FREEDOM
SERIES

User's Guide

ENERGY PACK	**ART.385.078.1**
110/220 VAC UNIT	**ART.385.079.0**
12/24 VDC	**ART.385.080.3**

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Important Notes:

- **Read this manual before using the tools.**
- **This equipment is to be used by trained personnel only.**
- **Immediately after connecting the tool to the energy pack the rescue device is ready for use. Unplug the devices if not being used.**

ENERGY PACK ART.385.078.1

Maintenance of the Energy Pack

Purpose:

The energy pack is designed for low maintenance.

The energy pack should be kept clean and dry. Visually inspect for damage and occasionally test to ensure proper function.

Storage:

The energy pack must be stored in a clean, dry place.

The energy pack can be placed on wet ground but should not be submerged in water.

After Use:

After each use of the energy pack, and at least once a year, the energy pack must be visually inspected and its functions tested. Before doing so, the energy pack must be cleaned and dried.

Inspect the energy pack for:

> Damage to the shoulder bag and belts

> Damage to the cover of the control module

> The condition of the maintenance-free, encapsulated battery. If there is visible damage to the control module or bag loosen the countersunk screw on the backside of the shoulder bag. Remove the battery and check for damage.

Check the energy pack charge by pressing the black “Test” button. To ensure that the energy pack is charged to working capacity, you should charge it after each use using a 110/230 VAC battery charger or the on-board 12/24 VDC charging station. The charger automatically switches to the keep-up mode when full charge is reached.

Changing the Fuse in the Control Module of the Energy Pack:

1. Remove tool from energy pack.

2. Remove the battery and control module from the carry case by removing the countersunk screw on the backside of the carrying case.

3. Remove the two special brass screws from the ends using a 7 mm screwdriver. Remove the control module.

4. Remove the four small screws on the top of the cover of the control module with a 1 mm Phillips screwdriver. Carefully lift off the cover of the control module.

5. Remove the fuse from the holder and insert a new fuse (1OA flat).

6. Re-assemble in reverse order. The LEDs and buttons must fit into the holes of the cover.

Certification:

The energy pack meets the requirements of the EC policy 89/336 EWG (including the modified policy 92/31 EWG) and bears the CE sign. .

Any tampering with the electronic part of the energy pack is prohibited and releases the manufacturer from any liability and voids all warranties.

What's wrong, if ...?

Problem	Action
The LEDs on the control module show a partial discharge, but the battery chargers do not charge the battery?	1. Fuse (1OA flat) to be changed 2. Check if the battery charger is in working order
There is damage to the control module and its cover?	Control Module to be returned to the manufacturer for maintenance and repair if necessary.
There is damage to the battery?	Battery to be exchanged and properly disposed; both provided by the distributor or manufacturer.

Technical Specification of the Energy Pack ART.385.078.1

Nominal charging voltage	12 V-DC
Capacity	17 Ah
Dimensions:	10.48” L x 7.92” W x 3.36” H
Weight	approx. 15.4 lbs

Description:

The energy pack consists of a control module and a lead-acid, gel cell battery (12 V / 17 Ah) which is rechargeable, leak-proof and position-insensitive. The control module consists of a housing that includes a plug-connection, a contactor relay and a charge moonitor with a test key, a reset key and a buzzer. The charge monitor includes an under-voltage protection feature and a total discharge protection feature.

The battery with the control module is carried in a shoulder bag with fixing belts and can also be carried on the back.

The cable length from the tool to the energy pack is about 4.5 ft; it is polyurethane coated and flame-resistant.

For recharging the battery and for keeping up the charge, an electronically controlled battery charger (mains battery charger or on-board charging station) with a loading current of 4.5A maximum is used. The battery charger is also provided with a charge monitor (showing the charging status) and an overloading protection.

Battery:

The battery is a lead accumulator (1 2 V / 17 Ah) which is encapsulated, maintenance free, position-insensitive and leak-proof. It is equipped with highly-absorptive separators and is allowed by IATA for transports in planes.

The life indicated by the manufacturer is five years or 1000 charging cycles minimum.
Realistically twice the amount can be reached.

Control Module:

The control module is used for control and supervising functions. This helps to assure the usability of the rescue tools at any time. The control module is situated on top of the battery and is connected with the poles via a clip-on mounting (quick fastening). A microprocessor is responsible for the operational monitoring management.

The control module is to be used only with the energy pack. It consists of a splash-proof housing (plastic) and includes the following:

- A socket with guiding groove and snapping notches for the connection cable
- A plug-in connection for the charging cable
- A contactor relay (controlling the power supply of the tool)
- A charge monitoring device with a test and reset key each
- Four LEDs

The controlling and operational elements are kept dry and clean by a transparent plastic cover.

It is also possible to connect another item to the plug-in connection, e.g. a spotlight with 1OOW maximum. **Warning!** In this case the total discharge protection is inactive!

Control Electronics:

The charge monitor provides under-voltage protection and total discharge protection (TDP) with a timer, a buzzer, and a reset key. The red LED “Stop” signals that the total discharge protection is active.

Low-Voltage Protection and Exhaustive Discharge Protection (TDP)

When connecting any tools, a permanent voltage control is activated automatically. If the operation of the tool causes the voltage to drop below the default threshold voltage of 10.5V for more than three seconds, the buzzer will sound intermittently. If the operation of the tools decreases the voltage below the second threshold voltage of 8.5V for more than three seconds, the contactor relay will be triggered and the battery will be disconnected from the tool. Even after switching off the tool, the battery is still disconnected (self-holding). Thus a separate reset is necessary.

The battery is reset both by pressing the **red “Reset” key** as well as by **recharging the battery**.

Battery Charger

The battery is recharged by an electronically controlled battery charger (AC battery charger or on-board charging station). The overcharge protection protects the battery from being over-charged.

Setting the Energy Pack Into Operation

Preparing the Energy Pack

Before using the energy pack please check that

- You fasten the shoulder belt with the lower angular eye hooks
- You fasten the body belt with the upper straight eye hooks.

Wrong fastening causes strain of the eye hooks!

Carrying the Energy Pack on the Shoulder

The energy pack should be carried on the right side with the upper edge at belt level. The plug socket faces the front on the right.

The shoulder belt should be put over the head on the left shoulder, now the belt runs from the left to the right and cannot slip off the shoulder during working operations.

The body belt has a quick fastening buckle in the center. Pulling at both ends tightens the energy pack to the body.

Carrying the Energy Pack on the Back

Use two shoulder belts and fasten them on each side at the lower and upper eye hook.

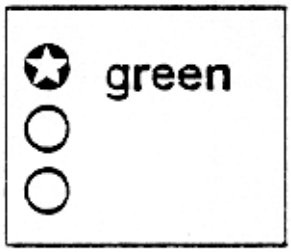
Checking the Charging Status With the Control Module of the Energy Pack

Disconnect the energy pack from the battery charger.

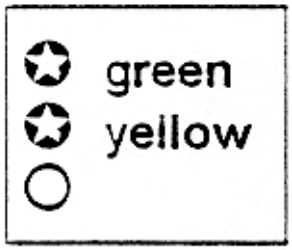
The rescue tool can be connected to the energy pack. It should not be set into operation during the testing procedure in order to obtain a correct testing result. No other tools should be operated with the energy pack during this phase.

In order to check if the energy pack is ready for operation press the black **"Test" key** at the control module of the energy pack. A brief load test is run. All three diodes (red - yellow - green) light up at the same time. Then the display shows as follows:

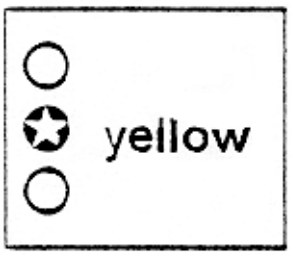
Diode lights up



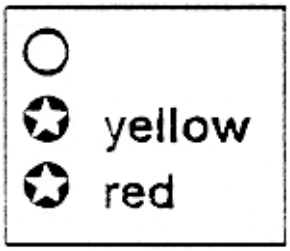
Battery is Fully Charged



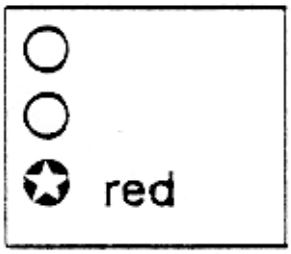
Battery is a Little Discharged



Battery is Partly Discharged



Battery is Seriously Discharged and Should be Recharged



Battery is Widely Discharged and Needs to be Recharged Urgently

If the energy pack is discharged to the final discharge voltage during operation (the energy pack should never be discharged below this level !) this is being signalled first by the red LED display and afterwards by an intermittent beep. In case this message is not noticed the power of the rescue tool is automatically cut off (total discharge protection) and the intermittent beep switches over to a continuous tone.

After a few seconds this effect can be reversed by pressing the red buttan “Reset” which then enables the operator to do some final movements or to reverse the rescue tool to the zero position.

" Warning! This reset procedure should only be done up to three times. In case this has to be carried out more often without recharging the battery, the energy pack or the electric motor of the rescue tool may be damaged.

110/220 VAC Charging Unit ART.385.079.0

12/24 VDC On-Board Charging Unit ART.385.080.3

Safety Precaution

Before using the battery charger please pay attention to the following instructions:

- The charging unit must be set to the same voltage as the outlet it will be using.
- If the battery charger or cable are visibly damaged, the battery charger should not be used!
- The battery charger is protected by internal fuses. Before changing the fuses unplug the charger!
- Do Not pull on the cable to unplug charger.
- Only operate the battery charger on a grounded circuit
- Do not bridge fuses or other safety components! Only use the fuse mode appropriate to the respective voltage !
- Do not expose the battery charger to water !
- Avoid spilling liquids into the battery charger!
- Do not put anything on top of the battery charger!
- Do not cover or enclose the vents of the case and the rear heat sink. Always keep a minimum space of 2 inches between a wall and the battery charger.
- Any tampering with the electronic part of the battery charger is prohibited and release the manufacturer from any liability and voids all warranties.

Warning! While charging, combustible gases may be produced in the accumulators of the energy pack. Avoid flames and sparks during the charging process. Charge the batteries in well-ventilated areas only! Before connecting and disconnecting the energy packs switch off the battery charger!

Technical Specification of the 110/220 VAC Unit ART.385.079.0

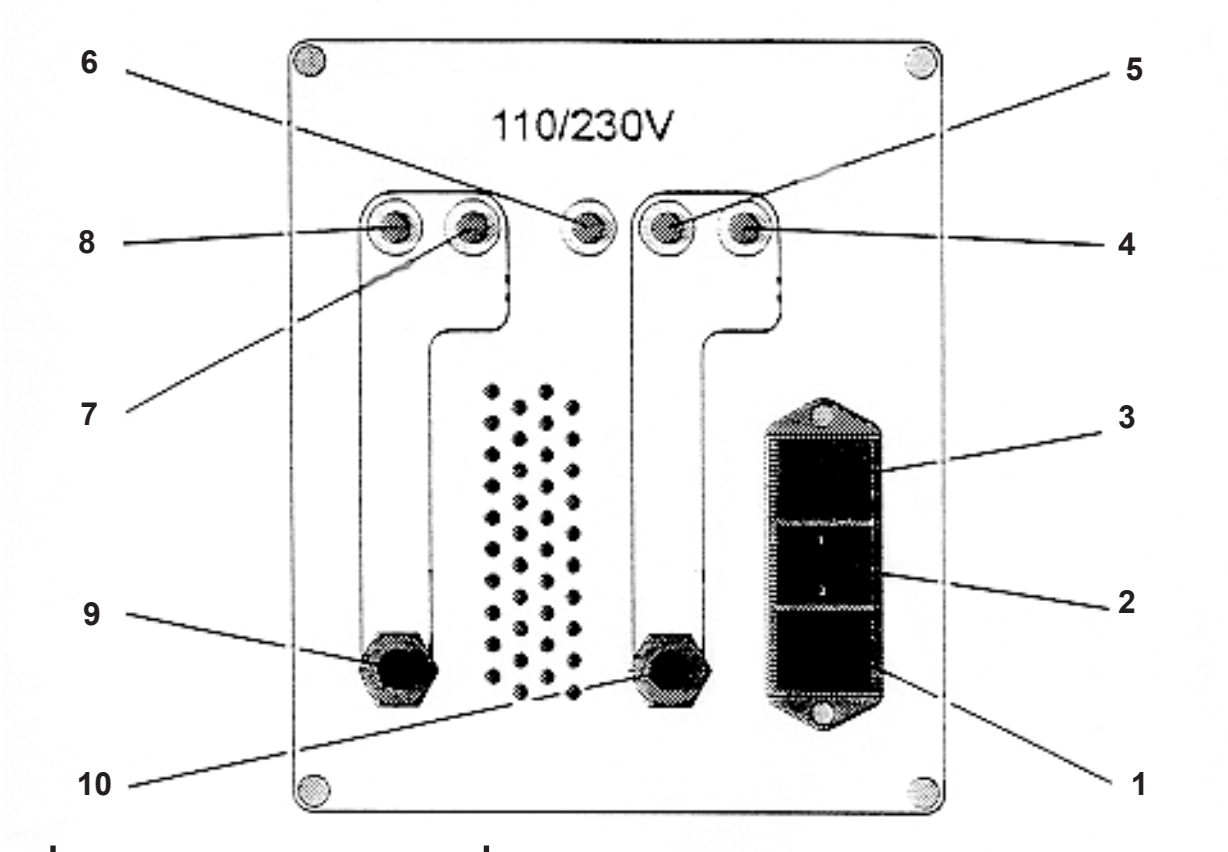
Input voltage	1 00 V / 11 5 V / 230 V-AC, 50/60 Hz
Power input	200 VA maximum
Nominal charging voltage	12 V-DC
Nominal charging current	4,5 A-DC
Charging according	DIN 41722
Number of simultaneously chargeable batteries: 2 of type EZ 12/17 (capacity 17 Ah)	
Temperature of the battery during the charging process (recommended)	41^0 F to 95^0 F
Storing temperature	-41^0 F to $+176^0$ F
Operating temperature	-4^0 F to $+122^0$ F
Relative humidity of air	up to 80%
System of protection	SKI / IP20
Dimensions	10.4” L x 6.68” W x 7.84” H
Weight	19.8 lbs
Certificates	Electromagnetic compatibility (EMC) certified up to 1 GHz
	TOV, GS, CE

Control and Protection Features:

- Low input voltage protection.
- Reverse output voltage protection
- Charger shut-off in case of disconnection from Energy Pack.
- Trickle charging of totally discharged batteries.
- High temperature shut-off.
- Charging plug is short circuit proof when removed from Energy Pack

Operational and Functional Elements

Front of the battery charger



Item	Function Element	Description
1	Power Socket	Connection for the power supply cable
2	On / Off Switch	Switch on/off power supply
3	Tray for Fuses	Definition of voltage / Storage for fuses
4	Energy Pack 2- LED “Keep up Charge	LED shows Green = Energy Pack 2 is charged
5	Energy Pack 2 LED “Charge”	LED shows Yellow = Energy Pack 2 is being charged
6	LED “Ready”	LED shows Green = Battery charger is ready LED shows Red = Battery charger not ready
7	Energy Pack 1 LED “Keep Up Charge”	LED shows Green = Energy Pack 1 is Charged
8	Energy Pack 1 LED “Charge”	LED Shows Yellow = Energy Pack 1 is being charged
9	Energy Pack 1	Charging cable to Energy Pack 1
10	Energy Pack 2	Charging cable to Energy Pack 2

After the removal of the energy packs both the yellow and green LED’s turn off

Setting the Battery Charger Into Operation

1) Before plugging in, please check that the power supply voltage is equal to the voltage level set on the fuse tray (D of the battery charger. If not, please continue according section 2)

2 Set-up of the supply voltage:

a) To pull out the fuse tray #3 on diagram from previous page (located above the on/off power switch) please press up the locking bracket which is located below the fuse tray.

b) Put in the light grey voltage selector which is in the fuse tray in such a way that the voltage level to be needed is visible from outside.

c) Put in the fuses according to the selected voltage:

Mains Voltage	Type of Fuse
100 VAC	2.5 A slow
115 VAC	2.5 A slow
230 VAC	1.25 A slow

d) Re-assembie the fuse tray.

e) Plug in the cable to the outlet.

3 After you turn the unit on, the battery charger runs a system check. Two seconds later the LED “READY" shows green, the battery charger is ready. Independant from each other up to two energy packs can be charged simultaneously.

If the “READY" LED shows red, the energy packs are not being charged.

4 Connect the charging cable/s to the energy packs. If the “CHARGE" LED shows yellow. The energy pack is being charged.

5 When the charging is complete the “CHARGE” LED shuts off, and the “KEEP UP CHARGE” LED shows green.

6 40 seconds after disconnecting the Energy Pack from the charging cable, the charging cable is voltage-free and short circuit proof.

Maintenance

Purpose

The battery charger is designed for low maintenance.

The charger should be kept clean and dry. Visually inspect for damage and occasionally test to ensure proper function

Installation

The battery charger must be installed on a clean, dry place.

Changing the Fuses

A) Disconnect the plug.

B) To pull out the fuse tray (located above the on/off power switch) press up the locking bracket which is located below the fuse tray.

C) Put in the fuses according to the selected voltage:

Mains Voltage	**Type of Fuse**
100 V-AC	2.5 A slow
115 V-AC	2.5 A slow
230 V-AC	1.25 A slow

D) Re-assemble the fuse tray.

E) Plug in to an outlet.

After switching on the battery charger, it runs a system check. Two seconds later the “READY" LED shows green, and the battery charger is ready.

Warranty

The battery charger is certified by TUV and bears the CE sign. The certification includes radioshielding and resistance to jamming.

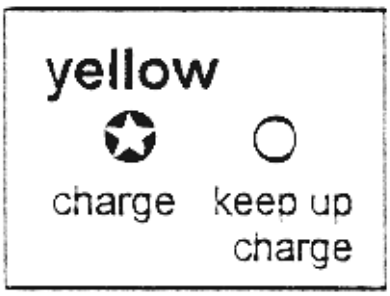
Any tampering with the electronic part of the battery charger is prohibited and releases the manufacturer from any liability and voids all warranties.

Checking the Charging Status at the Battery Chargers

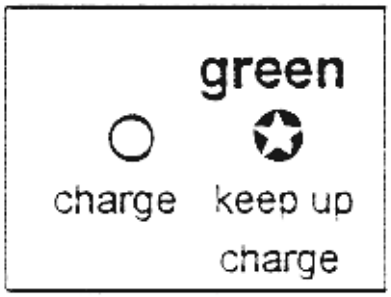
Alternatively the charging status of the energy pack can also roughly be tested at the battery chargers (AC battery charger or on-board charging station):

At the battery charger

The energy pack is connected to the battery charger.
The battery charger diodes show as follows:



Battery is Being Charged



Keep Up Charge, After the Battery Has Been Fully Recharged

Troubleshooting

If no LED flashes?	● No supply voltage is available ● Power supply cable is not plugged in. ● Power switch is not switched on ● One of the fuses in the fuse tray are damaged
The “Ready” LED flashes red?	● The voltage selector in the fuse tray is set to the wrong voltage ● The circuit element for temperature protection is active (the heat sink is too hot, the ventilation is too low)
The “Ready” LED flashes green, despite the battery being connected the LED’s “Keep Up Charge” and “Charge” LED’s are off?	●Short circuit in the charging cable between battery charger and the respective energy pack ●No contact between battery charger and energy pack ●Damaged fuse in the control module of the energy pack.

12/24 VDC On-Board Charging Unit ART.385.080.3

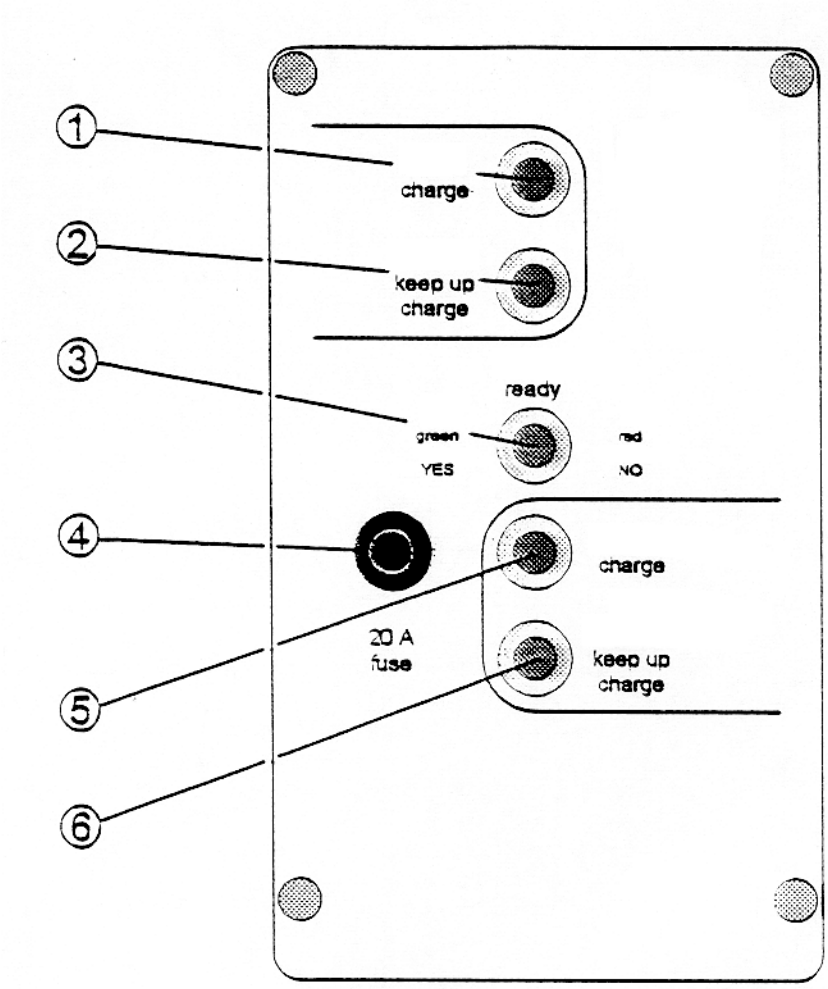
Technical Specification

Input Voltage	11.5 - 32 V-DC
Input Current	20 A
Nominal Charging Voltage	13.8 V-DC
Nominal Charging Current	4.5 A-DC
Charging According	DIN 41722
Number of Simultaneously Chargable Batteries	2 of type EZ 12/17 (Capacity 17AH)
Recommended Temperature of the Battery During the Charging Process	41^0 F - 95^0 F
Operating Temperature	-4^0 F to 140^0 F
System Protection	IP64
Dimensions	11.1” L x 10.6” W x 10.5” H
Weight	11 lbs.
Certificates	Electromagnetic Compatibility (EMC) Certified up to 1 GHz CE Certified

Control and Protection Features:

- Low input voltage protection
- Reverse output voltage protection
- Charger shuts-off if Energy Pack is disconnected
- Trickle charge of totally discharged batteries
- High temperature shut-off
- Output cables are short circuit proof after being disconnected from Energy Pack.

Operational and Function Elements



Front of the charging station

Description of the operational and function elements

Item	Function	Description
1 5	"Charge" LED	LED shows yellow = Battery is being charged
3	"Ready" LED	LED shows red = Input under-voltage LED shows green = Charging station is ready
2 6	"Keep up Charge" LED	LED shows green = Battery is being charged
4	Fuse 20A	

In case of input undervoltage	Yellow and Green LED's extinguish
After disconnection of batteries	Yellow and Green LED's extinguish

Maintenance

Purpose

The on-board charging station is designed for low maintenance.

The charger should be kept clean and dry. Visually inspect for damage and occassionally test to ensure proper function.

Changing the Fuses

A) Open the bayonet fitting of the retainer with a screwdriver
B) Change the defective fuse.
After the reset of the retainer the “Ready” LED shows green, the on-board charging station is ready.

Warranty

The battery charger is certified by TUV and bears the CE sign. The certification includes radioshielding and resistance to jamming.

Any tampering with the electronic part of the battery charger is prohibited and releases the manufacturer from any liability and voids all warranties.

Troubleshooting

If no LED’s flash?	● The connecting cable to the vehicle battery is damaged ● The fuse located in the front plate is damaged
The “Ready” LED flashes red?	● The power supply of the vehicle does not provide enough power, e.g. during a longer stop of the engine or because of lacking external charge.
The “Ready” LED flashes green, despite the battery being connected the “Keep Up Charge” and “Charge” LED’s are off?	●No contact between battery charger and energy pack ●Damaged fuse in the control module of the energy pack.