PulseTech Products Corporation

MODEL DFC-12

DIAGNOSTIC CONDUCTANCE CHARGER

For testing and charging 12 Volt automotive, commercial, and marine batteries.

INSTRUCTION MANUAL

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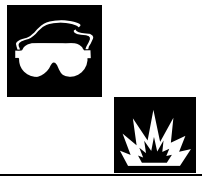
* * * PRECAUTIONS * * *

Always use the following precautions when working around batteries:

DANGER / POISON	
	**SHIELD EYES** **EXPLOSIVE GASES CAN CAUSE** **BLINDNESS OR INJURY**
	**NO SPARKS** **NO FLAMES**
	**SULFURIC ACID CAN CAUSE** **BLINDNESS OR SEVERE BURNS**

SAFETY INSTRUCTIONS

IMPORTANT: READ AND SAVE THIS SAFETY AND INSTRUCTION MANUAL. KEEP IT WITH OR NEAR CHARGER AT ALL TIMES.

1. IMPORTANT SAFETY INSTRUCTION

1.1 **WORKING IN THE VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION, AND WHEN DISCHARGED OR CHARGED. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT EACH TIME BEFORE USING YOUR CHARGER, YOU RE-READ THIS MANUAL AND MAKE CERTAIN YOU FULLY UNDERSTAND IT AND FOLLOW THE SAFETY AND OPERATING INSTRUCTIONS EXACTLY**.

1.2 To reduce risk of battery explosion, follow these safety instructions and those published by the battery manufacturer and the manufacturer of any equipment you intend to use in the vicinity of a battery. Review cautionary marking on these products and on engine, and on vehicle or equipment containing the battery.

1.3 **CAUTION:** To reduce the risk of injury, charge only rechargeable **LEAD-ACID TYPE** batteries which may include **MAINTENANCE-FREE, LOW-MAINTENANCE OR DEEP CYCLE** batteries. Other types of batteries may burst causing personal injury and damage.
If you are uncertain as to the type of battery you are attempting to charge, or the correct procedure for checking the battery's state of charge, contact the seller or battery manufacturer.

1.4 Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.

1.5 To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger.

1.6 Position AC and DC leads to avoid tripping over them and to prevent damage by hood, doors, or moving engine parts; protect from heat, oil, and sharp edges.

1.7 Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified service center.

1.8 Do not disassemble charger; take it to a qualified service center when repair is required. Incorrect reassembly may result in a risk of electric shock or fire.

1.9 If the charger is in need of service, call PulseTech at 1-800-776-1995 or 1-630-323-2800.

1.10 To reduce risk of electric shock, unplug charger from the AC outlet before attempting any maintenance or cleaning. Turning off the controls will not reduce this risk.

1.11 BOAT BATTERIES MUST BE REMOVED AND CHARGED ON SHORE. TO SAFELY CHARGE THEM ON BOARD REQUIRES EQUIPMENT ESPECIALLY DESIGNED AND UL LISTED FOR MARINE USE.

1.12 Connect and disconnect battery leads only when AC supply cord is disconnected.

1.13 Do not overcharge battery. (See Section 3)
1.14 When charging a battery, locate in a dry, well-ventilated area.
1.15 Never place articles on or around charger, or locate charger in a way that will restrict the flow of cooling air through cabinet.
1.16 An extension cord should not be used unless absolutely necessary. (See Section 4.3)
1.17 Have damaged cord or plug replaced immediately.
1.18 Do not expose charger to rain or snow.

2. PERSONAL PRECAUTIONS

2.1 Always have someone within range of your voice, or close enough to come to your aid, when working around lead acid batteries.
2.2 Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
2.3 Wear complete eye protection, clothing protection, and wear rubber soled shoes. Place damp cloth over battery to protect against acid spray. When ground is very wet or covered with snow, wear rubber boots. Avoid touching eyes while working near battery.
2.4 If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flush with running cold water for at least 10 minutes and get doctor's attention.
2.5 **NEVER** smoke or allow a spark or flame in vicinity of battery or engine.
2.6 Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short circuit the battery or other electrical part that may cause an explosion.
2.7 Before working with lead acid battery, remove personal metal items such as rings, bracelets, necklaces, watches, etc. A lead acid battery can produce a short circuit current high enough to weld such items causing a severe burn.
2.8 **CAUTION** – To reduce the risk of injury, charge only rechargeable LEAD ACID TYPE batteries which may include **MAINTENANCE FREE, LOW MAINTENANCE, OR DEEP CYCLE** batteries. Other types of batteries may burst causing personal injury and damage. The charger is not intended to supply power to a low-voltage electrical system other than applications using rechargeable, lead-acid type batteries. Do not use battery charger for charging dry-cell batteries commonly used with home appliances. These batteries may burst and cause personal injury and property damage.
2.9 NEVER charge a frozen battery, thaw it out first. Charging will then be safer and more efficient.

3. PREPARING TO CHARGE BATTERY

3.1 If necessary to remove battery from vehicle to charge, always remove grounded terminal from battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.
3.2 Be sure area around battery is well ventilated while battery is being charged. Gas can be forcefully blown away by using a piece of cardboard or other nonmetallic material as a fan.
3.3 Clean battery terminals. Be careful to keep corrosion from coming into contact with your eyes.
3.4 Add distilled water in each cell until battery acid reaches level specified by manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without caps, carefully follow the manufacturer's recharging instructions.
3.5 Study all battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.
3.6 Determine voltage of battery by referring to car owner's manual and make sure that the output voltage selector switch is set at correct voltage. If charger has adjustable charge rate, charge battery initially at lowest rate. If charger has only one voltage, verify that battery voltage matches voltage of charger. For a charger not having an output voltage selector switch, determine voltage of battery by referring to car owner's manual and make sure it matches output rating of battery charger.

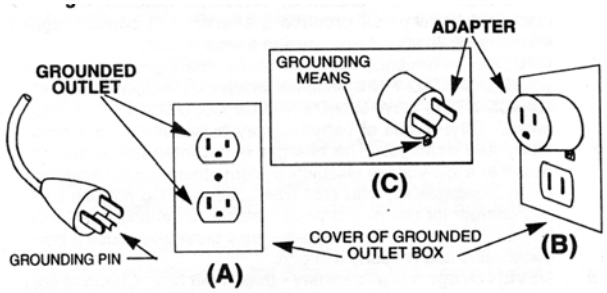
4. AC POWER CORD CONNECTION INSTRUCTIONS

4.1 Charger must be grounded to reduce risk of electric shock. Charger is equipped with an electric cord having an equipment grounding conductor and a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.
DANGER: NEVER ALTER AC CORD OR PLUG PROVIDED-IF IT WILL NOT FIT OUTLET, HAVE PROPER OUTLET INSTALLED BY A QUALIFIED ELECTRICIAN. IMPROPER CONNECTION CAN RESULT IN THE RISK OF AN ELECTRIC SHOCK.

4.2 This battery charger is for use on a nominal 120-volt circuit and has a grounding plug that looks like the plug illustrated in Figure A. A temporary adapter, which looks like the adapter illustrated in Figures B and C, may be used to connect this plug to a two-pole receptacle as sown in Figure B if a properly grounded outlet is not

available. The temporary adapter should be used only until properly grounded outlet can be installed by a qualified electrician.

DANGER: BEFORE USING ADAPTER AS ILLUSTRATED, BE CERTAIN THAT CENTER SCREW OF OUTLET PLATE IS GROUNDED. THE GREEN-COLORED RIGID EAR OR LUG EXTENDING FROM ADAPTER MUST BE CONNECTED TO A PROPERLY GROUNDED OUTLET – MAKE CERTAIN IT IS GROUNDED. IF NECESSARY, REPLACE ORIGINAL OUTLET COVER PLATE SCREW WITH A LONGER SCREW THAT WILL SECURE ADAPTER EAR OR LUG TO COVER PLATE AND MAKE GROUND CONNECTION TO GROUNDED OUTLET.



4.3 An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in a risk of fire and electric shock. If extension cord must be used, make sure:

a) That pins on plus of extension cord are the same number, size, and shape as those of plug on charger:
b) That extension cord is properly wired and in good electrical condition; and
c) That wire size is large enough for AC ampere rating of charger as specified in the following table:

RECOMMENDED MINIMUM WIRE SIZE FOR EXTENSION CORDS WHEN USED WITH BATTERY CHARGERS

AC INPUT RATING, AMPERES		WIRE SIZE, AWG			
Equal to or greater than...	But less than...	Length of Cord, Feet 25	50	100	150
8	10	16	14	10	8
10	12	16	12	10	8
12	14	16	12	10	8
14	16	14	12	8	8
16	18	14	12	8	6

5. CHARGER LOCATION

5.1 Locate charger as far away from battery as charger cables permit.
5.2 Never place charger directly above battery being charged; gases from battery will corrode and damage charger.
5.3 Never allow electrolyte to drip on charger when taking gravity readings or filling a battery.
5.4 Operate charger only in well ventilated area, free of dangerous vapors.
5.5 Store charger in safe, dry location and maintain in perfect condition.
5.6 Do not set battery on top of charger or where its acid might drip onto charger.

6. DC CONNECTION PRECAUTIONS

6.1 All switches should be set in **OFF** position and AC cord should be **DISCONNECTED** from electrical outlet before you connect and disconnect charger clamps. Never allow clamps to touch each other.
6.2 When attaching charger clamps, be certain to make the best possible mechanical as well as electrical connection. This will tend to prevent clamps from slipping off connections, avoid dangerous sparking, and assure safer and more efficient charging. Clamps should be kept clean.
CAUTION – Setting switches to **OFF** does not always disconnect charger electrical circuit from AC power cord or DC charger clamps.

7. BATTERY IN VEHICLE OR CONNECTION TO ENGINE

7.1 Before working on vehicle, firmly apply emergency brake and place gear shift to **NEUTRAL** – shift an automatic transmission to **PARK**.

7.2 Locate charger as far away from battery as charger cords permit and position AC and DC cords to avoid stepping on or tripping over them and to prevent damage by hood, doors, or moving engine parts.

7.3 Stay clear of fan blades, belts, pulleys, and any other parts the can cause physical injury.

7.4 Turn **OFF** all vehicle loads, including door lights, and correct any defects in car's electrical system that may have caused low battery.

7.5 Check polarity of battery posts. **POSITIVE (POS., P, +)** post usually has larger diameter than **NEGATIVE (NEG., N, -)** post.

7.6 Determine which post of battery is grounded (connected) to chassis. If negative post is grounded (as in most vehicles), see paragraph **7.7**. If positive post is grounded, see paragraph **7.8**.

7.7 For negative-grounded vehicle, first connect **POSITIVE (red)** clamp from charger to **POSITIVE (POS., P, +)** ungrounded post of battery. Then connect **NEGATIVE (BLACK)** clamp to vehicle chassis or engine block away from battery. **Do not connect clamp to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gauge metal part of frame or engine block**. When disconnecting charger, turn switches to **OFF**, disconnect AC cord, remove clamp from vehicle chassis, and then remove clamp from battery terminal.

7.8 For positive-grounded vehicle, connect **NEGATIVE (BLACK)** clamp from charger to **NEGATIVE (NEG., N, -)** ungrounded post of battery. Then connect **POSITIVE (RED**) clamp to vehicle chassis or engine block away from battery**. Do not connect clamp to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gauge metal part of frame or engine block.** When disconnecting charger, turn switches to **OFF**, disconnect AC cord, remove clamp from vehicle chassis, and then remove clamp from battery terminal. **CAUTION: WHEN POSITIVE (+) POST OF VEHICLE BATTERY IS GROUNDED, DOUBLE CHECK POLARITY.**

8. BATTERY OUTSIDE VEHICLE OR EQUIPMENT – NOT CONNECTED TO ENGINE

If necessary to remove battery from vehicle or equipment, always remove grounded terminal from battery first. **WARNING** – Make sure all vehicle loads are OFF to prevent a possible arc.
FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE. A SPARK NEAR BATTERY MAY CAUSE AN EXPLOSION. TO REDUCE RISK:

8.1 Check polarity of battery posts. **POSITIVE (POS., P, +)** post usually has larger diameter than **NEGATIVE (NEG., N, -)** post.

8.2 Attach at least a 24-inch 6 gauge insulated battery cable to **NEGATIVE (NEG., N, -)** battery post.

8.3 Connect **POSITIVE (RED)** charger clamp to **POSITIVE (POS., P, +)** post of battery.

8.4 Position yourself and free end of cable as far away from battery as possible – do not face battery when making final connection – then connect **NEGATIVE (BLACK)** charger clamp to free end of cable.

OPERATION

Visually inspect the battery before charging. If there are any signs of a leaking or cracked case, discard the battery. Do not attempt to charge a battery that is in this condition.

FRONT PANEL

Under the display, there are 5 push buttons and an ON/OFF switch.

The blue **UP/DOWN** buttons are used for scrolling through selections on the display and to increase/decrease displayed values.

The blue **ENTER** button is used to accept the displayed selection and to continue to the next step.

The blue **INFO** button is used to enter the options menu, which accesses the Charge Code, Last Test Data, and Language set-up.

The red **STOP** button is used to abort any charging cycle. <u>During menu selections, it can be used to go back to the previous step</u>.

BACK PANEL

The back panel contains the positive and negative charging cables, the AC power cord, and a 9-pin connector. <u>Note</u>: The 9-pin connector should only be used by authorized factory and service technicians. Improper use of this connector may result in permanent damage to the charger.

The handle, which attaches to the back panel, includes a <u>clamp-holder bar</u>. When used consistently, this feature adds safety, convenience and longer operating life to the clamps, cables, and charger.

OPERATING STEPS

<u>IMPORTANT NOTES</u>:

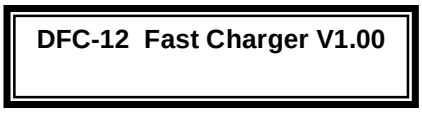
- **Clean the battery terminals. If stud adapters are required, fasten them with the proper tool. Do not use the battery clamps to tighten adapters.**
- **Stud adapters must be used on Side-Post and Group 31 batteries.**
- **Never remove the clamps from a battery to abort an active charging session. Always use the red STOP button before removing the clamps.**
- **Do not leave clamps laying in battery acid.**
- **Attach clamps to clamp-holder bar when the charger is not in use.**
- **Clean up any acid spills immediately (e.g. with baking soda and water).**
- **Clamps must be cleaned after every use.**
- **Never attach a cable to the 9-pin connector.**
- **Improper use of the 9-pin connector may result in permanent damage to the charger.**

1. <u>CONNECT CHARGER TO BATTERY</u>

Connect the DFC-12 charging clamps to the battery in accordance with all precautions and safety instructions (see sections 6, 7 and 8 under SAFETY INSTRUCTIONS).

2. CONNECT TO AC POWER

Plug the DFC-12 into a dedicated, grounded 15 Amp AC outlet. Do not use an AC line cord adapter or extension cord. Toggle the power switch to the ON position.



The user will be informed if any side of a charger clamp is not making full contact.

If you accidentally reverse the clamp connections, the DFC-12 will indicate this with a message and an audible alarm. Toggle the power switch to the OFF position and return to step 1.

3. SELECT CHARGING FUNCTION

Use the blue UP/DOWN buttons to select the type of function the DFC-12 will perform: Automatic Fast Charge, Manual Charge, or Jump Start Vehicle.

Press the blue ENTER button to continue.

AUTOMATIC FAST CHARGE

If the selected Charging Function was Automatic Fast Charge, use the blue UP/DOWN buttons to select the location of the battery: In Vehicle or Out of Vehicle.

Press the blue ENTER button to continue.

If the selected location for the battery was Out of Vehicle, go to step 4.

If the selected Battery Location was In Vehicle, use the blue UP/DOWN buttons to select the location for connecting the clamp: At Battery Post, At Jumper Post, or At Side Post.

Press the blue ENTER button to continue (go to step 4).

MANUAL CHARGE

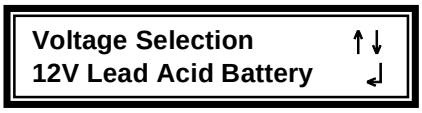
If the selected Charging Function was Manual Charge, go to step 4.

JUMP START VEHICLE

If the selected Charging Function was Jump Start Vehicle, see **CHARGING FUNCTIONS** - section **3. Jump Start Vehicle**.

4. SELECT BATTERY TYPE AND VOLTAGE

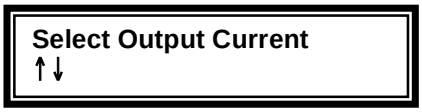
Use the blue UP/DOWN buttons to select the battery type and voltage: 12V Lead Acid Battery, 12V AGM/Spiral battery, 12V Group 31 - Truck.



Press the blue ENTER button to continue.

5. SELECT OUTPUT CURRENT (Manual Charge Only)

If the selected charging Function was Manual Charge, use the blue UP/DOWN buttons to select the desired output current: 10 Amp Mode, 30 Amp Mode, or 60 Amp Mode.



Press the blue ENTER button to continue.

6. SELECT BATTERY RATING UNITS

Use the blue UP/DOWN buttons to select the battery units: Use CCA Rating, Use CA Rating, Use MCA Rating, Use JIS Rating, Use DIN (A) Rating, Use SAE (A) Rating, Use IEC (A) Rating, Use EN (A) Rating.

Press the blue ENTER button to continue.

7. ENTER BATTERY RATING

Use the blue UP/DOWN buttons to enter the battery rating: from 100 to 1500 CCA.

Press the blue ENTER button to continue.

If the selected charging Function was Automatic Fast Charge, the charging cycle will begin. If the selected Charging Function was Manual Charge, go to step 8. See also **CHARGING FUNCTIONS** - section **1. Automatic Fast Charge**.

8. ENTER CHARGING TIME (Manual Charge Only)

If the selected charging Function was Manual Charge, use the blue UP/DOWN buttons to select the desired charging time: from 5 minutes up to 120 minutes.

Press the blue ENTER button to begin the timed charge.

Using the blue UP button past 120 minutes will select the Continuous Charge mode.

Press the blue ENTER button to begin the continuous charge. (The red STOP button is used to turn off continuous charging.) See also **CHARGING FUNCTIONS** - section **2. Manual Charge**.

CHARGING FUNCTIONS

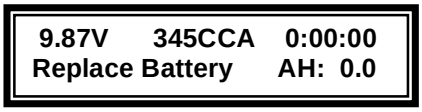
1. AUTOMATIC FAST CHARGE

The DFC-12 will control and supervise the entire charging session including: initial diagnostic testing, initial diagnostic charging, data analysis, charging duration, charging level, charging rate, trickle charging (when appropriate) and final diagnostic testing.

DIAGNOSTIC TESTING

The DFC-12 will quickly perform a number of tests to analyze the condition of the battery. While performing some initial diagnostic tests, the display may show a moving status bar.

If the analysis finds a battery to be bad, the DFC-12 stops and displays one of the following results: Replace Battery or Bad Cell Battery.

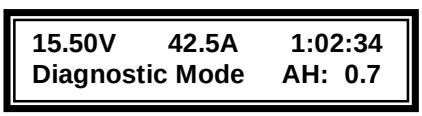


If the analysis finds a good battery with sufficient state-of-charge, the DFC-12 stops and displays the results.

DIAGNOSTIC CHARGING

If the analysis finds a battery with insufficient state-of-charge, the DFC-12 briefly displays the measured voltage and available starting current (in CCA or A), and then begins the diagnostic charging mode. This mode greatly enhances the DFC-12's ability to judge hard to diagnose batteries.

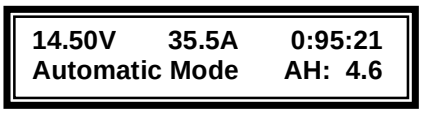
The length of time required for diagnostic charging varies, depending on the type of battery being charged. During this diagnostic mode (which does not exceed 5 minutes), the DFC-12 keeps the user informed by displaying the following information: charging voltage, charging current, remaining time to charge, charging mode, and the amount of charge put back into the battery (shown in amp-hours). Like diagnostic testing, during some parts of diagnostic charging, the display may show a moving status bar.



CHARGING

The DFC-12 controls the charging voltage and charging current based on its analysis of the battery and the battery information that was selected by the user. It continuously monitors the battery and analyzes the charging progress during the entire automatic charging session. In some cases, the DFC-12 may find a battery to be bad before the end of the estimated time to charge. In other cases, the DFC-12 may detect that the battery has charged more quickly than estimated. With either case, the DFC-12 will alert the user with an audible alarm and an appropriate message.

During charging, the DFC-12 keeps the user informed by displaying the following information: charging voltage, charging current, remaining time to charge, charging mode, and the amount of charge put back into the battery (shown in amp-hours).



Note: If at any time the DFC-12 needs to be stopped, press the red STOP button and the charging session will be aborted.

CHARGE COMPLETION

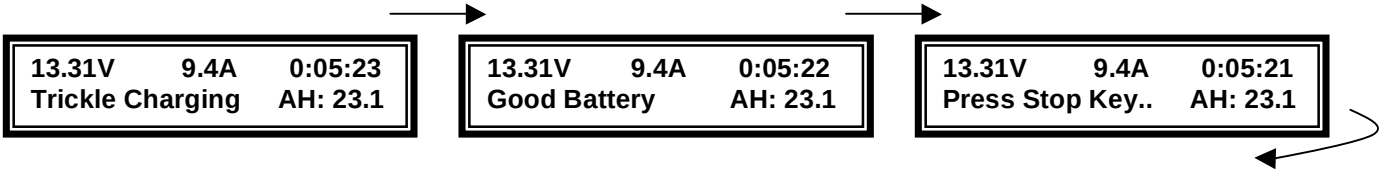
The automatic fast charge session is complete when the proper amount of charge is put back into the battery (remaining time to charge goes to zero). The DFC-12 will then perform its final diagnostic tests on the battery.

When the analysis is complete, the DFC-12 will alert the user with an audible alarm and will display the following information: battery voltage, available starting current (in CCA or A), total charging time, battery condition, and the final amount of charge put back into the battery (shown in amp-hours).

The audible alarm will sound every 30 seconds, until the user presses the red STOP button or disconnects the charger clamps from the battery.

TRICKLE CHARGING

When the DFC-12 detects that the battery has charged more quickly than estimated, the user is informed by an audible alarm and by the following cycled messages: Trickle Charging / Good Battery / Press Stop Key.. .



The DFC-12 will then lower the charging levels and trickle-charge the battery until the estimated, remaining time to charge is complete or until the user stops the charging session.

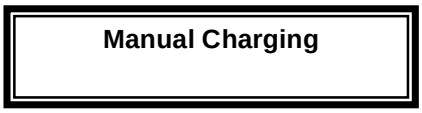
2. MANUAL CHARGE

The DFC-12 prompts the user to select the battery type and voltage, output current, battery rating units, battery rating, and charging time as described in OPERATING STEPS 4 - 8.

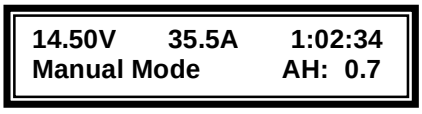
The DFC-12 charges the battery based on the voltage, current, and time that the user selects. It does not continuously monitor the battery nor analyze the charging progress in an effort to optimize charging levels or reduce charging time.

TIMED CHARGE

If a charging time is selected (between 5 and 120 minutes), the DFC-12 will charge at the selected levels and stop when time expires.



During charging, the DFC-12 keeps the user informed by displaying the following information: charging voltage, charging current, remaining time to charge, charging mode (Manual Mode), and the amount of charge put back into the battery (shown in amp-hours).



CHARGE COMPLETION

The manual charge session is complete when the selected, remaining time to charge goes to zero. The DFC-12 will measure and record the final parameters of the battery.

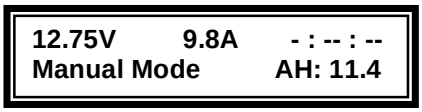
When the measurement is complete, the DFC-12 will alert the user with an audible alarm and will display the following information: battery voltage, available starting current (in CCA or A), total charging time, charging mode, and the final amount of charge put back into the battery (shown in amp-hours).

The audible alarm will sound every 30 seconds, until the user presses the red STOP button or disconnects the charger clamps from the battery.

CONTINUOUS CHARGE

If Continuous Charge is selected, the DFC-12 will charge at the selected levels until the user presses the red STOP button and stops the charging session.

During charging, the DFC-12 keeps the user informed by displaying the following information: charging voltage, charging current, charging mode (Manual Mode), and the amount of charge put back into the battery (shown in amp-hours).



When the STOP button is pressed, the DFC-12 will sound an audible alarm and display the following information: battery voltage, available starting current (in CCA or A), charging mode, and the final amount of charge put back into the battery (shown in amp-hours).

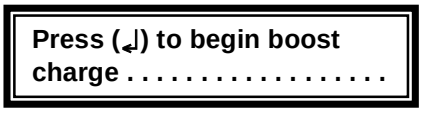
The audible alarm will sound every 30 seconds, until the user presses the red STOP button or disconnects the charger clamps from the battery.

Note: If the 60 Amp mode is selected for manual or continuous charging (see Operating Step 5.), the DFC-12 will automatically switch the output to the 30 Amp mode after one hour.

3. JUMP START VEHICLE

This charging function makes high output current available to boost charge an in-vehicle battery as well as assist in starting the engine.

The DFC-12 will prompt the user to begin boost charging the battery. This will greatly improve the ability to start the engine when it's time to crank the engine.



The DFC-12 informs the user that the battery is being boost charged. This process will take less than a minute.

When the DFC-12 determines the optimal time to crank the engine, it will inform the user. The user can crank the engine for up to 5 seconds.

The DFC-12 will inform the user when the jump start function is complete.

OPTIONS

The following options can be selected by pressing the blue INFO button as the first selection after the DFC-12 is turned on. Pressing the blue INFO button after a charge session has been completed (or aborted) will immediately display the Charge Code. To exit the Charge Code display and to access the other options, press the blue INFO button again.

1. VIEWING THE CHARGE CODE

A charge code can be viewed at the end of the charging session and anytime before the next charging session. A new charging code automatically overwrites the old charging code.

Press the blue INFO button.
Use the blue UP/DOWN buttons to select View Charge Code.

Press the blue ENTER button to display the Charge Code for the most recently completed charge session.

Press the blue INFO button to return to the Options menu.
Press the blue INFO button again to return to the Functions menu.

This code may be required for proper warranty processing. The charge code may be used to enforce warranty policy and to insure testing procedures are followed. Contact PulseTech for information regarding the optional decoder software.

2. VIEWING THE LAST TEST DATA

Press the blue INFO button.
Use the blue UP/DOWN buttons to select View Last Test Data.

Press the blue ENTER button to display the results for the most recently completed charge session.

The DFC-12 saves the following, final test data: battery voltage, available starting current (in CCA or A), total charging time, battery condition, and the final amount of charge put back into the battery (shown in amp-hours).

Press the blue INFO button to return to the Options menu.
Press the blue INFO button again to return to the Functions menu.

3. SELECTING THE DEFAULT LANGUAGE

Press the blue INFO button.
Use the blue UP/DOWN buttons to select Language.

Press the blue ENTER button to continue.

Use the blue UP/DOWN buttons to select a language: English, Español/Spanish, Français/French.

Press the blue ENTER button to save the new language selection, and to return to the Options menu.

Press the blue INFO button again to return to the Functions menu.

MAINTENANCE

Take proper care of your DFC-12.

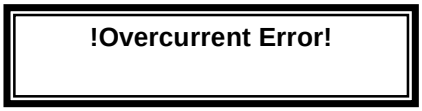
- Clean display with a standard window cleaning solution.
- Inspect and clean clamps on a regular basis (e.g. with a soft wire brush).
- Never allow clamps or cables to lay in battery acid.
- Clean up any acid spills immediately (e.g. with baking soda and water).

TROUBLE-SHOOTING

MESSAGES

1. The "Incorrect Voltage Error" message means that the user has made an incorrect menu selection (e.g. selected 12V but connected to 24V)or it means that the DFC-12 was connected across a battery voltage that the charger is not rated for.

2. The "!Overcurrent Error!" message means that a battery or vehicle electrical system has tried to draw too much current from the charger. Observe all ratings, limits, precautions and warnings. Check all connections and DFC-12 menu selections.



3. The "Part Number Corrupt!" message means that the information for a particular JIS battery number is corrupt. Except for testing with this JIS number, the DFC-12 is fully functional. Obtain the actual CCA rating for the battery and input this CCA value for "Battery Units" instead of using the JIS rating/JIS number.

4. The "Internal Memory Error" message means that an internal error has occurred in the charger and it should be sent back for service. See back page for details.

OPERATION

1. The ON/OFF switch is toggled to the on position but the charger does not power-up.
   a. Make sure the AC power cord is completely inserted into the AC outlet.
   b. Make sure the AC outlet is live (check fuse or circuit breaker).
   c. Check the AC power cord for damage.

2. The DFC-12 is on, the clamps are connected per Instruction Manual, but the display still shows "Check Connection".
   a. Make sure that both jaws of the charging clamp come in good contact with the connection point. "Check Connection" will remain on the display, as long as half of one clamp is not making good contact.

3. The DFC-12 is displaying messages in the wrong language.
   a. See the OPTIONS section of this manual (3. SELECTING THE DEFAULT LANGUAGE).

DFC-12 ASSEMBLY

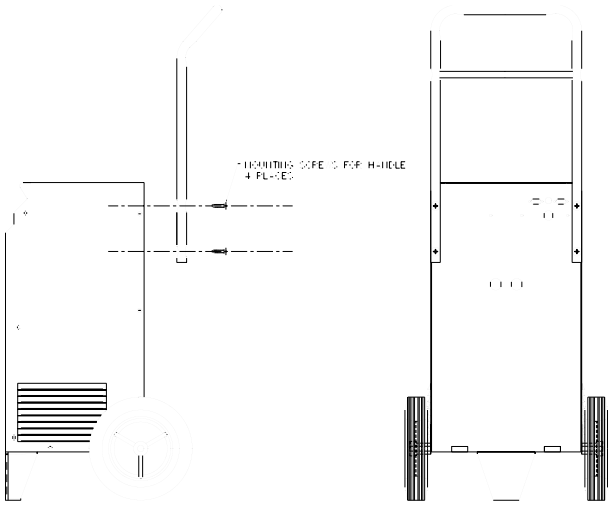
HANDLE INSTALLATION

CAUTION: THE DFC-12 MUST BE FULLY ASSEMBLED BEFORE OPERATING.

1. Locate the handle and hardware provided.

2. Position the handle, so that the angle faces away from the back of the DFC-12 and so that all mounting holes line up. Refer to the drawing.

3. Use all 4 screws to attach the handle to the back of the DFC-12.



NOTES

PATENTS

This charger is made in the U.S.A. and is protected by one or more of the following U.S. Patents: 6,172,505; 6,172,483; 6,163,156; 6,137,269; 6,104,167; 6,091,245; 6,081,098; 6,051,976; 6,037,777; 6,002,238; 5,945,829; 5,914,605; 5,831,435; 5,821,756; 5,757,192; 5,598,098; 5,592,093; 5,585,728; 5,574,355; 5,572,136; 5,343,380; 5,140,269; 4,912,416; 4,881,038; 4,825,170; 4,816,768; Canadian patents: 2,091,262; 1,295,680; 1,280,164; United Kingdom patents: 0,672,248; 0,417,173; German patents: P693 25 388.6; P689 23 281.0-08; European patent: 0,548,266; Japanese patent: 3006800; and other U.S. and Foreign patents issued and pending. This product may utilize technology exclusively licensed to Midtronics, Inc., by Johnson Controls, Inc., and/or Motorola, Inc.

SERVICE

To obtain service, purchaser should contact PulseTech for a Return Authorization number, attach a copy of proof of purchase, and return the unit to PulseTech Products Corporation, Attention: Service Department / RA #_____, 1100 South Kimball Ave., Southlake, Texas 76092. If PulseTech determines that the failure was caused by misuse, alteration, accident, or abnormal condition of operation or handling, you will be contacted for approval to be billed for repair of the product at current service repair rates. It will be returned freight prepaid. Battery chargers beyond the warranty period are also subject to the current service repair rates plus shipping and handling charges. Optional remanufacturing service is available with a six month warranty. Ask your customer service representative for information and RA#, 1-800-580-7554.

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