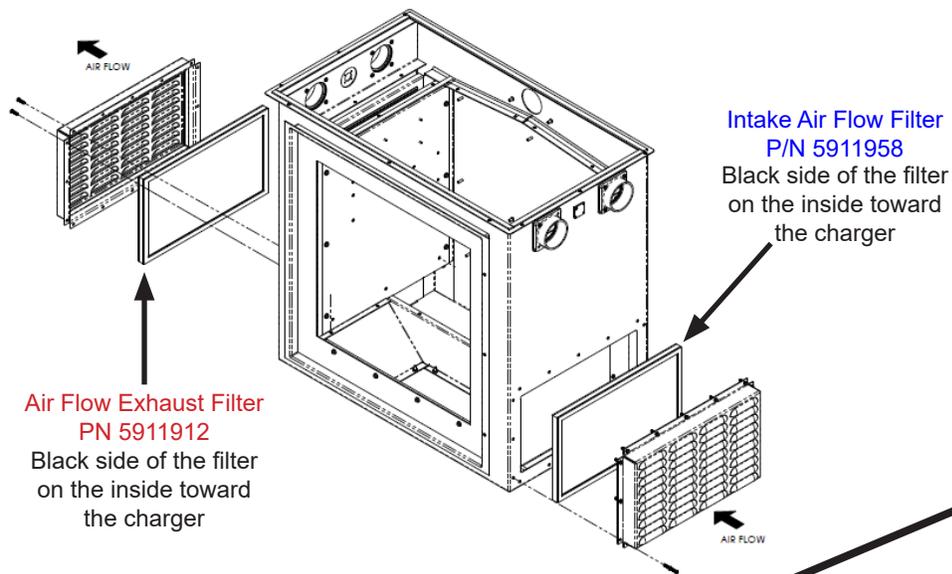
- Air Filter P/N **5911958** is for the air intake side of the charger.
- Air Filter P/N **5911912** is for the air exhaust side of the charger.
- The black side of both filters must be installed toward the inside of the charger.



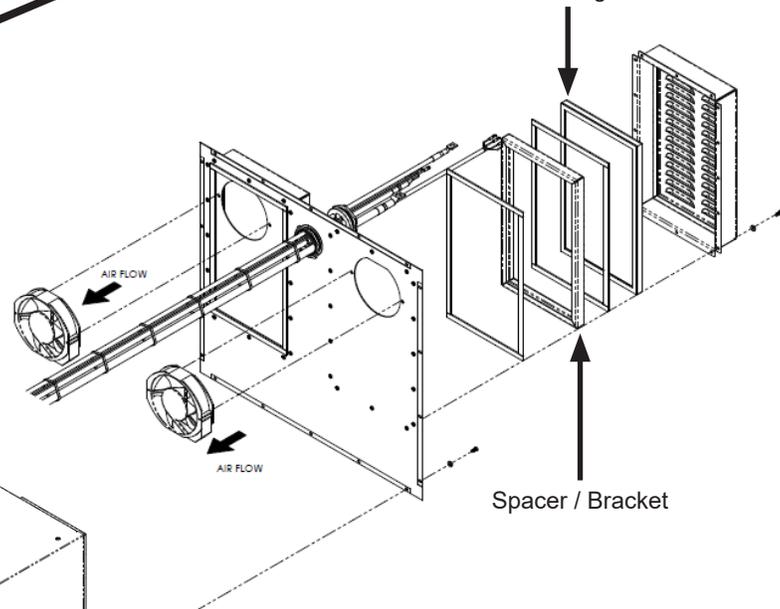
New Air Filters
Meet IP55 Standards

(See illustrations on the following page.)

DVS330 IP55 Side Air Vents



**Intake Air Flow Filter
P/N 5911958**
Black side of the filter
on the inside toward
the charger



DVS330 IP55 Front and Rear Vents

Cleaning the Air Filters

The IP55 filters can be cleaned using one of four methods:

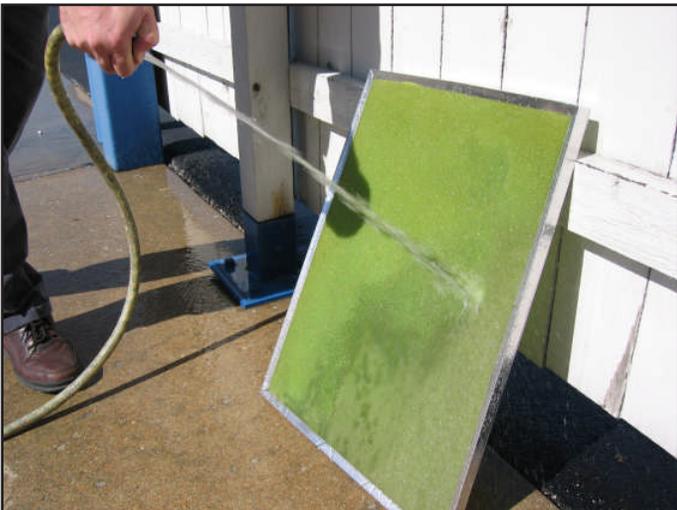
- Using a shop vacuum to remove any dust, water and debris
- Blowing it clean using compressed air
- Rinsing it with cool water
- Immersing it in warm soapy water



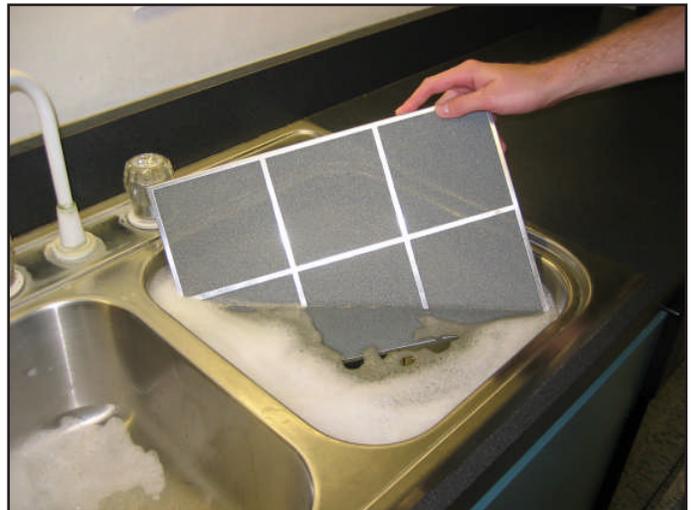
Vacuum method – A shop vacuum can be used to remove accumulated dust and debris.



Compressed air method – Use compressed air to blow out dust and debris in the opposite direction of the air flow on the charger.



Cold water rinse method – Dust and debris can be washed away using a garden hose.



Immersion in warm soapy water method – If dust and debris are difficult to remove using the other methods, dip the filter in a solution of warm, soapy water, then rinse it with clear water and let it stand until it is completely dry.

Procedure for Removing, Cleaning and Re-installing the Filters

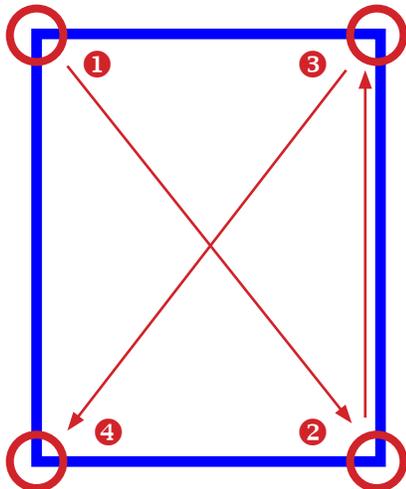
Back Filter

- A. Remove the screws securing the cover to the back side of the charger.

- B. Remove the cover – a spacer bracket and the filter are contained inside the cover.

- C. After cleaning the filter as shown on page 30, re-install the filter so the black side faces inward toward the charger, then re-install the spacer bracket.

- D. Re-install the cover onto the charger, and tighten the screws using a criss-cross pattern as shown below.



Front Filters

NOTE:

The procedure for removing and re-installing the front filter is identical to the back filter, but the front filter cover does not include a spacer bracket.

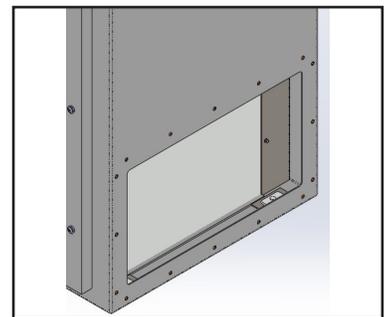
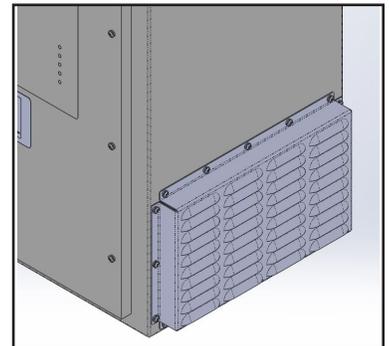
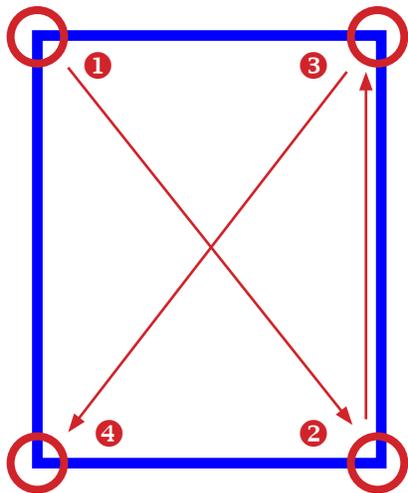
- A. Remove the screws securing the front cover.
- B. Remove the cover – the filter is contained inside.
- C. After cleaning the filter as shown on page 30, re-install the filter so the black side faces inward toward the charger.
- D. Re-install the cover onto the charger, and tighten the screws/bolts using a criss-cross pattern.

Side Filters

NOTE:

The procedure for removing and re-installing the side filter is identical to the back filter, but the side filter cover does not include a spacer bracket.

- A. Remove the screws securing the cover to the side of the charger.
- B. Remove the cover – the filter is contained inside the cover.
- C. After cleaning the filter as shown on page 30, re-install the filter so the black side faces inward toward the charger.
- D. Re-install the cover onto the charger, and tighten the screws using a criss-cross pattern as shown below.



6 – TROUBLESHOOTING

Sections 6.1 and 6.2 diagnose trouble with the DVS and provide codes of actions to be taken.

Section 6.3 describes the details of each action code listed in sections 6.1 and 6.2.

6.1 – Problem Symptoms, Probable Causes, and Action Codes.

This section relates problem symptoms to probable causes.

1. Find the symptom that best describes the problem in the first column.
2. Go through the probable causes in the second column.
3. Refer to the third column for the appropriate action corresponding to the probable cause.

Problem Symptom	Probable Cause(s)	Action Code
The display or LEDs do not illuminate.	There is no AC to the charger (power station). The AC input is mis-wired. The 120-VAC input fuse is blown.	D D C
One or more LEDs do not illuminate during the lamp test.	The LED(s) is (are) burnt out.	II
The display is illegible.	The environment is noisy. The control board is bad. There is corrosion on the internal components. The display connector is not properly seated.	E B EE II
The control panel is not responding to input.	The control board is bad. The environment is noisy. The membrane switch is damaged.	B E II
The charger (power station) does not start the charge when the battery is connected.	The output connector is not completely connected. The BMID is bad or reading out of range. The pilot line is disconnected. The control board is bad. The signal wiring is loose or incorrect. Corrosion is on the signal pins. The battery is over-discharged.	F G F B F EE K
The charger (power station) stops before the charge is completed.	The battery is overheating. The communication line is lost. A cell within the battery pack is bad. There is an algorithm/capacity mismatch. The charger (power station) is overheating. The BMID configuration is incorrect.	H, P F I J AA J

Problem Symptom	Probable Cause(s)	Action Code
The charger (power station) intermittently works.	The input or output wiring is loose. The BMID connections are loose. The local utility voltage is low. The internal components are corroded.	F F, G DD EE
The battery takes too long to charge.	There is an algorithm/capacity mismatch. The BMID is bad. The BMID wire is shorted or worn. The power cable or battery interconnection is loose. There is an SOC mismatch within the battery pack. The battery was too hot when the charge started. The battery was brought in at an extremely low SOC.	J G F Q I H, P K
The battery pack is failing to equalize.	The BMID is mis-programmed.	J
The output cables or connector is too warm during the charge.	The cable is undersized for the length and current of the charge. The connector is underrated for the charging current. The crimp or connection within the connector is bad. There is a short in the output cables. A cell within the battery pack is bad.	N N N F I
The battery does not last a full shift.	There is an algorithm/capacity mismatch. The equalization schedule is incorrect. The batteries are under-watered. A cell within the battery pack is bad. The BMID is bad. The charge cable was prematurely disconnected.	J O P I G F
The battery water usage is too high.	There is an algorithm/capacity mismatch. The equalization schedule is incorrect. The battery temperature is too high.	J O H, P
The battery temperatures are too high.	The interconnection between the batteries is loose. There is a battery pack/algorithm mismatch. The batteries are under-watered. There is a cell SOC mismatch. The temperature sensor was incorrectly installed.	Q J P I F, G
The charge connector arcs when disconnected.	The control board is bad.	B
The unit is noisy.	The sheet metal is loose. A fan blade or mount is loose. The transformer is noisy. The AC input is mis-wired.	R R A D

Problem Symptom	Probable Cause(s)	Action Code
There are excess fumes during charging.	The algorithm is overcharging the batteries. The batteries are under-watered.	J P
The history files are incorrect.	The control board is bad or noisy. The BMID is bad.	B G

6.2 – Fault and Warning Codes and Messages, Descriptions, and Action Codes

This section lists fault and warning codes and messages that may be displayed on the DVS front panel, corresponding descriptions of them, and corresponding action codes.

Fault or Warning Code	Fault or Warning Message	Description	Action Code
101	Logic Supply Failure	The logic power supply has failed.	B
103	ADC Ref Invalid	The A-to-D converter inputs are invalid.	B
106	PS1 Overvoltage	Power stage #1 (port A) voltage is too high.	S
107	PS1 Overcurrent	Power stage #1 (port A) current is too high.	T
108	PS1 Undercurrent	Power stage #1 (port A) current is too low.	U
109	PS1 Xstr Failure	Power stage #1 (port A) has a transistor failure.	V
110	PS1 General Failure	Power stage #1 (port A) has a current sensor fault.	W
111	PS1 Overtemp Failure	Power stage #1 (port A) temperature is too high.	Y
112	PS2 Overvoltage	Power stage #2 (port B) voltage is too high.	S
113	PS2 Overcurrent	Power stage #2 (port B) current is too high.	T
114	PS2 Undercurrent	Power stage #2 (port B) current is too low.	U
115	PS2 Xstr Failure	Power stage #2 (port B) has a transistor failure.	V

Fault or Warning Code	Fault or Warning Message	Description	Action Code
116	PS2 General Failure	Power stage #2 (port B) has a current sensor fault.	W
117	PS2 Overtemp Failure	Power stage #2 (port B) temperature is too high.	Y
118	DCBus VDC Too Low	The common DC bus voltage is too low.	X
119	DCBus VDC Too High	The common DC bus voltage is too high.	X
120	Nt Flt-lost Port X/Lost Main	Network Fault Lost Port X / Lost Main	GG
121	Network Cfg Failure	The Charger has invalid network Configuration.	GG
126	Temp Sensor Failure	The temperature sensor reading is invalid.	NN
129	Power Imbalance	There is a power stage power imbalance in 500-A mode.	JJ
132	Invalid Pilot on Port A	The battery is connected with an invalid pilot circuit.	MM
133	Chrg VDC Port A Low	The battery voltage is too low for the charger (power station).	Z
134	Chrg VDC Port A High	The battery voltage is too high for the charger (power station).	Z
135	BMID A Vbat Too Low	The battery voltage is too low for the BMID.	L
136	BMID VDC Too High	The battery voltage is too high for the BMID.	L

Fault or Warning Code	Fault or Warning Message	Description	Action Code
137	BMID BAT Over-Temp	The battery temperature is too high.	H
138	BMID Comm Fail Port A	The BMID link was lost after the charge started.	F
139	BMID Config Warning on Port A	The BMID is not adequately configured for charger (power station) usage.	M
142	BMID Temp Sensor Failure on Port A	The BMID temperature sensor is out of valid range.	G
143	Vbat Mismatch on Port A	The BMID and terminal voltages do not match.	KK
144	Battery Over-discharged on Port A	The battery is excessively discharged.	K
145	Early Charge Termination on Port A	The charge unexpectedly terminated.	BB
164	Invalid Pilot on Port B	The battery was connected with an invalid pilot circuit.	MM
165	Chrg VDC Port B Low	The battery voltage is too low for the charger (power station).	Z
166	Chrg VDC Port B High	The battery voltage is too high for the charger (power station).	Z
167	BMID B Vbat Too Low	The battery voltage is too low for the BMID.	L
168	BMID VDC Too High	The battery voltage is too high for the BMID.	L
169	BMID BAT Over-Temp	The battery temperature is too high.	H

Fault or Warning Code	Fault or Warning Message	Description	Action Code
170	BMID Comm Fail Port B	The BMID link was lost after the charge started.	F
171	BMID Config Warning on Port B	The BMID is not adequately configured for charger (power station) usage.	M
174	BMID Temp Sensor Failure on Port B	The BMID temperature sensor is out of valid range.	G
175	BMID B Vbat Mismatch	BMID and terminal voltages don't match.	KK
176	Batt Over-Discharge Port B	Battery Excessively discharged	K
177	Unexpected Charge Term Port B	Charge Terminated Unexpectedly	BB
178	Unauthorized Vehicle Attempted to Charge	Vehicle is not authorized to charge at this charger	NN
179	Cable Over-Temp	GBT Connector Temperature is too high	OO

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