POWERED BY SCHUMACHER

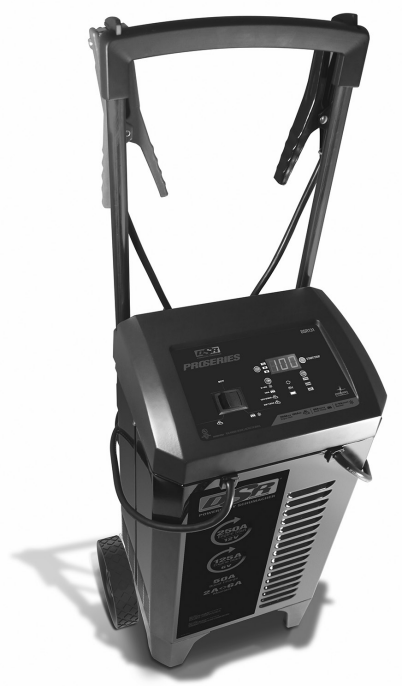
PROSERIES™

MODEL

DSR131

Battery Charger & Engine Starter

OWNERS MANUAL



PLEASE SAVE THIS OWNERS MANUAL AND READ BEFORE EACH USE.
This manual will explain how to use the battery charger safely and effectively. Please read and follow these instructions and precautions carefully.

1. IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS.

1.1 SAVE THESE INSTRUCTIONS – This manual contains important safety and operating instructions.

1.2 This charger is not intended for use by children.

1.3 Do not expose the charger to rain or snow.

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

1.6 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 an extension cord must be used, make sure:

- The pins on plug of extension cord are the same number, size and shape as those of plug on charger.
- The extension cord is properly wired and in good electrical condition.
- The wire size is large enough for AC ampere rating of charger as specified in section 8.

1.7 Do not operate charger with damaged cord or plug – replace the cord or plug immediately.

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

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

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

1.11 WARNING: RISK OF EXPLOSIVE GASES.

a. WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT YOU FOLLOW THE INSTRUCTIONS EACH TIME YOU USE THE CHARGER.

b. To reduce risk of battery explosion, follow these instructions and those published by battery manufacturer and manufacturer of any equipment you intend to use in vicinity of battery. Review cautionary markings on these products and on engine.

2. PERSONAL SAFETY PRECAUTIONS

2.1 Consider having someone close enough by to come to your aid when you work near a lead-acid battery.

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 and clothing protection. 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 flood eye with running cold water for at least 10 minutes and get medical attention immediately.

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 battery or other electrical part that may cause explosion.

2.7 Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.

2.8 Use charger for charging LEAD-ACID (STD, AGM or GEL) rechargeable batteries with recommended rated capacities of 12Ah (6V) and 22-59Ah (12V). It is not intended to supply power to a low voltage electrical system other than in a starter-motor application. Do not use battery charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.

2.9 NEVER charge a frozen battery.

2.10 WARNING: This product contains one or more chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

3. PREPARING TO CHARGE

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.

3.3 Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.

3.4 Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. Do not overfill. For a battery without removable cell caps, such as valve regulated lead acid batteries, carefully follow manufacturer's recharging instructions.

3.5 Study all battery manufacturer's specific precautions while charging and recommended rates of charge.

3.6 Determine voltage of battery by referring to car owner's manual and make sure that output voltage selector switch is set at correct voltage. If charger has adjustable charge rate, charge battery initially at lowest rate.

4. CHARGER LOCATION

4.1 Locate charger as far away from battery as DC cables permit.

4.2 Never place charger directly above battery being charged; gases from battery will corrode and damage charger.

4.3 Never allow battery acid to drip on charger when reading electrolyte specific gravity or filling battery.

4.4 Do not operate charger in a closed-in area or restrict ventilation in any way.

4.5 Do not set a battery on top of charger.

5. DC CONNECTION PRECAUTIONS

5.1 Connect and disconnect DC output clips only after setting any charger switches to "off" position and removing AC cord from electric outlet. Never allow the clips of charger to touch each other. Clips may be energized and they may spark.

5.2 Attach clips to battery and chassis, as indicated in sections 6 and 7.

6. FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE

WARNING: A SPARK NEAR THE BATTERY MAY CAUSE A BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:

6.1 Position AC and DC cords to reduce risk of damage by hood, door, or moving engine part.

6.2 Stay clear of fan blades, belts, pulleys, and other parts that can cause injury to persons.

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

6.4 Determine which post of battery is grounded (connected) to the chassis. If negative post is grounded to chassis (as in most vehicles), see (6.5). If positive post is grounded to the chassis, see (6.6).

6.5 For negative-grounded vehicle, connect POSITIVE (RED) clip from battery charger to POSITIVE (POS, P, +) ungrounded post of battery. Connect NEGATIVE (BLACK) clip to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.

6.6 For positive-grounded vehicle, connect NEGATIVE (BLACK) clip from battery charger to NEGATIVE (NEG, N, –) ungrounded post of battery. Connect POSITIVE (RED) clip to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.

6.7 When disconnecting charger, turn switches to off, disconnect AC cord, remove clip from vehicle chassis, and then remove clip from battery terminal.

6.8 See *Operating Instructions* for length of charge information.

7. FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE

WARNING: A SPARK NEAR THE BATTERY MAY CAUSE A BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:

7.1 Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has a larger diameter than NEGATIVE (NEG, N, –) post.

7.2 Attach at least a 24-inch-long 6-gauge (AWG) insulated battery cable to NEGATIVE (NEG, N, –) battery post.

7.3 Connect POSITIVE (RED) charger clip to POSITIVE (POS, P, +) post of battery.

7.4 Position yourself and free end of cable as far away from battery as possible – then connect NEGATIVE (BLACK) charger clip to free end of cable.

7.5 Do not face battery when making final connection.

7.6 When disconnecting charger, always do so in reverse sequence of connecting procedure and break first connection while as far away from battery as practical.

7.7 A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use.

8. GROUNDING AND AC POWER CORD CONNECTIONS

8.1 This battery charger is for use on a nominal 120 volt circuit and has a grounded plug. The charger must be grounded, to reduce the risk of electric shock. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances. The plug pins must fit the receptacle (outlet). Do not use with an ungrounded system.

8.2 **DANGER:** Never alter the AC cord or plug provided – if it does not fit the outlet, have a proper grounded outlet installed by a qualified electrician. An improper connection can result in a risk of an electric shock or electrocution.

NOTE: Pursuant to Canadian Regulations, use of an adapter plug is not allowed in Canada. Use of an adapter plug in the United States is not recommended and should not be used.

8.3 USING AN EXTENSION CORD

The use of an extension cord is not recommended. If you must use an extension cord, follow these guidelines:

- Pins on plug of extension cord must be the same number, size, and shape as those of plug on charger.
- Ensure that the extension cord is properly wired and in good electrical condition.
- Wire size must be large enough for the AC ampere rating of charger, as specified:

Length of cord (feet)	25	50	100	150
AWG* size of cord	16	12	10	8

*AWG-American Wire Gauge

9. ASSEMBLY INSTRUCTIONS

9.1 Remove all cord wraps and uncoil the cables prior to using the battery charger.

9.2 Extend the handle from the retracted position by pulling it upward until it locks into place. (Press the small silver buttons inward, if necessary.)

10. CONTROL PANEL

ON/OFF SWITCH

Use this switch to select between the CHARGE/MAINTAIN rate, BOOST rate and the ENGINE START mode.

OFF – When the switch is in this position (middle), the charger is turned off.

BOOST or CHARGE/MAINTAIN – When the switch is in this position, the Rate Selection button can be set to either the 6<>2A Charge/Maintain or the 50A Boost setting.

ENGINE START – When the switch is in this position, the Rate Selection button can be set to either 12V/250A or 6V/125A Engine Start mode. The corresponding rate selection LED will illuminate for each Engine Start Mode.

DIGITAL DISPLAY

The Digital Display gives a digital indication of voltage, amperage, and battery %. It always starts in Voltage mode, but can be switched to a different mode by pressing the Display button as shown below:

Boost mode:
Voltage > OFF > Amperage…

Charge/Maintain mode:
Voltage > OFF > Battery Percentage > Amperage…

Engine Start mode:
Voltage (No Amperes or Battery Percentage Mode) If the process is stopped on any mode (by pressing the START/STOP button), the display will show “OFF”.

NOTE: When in Charge/Maintain mode, the display will automatically go into sleep mode (shut-off) after 2 minutes. To turn the display back on, press any push-button.

DISPLAY BUTTON

Use this button to set the function of the digital display to one of the following:

(Battery %) – The digital display shows an estimated charge percentage of the battery connected to the charger’s battery clamps, when charging.

(Amps) – The display shows the output current, in amps.

(Voltage) – The Digital Display shows the voltage at the charger battery clamps, in DC volts, while idling. The auto detection voltage, 6 or 12, will be displayed while boosting/charging.

START/STOP BUTTON

Use this button to start or stop the charging or boosting process, after the battery is properly connected and an output or rate has been selected.

RATE SELECTION BUTTON

When in Boost or Charge/Maintain mode, use this button to select one of the following rates:

50A Boost
For quickly adding energy to a severely discharged or large capacity battery.

6<>2A Charge/Maintain
For charging small and large batteries.

When in Engine Start mode,
use this button to select one of the following rates:

12V/250A Engine Start –
Provides 250A of engine start capabilities for 12V battery systems.

6V/125A Engine Start –
Provides 125A of engine start capabilities for 6V battery systems.

LED INDICATORS

LEDs light to indicate the following:

– The Digital Display shows the percentage of the battery.

– The Digital Display shows the output current, in Amps.

– The Digital Display shows the battery voltage.

Charge/Maintain – The charger is in 6<>2A Charge/Maintain mode.

Boost – The charger is in 50A Boost mode.

12V Engine Start – The charger is in the 12V Engine Start mode.

6V Engine Start – The charger is in the 6V Engine Start mode.

ON – The charger has detected that a battery is connected, and is performing the selected operation.

Charged/Maintaining –
The battery is fully charged and the charger is in maintain mode.

Reversed Clamps –
The connections are reversed.

NOTE: See *Operating Instructions* for a complete description of the charger modes.

BATTERY TYPE BUTTON

Use this button to select the type of battery.

STD – Used in cars, trucks and motorcycles, these batteries have vent caps and are often marked “low maintenance” or “maintenance-free”. This type of battery is designed to deliver quick bursts of energy (such as starting engines) and has a greater plate count. The plates are thinner and have somewhat different material composition. Standard batteries should not be used for deep-cycle applications.

AGM – The Absorbed Glass Mat construction allows the electrolyte to be suspended in close proximity with the plate’s active material. In theory, this enhances both the discharge and recharge efficiency. The AGM batteries are a variant of Sealed VRLA (valve regulated lead-acid) batteries. Popular uses include high-performance engine starting, power sports, deep-cycle, solar and storage batteries.

GEL – The electrolyte in a GEL cell has a silica additive that causes it to set up or stiffen. The recharge voltages on this type of cell are lower than those for other styles of lead-acid battery. This is probably the most sensitive cell in terms of adverse reactions to overvoltage charging. Gel batteries are best used in VERY DEEP cycle application and may last a bit longer in hot weather applications. If the wrong battery charger is used on a gel cell battery, poor performance and premature failure will result.

11. OPERATING INSTRUCTIONS

CHARGING THE BATTERY

Keep in mind: when charging a battery, the more a battery is discharged, the faster it absorbs charge from the charger. In other words, it takes longer for the battery to absorb the last few percents of charge than the first several percents.

WARNING: When the START button is pressed in either Boost mode, Charge/Maintain mode or Engine Start mode, the clamps are energized and will spark if touched together. A spark near the battery may cause an explosion.

NOTE: A marine (boat) battery must be removed and charged on shore.

Boost or Charge/Maintain Mode

1. Place battery in a well-ventilated area.
2. Clean the battery terminals.
3. Set the switch to the OFF position.
4. Connect the battery, following the precautions listed in sections 6 and 7.
5. Connect the charger to the electrical outlet.
6. With the charger plugged in and connected to the battery of the vehicle, set the switch to the Boost/Charge/Maintain position.
7. Select the Charge/Maintain rate and the battery type.
   - If the voltage of the battery is under 12.7V, the unit will automatically switch to BOOST mode when the Start button is pressed. When the unit automatically switches to Boost mode, the 50A Boost LED will light. When the automatic Boost mode is completed, the unit will automatically switch to the Charge/Maintain rate and complete the charge.
   - If the unit doesn't automatically switch to Boost Mode when the Start button is pressed, you can manually put the unit into the Boost mode. Press the Rate Selection button until the 50A Boost LED lights. If the battery is properly connected the ON LED will light solid and the boosting process will start. Boost mode will remain energized until the Rate Selection button is pressed or the main ON/OFF switch is set to the OFF position. The unit will not automatically switch to the Charge/Maintain rate to complete the charge.
8. Press the START button.
   - If the unit automatically switches to the Boost, but the 6<>2A Charge/Maintain rate is preferred, press the Rate Selection button (while still boosting) until the Charge/Maintain LED is illuminated.
9. To stop the charging process, press the STOP button, set the ON/OFF switch to the OFF position and disconnect the charger from the AC outlet and battery, as explained in sections 6 and 7.

BATTERY CHARGING TIMES

APPLICATION	BATTERY SIZE	CHARGING TIME (Hours) 2A	6A	8A	10A
POWERSPORTS	6Ah	6	2	1.75	1.5
	32Ah	15	5	4.5	4
AUTOMOTIVE	300 CCA	12	4	3.5	3
	1000 CCA	30	10	8.5	7
MARINE	50Ah	15	5	4.25	3.5
	105Ah	33	11	9.5	8

Times are based on a 50% discharged battery and may change, depending on age and condition of battery.

USING THE ENGINE START FEATURE

Your battery charger can be used to jump start your car if the battery is low.

IMPORTANT: Follow the same safety instructions and precautions as when charging the battery. Wear complete eye protection and clothing protection. Charge your battery in a well-ventilated area.

WARNING: Using the ENGINE START feature WITHOUT a battery installed in the vehicle will damage the vehicle's electrical system.

NOTE: If the engine turns over but never starts, there is not a problem with the starting system; there is a problem somewhere else with the vehicle. STOP cranking the engine until the other problem has been diagnosed and corrected.

NOTE: During extremely cold weather, or if the battery is under two volts, first boost the battery in 50A Boost mode for at least several minutes before using the Engine Start feature.

NOTE: If you have charged the battery and it still will not start your car, do not use the Engine Start feature, or it will damage the vehicle's electrical system. Have the battery checked.

Engine Start Mode

1. Set the ON/OFF switch to the OFF (center) position.
2. Connect the charger to the battery and AC power, as explained in sections 6 and 7.
3. With the charger plugged in and connected to the battery of the vehicle, set the ON/OFF switch to the Engine Start position. If the battery is properly connected, the yellow/orange Engine Start LED will light solid and the display will show the current voltage of the battery. If the display shows "0.0", check the battery connections.
4. Use the Rate Selection button to select either the 12V Engine Start or 6V Engine Start rate.
5. Press the START button to enable the Engine Start output. The display will show "On".
6. When the Digital Display shows "rdY", crank the engine until it starts or 5 seconds pass. If the engine does not start within 5 seconds, wait 45 seconds before attempting to crank the engine again.

NOTE: After 3 minutes in Engine Start mode, the charger will allow the charger and the battery to cool down for 180 seconds. If the engine fails to start, use the 50A Boost mode to put energy into the battery for several minutes before attempting to crank the engine again.

7. After the engine starts, press the STOP button, set the ON/OFF switch to the OFF (center) position, unplug the AC power cord and finally disconnect the battery clamps from the vehicle, as explained in sections 6 and 7.
8. Clean and store the charger in a dry location.

ABORTED CHARGE

If charging cannot be completed normally, charging will abort. When charging aborts, the charger's output is shut off, and the display will show "bAd bAt" and an error code. Do not continue attempting to charge this battery. Have it checked or replaced.

DESULFATION MODE

The display will show "SUL" when a sulfated battery is detected, and the charger will go into desulfation mode. If the desulfation is not successful after 10 hours, the charger will go into abort mode and the display will show "bAd / bAt / F02".

COMPLETION OF CHARGE

Charge completion is indicated by the CHARGED/MAINTAINING (green) LED. When lit, the charger has switched to the maintain mode of operation.

MAINTAIN MODE (FLOAT MODE MONITORING)

When the CHARGED/MAINTAINING (green) LED is lit, the charger has started maintain mode. In this mode, the charger keeps the battery fully charged by delivering a small current when necessary. If the charger has to provide its maximum maintain current for a continuous 12 hour period, it will go into abort mode (see *Aborted Charge* section). This is usually caused by a drain on the battery or the battery could be bad. Make sure there are no loads on the battery. If there are, remove them. If there are none, have the battery checked or replaced.

MAINTAINING A BATTERY

The DSR131 charges and maintains 6V and 12 volt batteries, keeping them at full charge.

NOTE: The maintain mode technology allows you to safely charge and maintain a healthy battery for extended periods of time. However, problems with the battery, electrical problems in the vehicle, improper connections or other unanticipated conditions could cause excessive current draws. As such, occasionally monitoring your battery and the charging process is required.

FAN OPERATION

It is normal for the fan to be on all of the time. Keep the area near the charger clear of obstructions to allow the fan to operate efficiently.

12. MAINTENANCE AND CARE

A minimal amount of care can keep your battery charger working properly for years.

- Clean the clamps each time you are finished charging. Wipe off any battery fluid that may have come in contact with the clamps to prevent corrosion.
- Occasionally cleaning the case of the charger with a soft cloth will keep the finish shiny and help prevent corrosion.
- Coil the input and output cords neatly when storing the charger. This will help prevent accidental damage to the cords and charger.
- Store the charger unplugged from the AC power outlet in an upright position.
- Store inside, in a cool, dry place. Do not store the clamps on the handle, clipped together, on or around metal, or clipped to the cables.

13. TROUBLESHOOTING AND ERROR CODES

Error Codes

CODE	DESCRIPTION	REASON/SOLUTION
bAd bAt F01	The battery voltage is still under 10V (for a 12V battery) or 5V (for a 6V battery) after 2 hours of charging.	The battery could be bad. Have it checked or replaced.
SUL	The charger has detected a sulfated battery.	The charger will go into desulfation mode. If the desulfation is not successful after 10 hours, the charger will go into abort mode.
bAd bAt F02	The charger cannot desulfate the battery.	The battery could not be desulfated; have it checked or replaced.
F03	The battery was unable to reach the “full charge” voltage.	May be caused by trying to charge a large battery or bank of batteries on too low of a current setting. Try again with a higher current setting or have the battery checked or replaced.
F04	The connections to the battery are reversed.	The battery is connected backwards. Unplug the charger and reverse the connections to the battery.
bAd bAt F05	The charger was unable to keep the battery fully charged in maintain mode.	The battery won’t hold a charge. May be caused by a drain on the battery or the battery could be bad. Make sure there are no loads on the battery. If there are remove them. If there are none, have the battery checked or replaced.
F06	The charger detected that the battery may be getting too hot (thermal runaway).	The charger automatically shuts the current off if it detects the battery may be getting too hot. Have the battery checked or replaced.

If you get an error code, check the connections and settings and/or replace the battery.

Troubleshooting

PROBLEM	POSSIBLE CAUSE	SOLUTION
Charger will not turn on when properly connected.	AC outlet is dead.	Check for open fuse or circuit breaker supplying AC outlet.
	Poor electrical connection.	Check power cord and extension cord for loose fitting plug.
	Battery is defective.	Have the battery checked.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Engine start does not work.	Drawing more than the Engine Start rate.	Crank time varies with the amount of current drawn. If cranking draws more than the Engine Start rate, crank time may be less than 5 seconds.
	Failure to wait 3 minutes (180 seconds) between cranks.	When the Engine Start LED blinks, wait 3 minutes of rest time before the next crank.
	The charger may be overheated.	The thermal protector may have tripped and needs a little longer to reset. Make sure the charger vents are not blocked. Wait and try again.
	Battery may be severely discharged.	On a severely discharged battery, use the 50A Boost rate for 10 to 15 minutes, to help assist in cranking.
The display shows "bAd / bAt / F01".	The battery voltage is still below 10V (for a 12V battery) or 5V (for a 6V battery) after 2 hours of charging.	The battery may be defective. Make sure there are no loads on the battery. If there are, remove them. If there are none, have the battery checked or replaced.
The display shows "bAd / bAt / F02".	Desulfation was unsuccessful, after 10 hours.	The battery may be defective. Have battery checked or replaced.
The display shows "bAd / bAt / F05".	Lack of progress is detected after 12 hours in Maintain mode.	The battery won't hold a charge. May be caused by a drain on the battery or the battery could be bad. Make sure there are no loads on the battery. If there are remove them. If there are none, have the battery checked or replaced.

14. SPECIFICATIONS

UL

Input .....120V AC @ 60Hz, 11A continuous, 50A intermittent

Output ..... 6/12V DC, 6A; 50A int., 60 sec. max on, 180 sec. min off
6/12V DC, 125/250A int., 5 sec. max. on, 180 sec. min. off

cUL

Input .....120V AC @ 60Hz, 11A continuous, 50A intermittent

Output ..... 6/12V DC, 6A; 35A int., 60 sec. max on, 180 sec. min off
6/12V DC, 125/220A int., 5 sec. max. on, 180 sec. min. off