July 2021

SAFETY AND OPERATING INSTRUCTIONS

DUAL VOLTAGE 12/24 POWER PACK

Model Nato 175DM and Nato 200DM

Fitted with Short Circuit Protection

1. The Nato 175DM and Nato 200DM portable engine starter packs have separate 12 volt and 24 volt outputs. The internal components are protected against accidental short circuit by 750 amp fuses, mounted externally on the 12 volt and 24 volt positive (+) outputs. Designed primarily for the instant starting of all engines with 24 volt electrical systems, including heavy trucks, armoured vehicles, tanks and machinery, the Nato 175DM and Nato 200DM also have a 12 volt output designed to start 12 volt gasoline engines and smaller 12 volt pick-ups, jeeps or personnel carriers.

2. Housed in a tough slim mild steel case, with Nato green powder coat finish the portable starter pack has two ultra high discharge sealed, maintenance free batteries. Two identical isolator switches control power to the 12 volt and 24 volt end mounted polarised heavy duty sockets located at opposite ends of the power pack.

3. Re-charging of the internal cells, is from an auto-selecting 110v/220v single phase miniaturised internal charger which connects to the electrical supply by a standard IEC mains “computer/kettle” lead.

4. **IMPORTANT: HEALTH AND SAFETY AT WORK**

This portable power pack is designed to deliver up to 18 kilowatts of instant power for short periods. It is extremely powerful using military aerospace technology. It is designed for the professional operator and should be used only by personnel who have received instruction on the correct operating procedures. Failure to follow the correct procedures or to take adequate precautions can cause damage to the disabled vehicle’s batteries or electrical systems which could result in injury to the operator and damage to the equipment. Lift pack with care, weight exceeds 20 kgs.

5. **BEFORE USE**

Read, note and understand the following operating procedures and ensure all users of the equipment are made fully aware of these instructions. Before use this pack should be top up charged for 12 hours

6. Your pack has two independent circuits, operated via individual key switches. The pack is fitted with reverse polarity warning and anti-surge suppression. 12 volt or 24 volt starting is obtained by inserting the key into either the 12 volt or 24 volt isolator switch and turning the key 90°.

7. **SAFETY**

- When not being used, always disconnect and remove the output leads from the Power Pack.
- Never short circuit the equipment - check that battery terminals or bare leads etc are not touching the chassis.
- Before operating isolator switch check and verify polarity is correct from jump leads to vehicle or plant battery leads or terminals.
- Never, under any circumstances, boost charge the Power Pack - only charge the Power Pack when it is disconnected from all external batteries.
- Use only the charger lead supplied by us and the internal charger system which is set and regulated to maximise battery life and cannot overcharge the unit.

8. **CORRECT OPERATING PROCEDURE**

8.1 Select the 12 or 24 volt outlet. Insert the jump leads into the outlet connector of the pack pushing it firmly into the pack so that the contacts are fully engaged.

8.2 If using crocodile clips, connect the jump leads to the correct battery output terminals of the disabled engine that requires starting.

8.3 **NOTE CAUTION**:

This pack has an audible reverse polarity alarm. It also has short circuit protection, which will protect the internal wiring and batteries. Excessive load above 750 amps or a direct short circuit will melt the 750 amp fuse. This will break the connection to the outlet plug. The fuse will require replacing before using the pack with the same voltage selected.

8.4 If the leads have been correctly connected to the vehicle battery, “positive +” lead to “positive +” output terminal, “negative -” lead to “negative -” output terminal, switch on pack by inserting the isolator key and turning it through 90°. If in doubt about connections, verify that leads are correctly connected as follows: with pack switched off swap over croc clips from battery terminals, buzzer sounds if connection is not correct: (reverse polarity) (in either 12 volt or 24 volt operation).

8.5 With pack switched on, the crocodile leads are now live and the engine may be cranked immediately. Where applicable always allow preheaters to operate and on completion of preheat cycle, engage starter. Once the engine has fired and is idling smoothly, switch off the pack by turning and removing the isolator key which will cut the power to the crocodile leads.

8.6 **VOIDING OF WARRANTY**: Your portable starter pack is one of the most powerful available to professional users.

Do not crank continuously for more than 15 seconds. Wait 2 minutes before trying again. **NOTE**: Excessive cranking can produce massive heat generation within the pack and may lead to cell failure. If engine fails to partially fire after 15 seconds, cease cranking and wait and investigate. Remember, the pack can deliver in excess of 18000 watts of instant cranking performance. Use with caution – cell distortion, or overheating are signs of abuse and are not covered by warranty.

9. **WARNING**

NOTE: Crocodile clips must always be connected and removed with the isolator switch in the "off" position. Under no circumstances should live leads be connected or removed from any vehicle, plant or engine. This practice is dangerous and may result in damage to sensitive engine electronic circuits and may cause injury to the operator.

10. **REVERSE POLARITY/CORRECT POLARITY WARNING DEVICE**

10.1 **Reverse Polarity**:

Connecting the crocodile clips to a battery where the polarity is incorrect will result in an audible warning in either 12 volt or 24 volt mode, providing a minimum of power still remains in the flat battery. Should the audible warning sound, then under no circumstances should the pack be switched on. Instead, the crocodile clips should be removed and replaced in the correct position ie positive to positive and negative to negative.

10.2 **WARNING**

Short Circuit

This pack is fitted with short circuit protection. However, if in doubt seek assistance with connections. Do not switch on pack if unsure. Short circuiting will melt the 750 amp safety fuse. However, damage may be caused to vehicle wiring and sensitive electronic equipment by the action of short circuit before the fuse protection operates and disconnect the power from the portable starter pack.

11. **PACK STOWAGE AND TRANSPORTATION**

11.1 After use, the pack must be switched off by removing the key from the isolator switch.

11.2 Once the switch has been turned off the crocodile lead set or Nato plug and cable must be disconnected from the 12 or 24 volt outlet by grasping the outlet connector firmly in one hand and the pack in the other and removing it by pulling it smartly.

11.3 **Avoid cell distortion and cell failure**: The pack is now safe for transportation or stowage. NOTE: After very heavy cranking, power cells will become warm, wait at least 1 hour before connecting charge lead to mains.

12. **NOTE**

Whatever the method of “jump starting” a vehicle, there is always the remote possibility that the batteries have failed due to open circuit. Removing any jump leads in these circumstances may cause failure of the alternator since removing the Power Pack is the same as running a vehicle without a battery.

12.2 **Anti-surge (ECU) protection circuit:**

Removing any remote battery system, charger or jump leads from a vehicle while the engine is running may create a small spark. The voltage associated with the spark or “arc” can be much higher than the battery voltage and in extreme cases can cause component failure within an engine management system or fire control system on military armour, commercial vehicles or heavy plant. The unit has an antisurge suppression circuit to guard against surge and can be switched off with the engine running.

12.3 If you are in any doubt, allow the vehicle to recharge its battery for not more than five minutes with the power pack still connected, then switch off engine, switch off power pack and immediately restart the vehicle under its own power.

13. **POWER PACK RE-CHARGING**

13.1 Power cell life is dependent on three main factors – cranking duration, temperature and method of charging. The charge cycle and charge rate has been set and the time, from discharge to full recovery is approximately 8-12 hours maximum. Note point 8.3.

13.2 For equipment used once per day or less as in the summer months – recharge overnight and switch off in the morning.

(Batteries will retain 85% of their charge up to 12 months). During heavy and repeated winter use (October to March) leave charger permanently connected and switched on to ensure that the pack is always fully charged and able to deliver its maximum cranking performance at any time.

13.3 **CONNECTING THE CHARGER 110v /220v 50/60Hz mains input**

Connect charge lead to pack and then connect to domestic mains supply. The charger is dual voltage. Alternatively, the built in charger will automatically operate at 110 volts. In this case, the mains input plug must be changed to a recognised 110v plug.

13.4 Switch off charger at mains before removing charging plug from pack and whenever charger is not connected to the pack. Stow charger lead in handle.

14. **IMPORTANT**

When charging pack remember;

- **NEVER** boost charge - battery will be destroyed.
- **NEVER** leave battery discharged - recharge as directed.
- **AVOID** using the isolator as a “starter” switch.
- **NEVER** try to start a vehicle with either a seized engine or shorted starter motor – pack will be severely damaged.
- **AVOID** cranking the engine continuously for more than 15 seconds - ideally crank for no more than 5 seconds.
  Where possible wait 2 minutes between attempts to start where the engine has cranked in excess of 15 seconds without any partial starting.
- **DO** check polarity before switching on pack.
- **REMEMBER** the harder the pack is used and the deeper it is discharged, the sooner the power cells will need replacing. Assist the pack by minimising cranking duration on vehicles that are known difficult starters, use the pack in conjunction with the vehicle’s own batteries.

15. **FUSE REPLACEMENTS**

In the event of a fuse failure caused by accidental short circuit, it is permissible to exchange the failed fuse with the identical fuse on the other outlet until a replacement fuse can be fitted.

For fuse replacement, unscrew the two fuse mounting nuts, remove the fuse. Make sure the new fuse is located fully against the stainless steel hexagon nut or the base of the stud. Fit washers over studs, replace hexagon lock nuts and tighten finger tight plus one quarter turn approx.

Note: **Fully Insulated Design**

Because the fuse is located in the positive (+) line which is fully insulated from the core and the pack negative line is also fully insulated from the case, there is NO danger whatsoever of any short circuit or arcing if the fuse, fuse holder or fuse retaining screws are accidentally in contact with the casing, or any part of the pack.

The fuse is deliberately exposed so that the operator can make sure it is connected tightly at all times, and its condition can be easily checked, and quickly replaced if necessary.