



Professional Broadcast Equipment

# PAG CUBE

Intelligent Parallel Charger  
V-Mount & PAGlok Models



Instruction Manual



# Use the PAG Cube to power your camera

PAGLOK  
VERSION  
ALSO  
AVAILABLE



PAGLOK  
VERSION  
ALSO  
AVAILABLE

## PAG CPA Camera Power Adaptor

The PAG CPA Camera Power Adaptor, is available as a separate unit, and enables you to power your camera from an AC mains supply, using the Cube charger.

The PAG CPA is housed in a compact, impact resistant case and can be connected to any channel on the Cube Charger.

Connection to the camera can be made using PAG Adaptor Model 9450, XLR-4 male to female (coiled lead). The PAG CPA outputs 16.8V at 5.5A and is suitable for use with modern broadcast cameras\* which use 14.4V / 14.8V Li-Ion batteries.

The PAG CPA can only be used in conjunction with PAG Cube Chargers (V-Mount or PAGlok) or the PAG V4-iPC Charger (V-Mount).

PAG CPA (V-Mount)  
Model No. 9701V  
Size: 130 x 86 x 47mm  
Weight: 198g

PAG CPA (PAGlok)  
Model No. 9701  
Size: 130 x 86 x 47mm  
Weight: 198g

\* May not be suitable for some older cameras. Please ensure voltage compatibility before use.



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# SAFETY

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- 1.1 This manual contains important safety and operating instructions. Please read these fully and note all warnings before using the charger. Please follow all instructions and retain this manual for future reference. A PDF version of this manual is available to download from the PAG website at [www.paguk.com](http://www.paguk.com)
- 1.2 The PAG Cube charger is not intended for any use other than the charging of batteries as detailed in Section 2 'Specification'.
- 1.3 **IMPORTANT:** Use only on AC supplies 90-265V, 50/60Hz. Supply connection to the unit should be made using only the standard lead supplied with this equipment.
- 1.4 Protect the power cord from being walked on or pinched, particularly at plugs. Unplug this apparatus during lightning storms or when unused for long periods of time.
- 1.5 Ensure that the ventilation slots are not obstructed when in use, e.g. do not site the charger on a carpet, and ensure that nothing covers the charger when it is in use.
- 1.6 **WARNING:** Indoor use only. To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
- 1.7 Although the charger is short circuit protected, extreme care should always be taken not to short circuit the battery itself. Rechargeable batteries can deliver power at a very high rate, and short circuiting even a partially charged battery could result in a fire or personal injury.
- 1.8 The Cube Charger is designed to accept the following batteries by direct connection:

**Model 9702:** PAGlok Lithium-Ion, Nickel-Metal Hydride and Nickel-Cadmium batteries.

**Model 9702V:** PAG and Sony V-Mount Lithium-Ion and Nickel-Metal Hydride batteries.

Do not attempt to connect any other type of battery.

- 1.9 **WARNING:** This appliance must be earthed.

- 1.10 Users who are not qualified electronics technicians must not attempt to disassemble the charger. There are no user-serviceable parts inside, and incorrect re-assembly may result in a safety hazard.
- 1.11 Do not use the apparatus if it has been damaged in any way, such as the supply cord or plug is damaged, liquid has been spilled, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped. In this event you should seek advice from your nearest PAG Dealer, or direct from PAG Ltd., London, by telephoning +44 (0)20 8543 3131.

## SECTION 2

# SPECIFICATION

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### 2.1 Cube Charger Features (both models):

- > Four fast-charging channels.
- > Intelligent Parallel Charging (iPC).
- > Bright, informative Liquid Crystal Display.
- > Lightweight, travel-friendly design.

### 2.2 Range of Batteries Charged:

#### **Cube Charger (PAGlok) Model No. 9702:**

- > PAGlok Lithium-Ion batteries.
- > PAGlok Nickel-Metal Hydride batteries (but not NMH60 Model 9374).
- > PAGlok Nickel-Cadmium batteries.

*PAGlok Lithium-Ion batteries having more than two terminals are charged simultaneously. All other PAGlok Lithium-Ion batteries are charged sequentially. All PAGlok Nickel-Metal Hydride and Nickel-Cadmium batteries are charged sequentially.*

#### **Cube Charger (V-Mount) Model No. 9702V:**

- > PAG V-Mount Lithium-Ion batteries.
- > Sony V-Mount Lithium-Ion batteries.
- > PAG V-Mount Nickel-Metal Hydride batteries.
- > Sony V-Mount Nickel-Metal Hydride batteries.

*Nickel-Metal Hydride batteries are charged sequentially.*

### **2.3 Battery Connections:**

Model 9702: 4 x PAGlok Connectors.

Model 9702V: 4 x V-Mount compatible connectors.

### **2.4 Main Charge Program:**

> Li-Ion Intelligent Parallel Charging program.

> Maximum output 6A at 16.8V (100W approx.).

### **2.5 Recovery Charge Program:**

This special program will automatically recover a Li-Ion battery where the output has been shut down. Additionally, the program detects batteries having a very low voltage, and initiates a special low charge current. The program will operate until the voltage has risen sufficiently for batteries to safely accept the normal charge current.

### **2.6 Self Test Program:**

The internal microcomputer constantly monitors the battery under charge or process as well as the operation of the charger's own functions which will be shut down to a safe condition should any of the tests fail.

### **2.7 Mains Input:**

90V to 265V AC. Frequency 50-60 Hz. EN6100-3-2 Power factor corrected.

Maximum consumption 140W.

### **2.8 Output Protection:**

Charger protected against short circuit and excess battery voltage.

### **2.9 AC Mains Failure Protection:**

Should mains failure occur during a charging program, or whilst the charger is connected, it will shut down to a safe condition.

### **2.10 User Interface:**

Comprehensive Liquid Crystal Display showing status of battery and charger.

The charger is fully automatic in operation and no user controls are provided.

### **2.11 Safety:**

Designed to comply with electrical safety standard BS EN 60065 and UL6500.

NOTE: U.K. mains leads are fitted with a 1" fuse to BS1362 rated 5A as standard.

### **2.12 European Union Directives:**

Complies with the following EU Directives:

> EMC Directive 89/336/EU.

> Low Voltage Directive 73/23/EU.

### 2.13 Operating Temperature Range:

0°C to +40°C (+32°F to +104°F).

### 2.15 Overall Dimensions:

#### Model 9702:

157mm high x 150mm wide x 150mm deep.  
(6.2" x 5.9" x 5.9" approximately).

#### Model 9702V:

157mm high x 157mm wide x 157mm deep.  
(6.2" x 6.2" x 6.2" approximately).

### 2.16 Weight (both models):

1.19kg

### 2.17 Typical Battery Charging Times:

<b>Batteries:</b>	<b>Charge Time:</b>
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1 x PAG L95	3hrs 15mins
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2 x PAG L95s	4hrs
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3 x PAG L95s	5hrs
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4 x PAG L95s	6hrs 30mins
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*These times are approximate only, and assume batteries are fully discharged. Charging times will be less if batteries are already partially charged.*

## SECTION 3

# INSTALLATION

- 3.1 Cube chargers are fitted with a mains input socket conforming to CEE22 (IEC socket). Mains supply connection to the charger should be made using only the standard lead supplied with this equipment.
- 3.2 Cube chargers have been designed for use on AC mains supplies worldwide, and automatically accept supplies in the range 90V to 265V. Mains supply frequency must be in the range 50-60 Hz.

NOTE: Cube chargers **MUST NOT** be operated from a vehicle 12V battery using the PAG Vehicle Battery-Power Converter, Model No. 9774.

- 3.3 **PAG TECHNICAL SALES AND INFORMATION DESK:**  
For further information, contact PAG Technical Sales and Information Desk +44 (0)20 8543 3131 or your nearest PAG Authorised Service Centre. Alternatively, visit the PAG Web Site at [www.paguk.com](http://www.paguk.com).

## SECTION 4

# OPERATING INSTRUCTIONS

- 4.1 IMPORTANT: Note section 4.16 Supply Failure. Cube chargers may be disconnected from the supply at any time in complete safety and without damage to the charger or any batteries connected.
- 4.2 Connect the charger to a suitable supply using the standard lead. The blue LCD screen will illuminate.
- 4.3 On power-up, the charger will automatically run a self test program.
- 4.4 With no batteries connected, the display will indicate 'ABST' on all four channels.
- 4.5 When batteries are connected, charging will automatically commence and the display will indicate 'CHRG' on the appropriate channels.
- 4.6 Li-Ion batteries are charged simultaneously, using PAG's Intelligent Parallel Charging program (see 'Charging Times' Section 2.17).  
**NOTE:** Nickel-Metal Hydride batteries are charged sequentially.



- 4.7 The charger display will indicate 'DONE' when a battery has received as much charge as it can safely accept.
- 4.8 As Li-Ion batteries near the end of charge, the charge current is reduced. This is perfectly normal for the 'constant voltage' phase of the charge cycle.
- 4.9 Batteries may be removed, and others connected at any time, without affecting the operation of the charger.
- 4.10 The charger will continue to monitor the status of all charging channels. It will not attempt to charge batteries which the charger indicates are 'DONE' or faulty (indicated as 'FAIL'). If a battery is now disconnected the display will indicate 'ABST'. If a new battery is connected to the free channel, the charging sequence will be initiated automatically. The order in which batteries are connected is therefore immaterial; the charger will ensure that all batteries are charged in as short a time as possible.
- 4.11 If the charger detects a faulty battery while the charging program is running, the display will show 'FAIL'. This could be caused by one of several conditions, such as a very old or damaged battery, a short circuit battery, or an excessively high or low voltage battery.
- 4.12 The charger will not recognise the connection of a battery which has a voltage substantially outside of its range or one of unsuitable chemistry type.
- 4.13 If the internal protection circuit of a PAG or Sony Lithium-Ion battery should turn-off, for any reason, the battery display will not operate, and there will be no voltage at the battery terminals. The Cube incorporates a Recovery Charge program which will automatically turn the protection circuit back on again.
- 4.14 If the charger should detect a fault during operation, it will shut down to a safe condition. See Section 5.4 'Servicing and Repairs'.
- 4.15 If the AC mains power fails during operation, the charger will shut down safely; no damage will occur to either the charger or the batteries. When the mains power is restored the charger will default to the main charge program.
- 4.16 The PAG CPA Camera Power Adaptor is a separate unit that enables you to power your camera from an AC mains supply, using the Cube charger (see inside front cover). This unit can be connected to any channel on the Cube charger. Connection to the camera can be made using an XLR-4 male to female adaptor lead (PAG Model 9450). When the unit is connected the Cube charger display indicates 'CPA' for that channel. When the CPA is in operation the display indicator flashes.

# SERVICING & REPAIRS

- 5.1 **WARNING:** To reduce the risk of electric shock, do not attempt any servicing or repairs unless you are qualified to do so. Refer all servicing or repairs to qualified servicing personnel. The charger contains advanced electronics that do not require periodic maintenance. Consequently there are no user serviceable parts inside.
- 5.2 Qualified electronics engineers who wish to gain access to internal assemblies should note that parts of the power circuit retain a high voltage even after the mains supply has been disconnected. Wait for a period of five minutes following disconnection before commencing disassembly, and be aware of charged capacitors.
- 5.3 When the charger is correctly connected to a mains supply and the display is not functioning, it may be that a supply fuse has become open circuit. Equipment supplied for use in the UK is supplied with a standard UK mains cordset, complete with a moulded, fused plug. If this fuse has become open circuit it should be replaced by another of the correct rating (see 'Specification' section 2.12). **USE ONLY A FUSE OF THE CORRECT RATING.** If the replacement of the fuse fails to correct the above symptoms, do not attempt further fuse replacement. It is likely that a fault has developed. Seek advice from your nearest PAG dealer or direct from PAG Ltd., London, by telephoning +44 (0)20 8543 3131.
- 5.4 Cube chargers feature a fail-safe shutdown mode. In the unlikely event of an internal malfunction, an error message will be displayed on the screen, see 4.15 above. This could be the result of any number of undesirable situations from which the system is protecting itself, such as the obstruction of ventilation slots, causing inadequate cooling, or the microcomputer's detection of an internal fault. In these cases the charger should be disconnected from the supply, any obstruction of the air vent system removed, and the unit allowed to cool before reconnecting to the supply. Should the charger re-enter the fail-safe shutdown mode, more detailed investigation is required. Make a note of the error message and seek advice from your nearest PAG dealer or direct from PAG Ltd., London, by telephoning +44 (0)20 8543 3131.
- 5.5 Unqualified personnel should not attempt further investigation (see paragraph 5.1 above). Any such interference would invalidate the guarantee and invariably cause more damage than the original fault.

# WARRANTY

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- 6.1 Notwithstanding any provision of any agreement the following warranty is exclusive: PAG Limited warrants each Cube charger it manufactures to be free of defects in material and workmanship under use and service for TWO YEARS from the date of purchase. This warranty extends only to the original purchaser. This warranty shall not apply to fuses or any product or parts which have been subject to misuse, neglect, accident or abnormal conditions of operation.
- 6.2 In the event of failure of a product covered by this warranty, PAG Limited will repair and calibrate equipment returned to an authorised service facility within the period of the warranty, provided the warrantor's examination discloses to its satisfaction the product was defective. The warrantor may, at its option, replace the product in lieu of repair. With regard to any equipment returned within this period, said repairs or replacements will be made without charge. If the failure has been caused by misuse, neglect, accident or abnormal conditions of operation, repairs will be billed at a nominal cost. In such a case, an estimate will be submitted before work is started, if requested.
- 6.3 The foregoing warranty is in lieu of all other warranties, express or implied, including but not limited to any implied warranty or merchant-ability, fitness or adequacy for any particular purpose or use. PAG Limited shall not be liable for any special, incidental, or consequential damages, whether in contract, tort, or otherwise.

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## EU DECLARATION OF CONFORMITY

We **PAG Ltd.**  
**London, England.**

hereby declare that the products described below conform to the relevant requirements of the appropriate EU Directives. This declaration shall cease to be valid if modifications are made to the products without our approval.

PRODUCT: PAG Cube Battery Charger

MODEL: 9702V & 9702

APPLICABLE EU DIRECTIVES: EMC DIRECTIVE 89/336/EU  
LOW-VOLTAGE DIRECTIVE 73/23/EU  
CE MARKING DIRECTIVE 93/68/EU

HARMONISED STANDARDS APPLIED: GENERIC:  
EN 50081 - 1 (EMISSIONS)  
EN 50082 - 1 (IMMUNITY)

PRODUCT SPECIFIC: EN 55022 - B EN 60555 - 2/3  
IEC 801 - 2/3/4 EN 60335 - 1  
EN 60335 - 2 - 29

Signed for and on behalf of PAG Ltd.

A handwritten signature in black ink, appearing to read 'Alan Lavender'. The signature is written in a cursive, flowing style.

Alan Lavender  
Chief Executive.

Date: 17.1.07