



PAGlinkTM

INTELLIGENT LINKING BATTERIES



paguk.com



- PAGlink is the industry's only Intelligent Linking Battery System. It is available in V-Mount & Gold Mount formats.
- It comprises 96Wh and 150Wh Li-Ion batteries, designed to power the wide variety of cameras and accessories used for broadcast acquisition, video production and digital cinematography.
- 2 or more PAGlink batteries of any rated capacity, and in any state-of-charge, can be linked to extend the run-time of your camera set-up.
- Linking batteries increases the current-draw capability to 12A.
- Sharing the current-load extends overall battery life.
- Batteries can be hot-swapped to provide continuous power.
- PAGlink batteries are smaller and lighter, with a higher energy-density than other manufacturer's batteries of an equivalent rated capacity.
- The batteries do not discharge into each other. A fully-charged battery can be linked to an almost fully-discharged battery to keep your set-up running.
- PAG works closely with camera manufacturers to ensure that PAGlink batteries are compatible with multiple camera data systems and viewfinder displays.

- PAGlink batteries provide an accurate display of remaining run-time on-load, and available capacity.
- They feature a multi-level, fail-safe, electronic protection system with coated circuits.
- They are tested to UN standards, by an independent authority, for legal air transport.
- PAGlink batteries and chargers are capable of receiving firmware upgrades in the field, to accomodate developments in camera technology.
- PAG offers a 3 year guarantee for its 94Wh & 96Wh PAGlink batteries, with no restrictive conditions.
- PAGlink offers more efficient, linked battery charging, an industry first developed by PAG.
- Up to 8 linked batteries can be charged on each charging position. Sony and Anton/Bauer chargers can also be used.
- Only PAGlink offers the world's smallest and most versatile multi-battery charger, designed for light travel.
- Outputs for camera accessories are available via a user-configurable PowerHub.
- Battery usage data, to assist with battery management, can be viewed using an inexpensive Battery Reader.
- PAGlink batteries have a longer than average cycle life that provides a better return on investment than any other battery system.

PATENTS APPLY: PAGUK.COM/PATENTS

PAGlink Intelligent Battery System



Link-up and Power-up

PAGlink is a system of intelligent linking batteries, chargers and accessories, available in V-Mount and Gold Mount formats. PAGlink is designed to power the wide range of cameras and equipment used for broadcast acquisition, video production and digital cinematography.

PAGlink Li-Ion batteries are compact, lightweight, and available in 94/96 Watt-hours and 150Wh capacities. They can be linked, regardless of their rated capacity, or state of charge, combining their capacities in parallel to produce greatly extended run-times for your camera set-up:

- 2 x 96Wh batteries = 192Wh
- 2 x 150Wh batteries = 300Wh
- 1 x 96Wh + 1 x 150Wh = 246Wh

Up to 8 batteries can be linked for discharge - an industry first, unique to PAGlink, and developed by PAG.

Why should I link batteries?

Linking batteries for discharge has many advantages. Combining their capacities greatly increases your run-time. When you have 300Wh or more on-board, you won't have to change the battery at a time when you could miss the shot. When power does eventually run low, PAGlink allows you to simply add another battery or hot-swap the rear battery to keep your camera and accessories running. The ability to link a fully-charged battery to an almost fully-discharged battery is one of the cleverest features of PAGlink.

High-Load Applications

Linked batteries provide an increased current-draw of 12A, ideal for the most power-hungry camera and multiple accessories. Sharing the load in this way also contributes towards a longer battery life and provides a better return on investment.

Fly with all the high-capacity Li-Ion power you need

Unlinked, your batteries have a flight-friendly capacity for air transport. Individual Li-Ion batteries that have capacities of 160Wh or more are not permitted on passenger aircraft.

More Outputs for Accessories

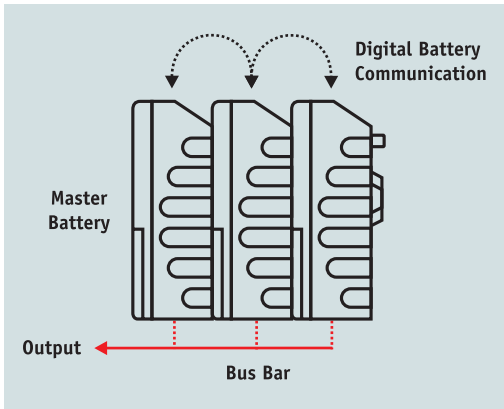
PAGlink provides more power for your camera set-up, and the PAGlink PowerHub provides the outputs. The PowerHub is an accessory power plate that features D-Tap and USB outputs that are interchangeable with Lemo, Hirose or 2.1mm options (*see Page 26*).

Linked Battery Charging

PAGlink battery charging is more efficient and more convenient. For the first time it is possible to link up to 8 batteries on each position for simultaneous charging. Linked charging reduces the number of chargers you need, saving you money and consigning one-channel-per-battery charging to the past (*see Page 18*).

The First Digital Battery System

When linked, PAGlink batteries form a network and communicate digitally at high-speed, reporting their state of charge. The battery with one or more linked to its front PAGlink contacts becomes the 'master' and manages safely the output of all the other connected batteries.



The master battery is always active, but not necessarily delivering current. It sees the load and then decides which

batteries to connect to the supply of power, according to their charge status, to meet the demand. The system makes the most efficient use of the energy available, and prevents a transfer of charge between batteries. It enables a fully charged battery to be linked safely to an almost fully-discharged battery. The PAGlink system is covered by multiple international patents.

Intelligent Batteries for Computerised Cameras

Cameras are becoming increasingly computerised. They benefit from communication with the batteries used to power them. PAGlink is the first digital battery system designed to communicate automatically with multiple camera data systems.

PAG works closely with the camera manufacturers to ensure that the information required by the camera is provided by the PAGlink batteries. Some less advanced battery systems, are designed to communicate with one specific camera data system; many battery systems do not communicate at all.

PAGlink's multi-system communication enables the batteries to report capacity for display in camera viewfinders, and adjusts automatically when it encounters a new data system.

A lack of battery communication can result in unexpected loss of power, which could corrupt your files. Retrieving the images is time consuming, with no guarantee that they will be usable - a scenario that is too costly to risk. For this reason you should choose a battery system that is as technologically sophisticated as your camera.

PAGlink is sophisticated but not complicated for you to use. It is designed to make your life easier. Communication takes place automatically.

PAGlink gives you reassurance that you will not unexpectedly lose power, and allows you to concentrate on getting the images you want.

Camera Run-Time and Battery Capacity at a Glance

The PAGlink V-Mount System features a choice between batteries that have a numeric display or a 5-light indicator. All PAGlink Gold Mount batteries feature the numeric option. Both types of display will provide a prediction of remaining run-time, on-load, after two button-presses. When batteries are linked, the run-time for the total of all connected batteries is shown. Individual battery capacity is displayed with a single button press, on or off-load.



The numeric Run-Time & Capacity Display provides a run-time prediction expressed in hours and minutes (1). Capacity is displayed as a percentage, in 1% increments (2).



When battery capacity drops below 5% the display will indicate that the battery should be charged as shown (3).

When the battery is fully charged the display will indicate '100' (4).

The 5-Light Run-Time & Capacity Indicator provides a run-time prediction, in hours and minutes, after two presses:



The 'HRS' LED flashes twice (5), and then the number of remaining hours is indicated by the number of lit LEDs:
1 LED = 1 hour (6).



The 'MINS' LED flashes twice (7), and then the number of remaining minutes is indicated by the number of lit LEDs:
1 LED = 10 minutes (8).

The 5-Light indicator shows available battery capacity as a percentage. A single button press, on or off-load, shows capacity in approximately 20% blocks:

5 LEDs	=	80 - 100%	remaining
4 LEDs	=	60 - 79%	remaining
3 LEDs	=	40 - 59%	remaining
2 LEDs	=	20 - 39%	remaining
1 LED	=	10 - 19%	remaining
1 LED flashing	=	0 - 10%	remaining

When batteries are linked, the capacity figure displayed is always for the individual pack. It is possible to link PAGlink batteries regardless of their display type or their capacity. They can be mixed for either charge or discharge. Linking a battery that has a numeric display with one that has a 5-light indicator provides a numeric run-time display for the combined power.

All PAGlink batteries maintain an accurate state-of-charge display by tracking their performance and adjusting calibration values to compensate for the aging of the cells.

In-Viewfinder Capacity Information

Battery status can be shown as a percentage of available capacity in the viewfinder/LCD of a camera designed to accept this data. When the batteries are linked, the data displayed is for the combined capacity available.



Different data standards are used by different camera and battery manufacturers. PAGlink batteries automatically adjust the data output standard to support the following: SMB (Sony & Red), I²C (IDX), and the 0-5V analogue system (used by Anton Bauer).

Future-Proof Batteries and Chargers

PAG batteries and chargers are firmware upgradeable. The program can be updated in the field by the user, in a matter of seconds, by connecting an update tool to external contacts. Updates enable you take advantage of the technological advances that PAG introduces to accommodate developments in camera technology.

Better Batteries by Design

It Starts With the Cells

PAGlink batteries embody premium grade, sealed, rechargeable Li-Ion cylindrical cells. Cell quality is essential for a safe Li-Ion battery and an important contributing factor to an extended battery life.

Durability

The battery case design provides protection in the event of accident or abuse, cradling the cells against damaging shock and vibration. PAG battery cases are manufactured from a high-impact, injection-moulded material which is inherently very strong. PAG cases have non-slip external features for secure handling.

Although PAGlink batteries are designed to survive the rigours of normal professional use, it is common sense to handle them with care and to avoid subjecting them to severe impact. Any battery can receive internal damage from mishandling that may not be apparent from the outside.

Protection Circuits

PAGlink batteries incorporate a multi-layered, electronic protection system to ensure safety and prevent practices that shorten battery life. Over-discharging and charging from an inappropriate source are prevented. The battery is protected against high current and high voltage demands. Charging and discharging when temperatures are too high or too low are also prohibited.

The protection circuit is conformally-coated to protect it from electrolyte and ensure the operation of the safety systems in the event of damage to the battery. If the battery has been shut down by the protection circuit it can be recovered by simply removing it from the load and pressing the display button, provided the battery still retains some charge.

Flight-Friendly UN Tested Batteries

The PAGlink system has been conceived so that you can fly with all the Li-Ion battery power that you need. All PAG Li-Ion batteries are tested to UN standards, by an independent authority, in accordance with IATA Air Transport Regulations. These currently state that up to 20 UN tested Li-Ion batteries, which have capacities no greater than 100Wh, can be legally transported on passenger aircraft, in carry-on luggage. In addition, there is an



allowance of two 150Wh batteries per person. PAG labels its batteries with the UN Test number for each battery design and the IATA quantity allowance based on its capacity.



Replaceable Battery Linking Mechanism

If linked batteries suffer an excessive blow, the unique PAGlink mechanism will allow them to separate safely, protecting the battery packs from irreparable damage. The mechanism can be easily replaced, without opening the sealed battery case.

The Best Return on Investment

PAGlink is a high-quality, sophisticated battery system that is competitively priced. PAG's total battery design philosophy ensures that you receive the longest possible working life from your PAGlink batteries. Some customers have reported good capacity from their PAG Li-Ion batteries even after 7 years use. This is well in excess of the industry average life.



PAG guarantees its 94Wh & 96Wh PAGlink Li-Ion batteries for 3 years, with no restrictions on the conditions of use.



PAG guarantees its 150Wh PAGlink Li-Ion batteries for 2 years, with no restrictions on the conditions of use.

When the already attractive price is divided by the number of years service provided, we believe that PAG batteries offer the best return on investment possible.

PAGlink V-Mount 96Wh Batteries



Model 9303 PAGlink PL96e Battery

- 96 Watt-hours (14.8V 6.5Ah)
- 12A linked, 8A individually
- 5-Light Display
- 133 x 84 x 50mm
- 0.73kg



Model 9304 PAGlink PL96T Battery

- 96 Watt-hours (14.8V 6.5Ah)
- 12A linked, 8A individually
- Numeric Display
- 133 x 84 x 50mm
- 0.73kg

PAGlink V-Mount 150Wh Batteries



Model 9308 PAGlink PL150e Battery

- 150 Watt-hours (14.8V 10Ah)
- 12A linked, 8A individually
- 5-Light Display
- 133 x 84 x 50mm
- 0.77kg



Model 9309 PAGlink PL150T Battery

- 150 Watt-hours (14.8V 10Ah)
- 12A linked, 8A individually
- Numeric Display
- 133 x 84 x 50mm
- 0.77kg

PAGlink Gold Mount Batteries



Model 9306 PAGlink HC-PL94T Battery

- 94 Watt-hours (14.8V 6.4Ah)
- 12A linked, 10A individually
- Numeric Display
- 129 x 87 x 58mm
- 0.73kg



Model 9313 PAGlink HC-PL150T Battery

- 150 Watt-hours (14.8V 10Ah)
- 12A linked, 10A individually
- Numeric Display
- 129 x 87 x 58mm
- 0.77kg

PAGlink Chargers



Linked Battery Charging - An Industry First

PAGlink batteries can be charged individually or linked. The batteries can be of any rated capacity, and in any state of charge, for linked charging using the 2-position PAGlink PL16, 4-position PL16+ and single-position Micro Charger.

Up to 8 PAGlink batteries can be linked for charging on each charging position. The batteries communicate with each other to manage the charging process, which is fully automatic. The most discharged batteries are given priority until each battery in the stack is in a similar state of charge. The charger then uses the available power efficiently and intelligently to fully-charge all the batteries simultaneously, and as quickly as possible.



Two-position PAGlink PL16 Charger

After a shoot, simply stack your batteries on the charger, and by the morning they will be fully-charged and ready to use. This means no more midnight battery swapping to get all your batteries charged for the next day. 8 fully-discharged 96Wh batteries can be fully-charged in less than 12 hours, without intervention, using a PL16 charger. When batteries are fully-charged they stop accepting charge automatically and can be left on the charger until needed.

Each battery's state of charge is displayed on its individual capacity indicator. When charging batteries that have the numeric display, the display characters can be inverted, for legibility, with a single button press. The display reverts automatically after the battery is removed from the charger.

The 4-position PL16+ is an ideal workshop charger, especially for broadcasters and rental companies. The extra charging positions enable you to charge non-linking batteries alongside PAGlink batteries. The 2-position PL16 is compact, lightweight, and designed for location use. The single-position Micro Charger is ideal when you want to travel as light as possible.

Ultra-Compact Charging

The PAGlink Micro Charger is the world's smallest and most versatile broadcast battery charging kit. It fits easily in your camera bag, or even your pocket, and is designed to charge up to 4 linked batteries from a variety of sources.



The ultra-compact Micro Charger

The charger clips over the battery contacts, and can be connected to a power supply unit that converts 100-240V AC input to low voltage DC. Alternatively, the charger can be powered from a 12V vehicle battery, via the lighter socket,

or a USB charger (2A), using the DC power leads supplied. The charger's input range is 5-20V DC. One fully-discharged 96Wh battery will be 80% charged in approximately 3 hours. Two fully-discharged batteries will be fully-charged in less than 8 hours. *See PAGlink Charge Times on Page 25.*

The Micro Charger Power Supply Unit accepts interchangeable plugs (US, UK, Euro and Australia), enabling direct connection to AC supplies worldwide.

The following parts can be bought separately:

9713PSU	Power Supply Unit
9713U	UK Power Plug
9713J	US/Japan Power Plug
9713E	Euro Power Plug
9713A	Australia Power Plug
9713 USB	USB DC Power Lead
9713CAR	In-Car DC Power Lead

Non-PAGlink Chargers

Linked PAGlink batteries may be charged simultaneously on any reputable constant-voltage charger designed for professional Li-Ion batteries, such as PAG, Anton/Bauer and Sony chargers. However when using non-PAGlink chargers, linked batteries must be within 40% state-of-charge of each other to be fully charged.

Non-PAGlink Batteries

PAGlink Chargers are also suitable for charging non-linking Li-Ion batteries manufactured by PAG or Sony (V-Mount), and PAG or Anton/Bauer (Gold Mount).

PAGlink V-Mount Chargers



Model 9707 PAGlink PL16 Charger

- 2-positions / 16 PAGlink batteries
- 100W camera power supply with XLR4 output
- 75 x 210 x 190mm / 1.4kg



Model 9711 PAGlink PL16+ Charger

- 4-positions / 16 PAGlink batteries or 4 non-linking batteries
- Automatic Recovery Program
- 75 x 210 x 315mm / 1.6kg

PAGlink Gold Mount Chargers



Model 9707A PAGlink PL16 Charger

- 2-positions / 16 PAGlink batteries
- 100W camera power supply with XLR4 output
- 75 x 220 x 190mm / 1.4kg



Model 9711A PAGlink PL16+ Charger

- 4 positions / 16 PAGlink batteries or 4 non-linking batteries
- Automatic Recovery Program
- 75 x 220 x 315mm / 1.6kg

PAGlink Micro Chargers



MICRO CHARGER



PSU (AC/DC CONVERTER)



USB POWER LEAD



IN-CAR POWER LEAD

Model 9713V Micro Charger (V-Mount)

- 1 position / 1 to 4 PAGlink batteries
- Input 5-20V DC
- 73 x 62 x 31mm / 75g

Model 9713 Micro Charger (Gold Mount)

- 1 position / 1 to 4 PAGlink batteries
- Input 5-20V DC
- 73 x 62 x 33mm / 75g

PAGlink Charge Times

The following charge times are for fully-discharged to fully-charged 94/96 Watt-hour PAGlink batteries:

PAGLINK PL16 & PL16+ CHARGER:

CONFIGURATION	TOTAL	CHARGE TIME
	1	2 hrs 30 mins
(1 / 1)	2	3 hrs
(2 / 2 or 1 / 1 / 1 / 1)	4	6 hrs
(3 / 3 or 2 / 2 / 1 / 1)	6	9 hrs 30 mins
(4 / 4 or 2 / 2 / 2 / 2)	8	11 hrs 45 mins
(8 / 8 or 4 / 4 / 4 / 4)	16	24 hrs
(8 / 8 / 8 / 8)	32	48 hrs

PAGLINK MICRO CHARGER:

TOTAL	CHARGE TIME
1	4 hrs
2	8 hrs
3	12 hrs
4	16 hrs

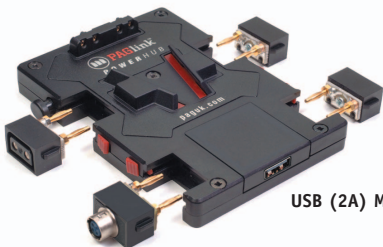


More Outputs for Camera Accessories

PAGlink batteries provide the power and the PowerHub provides the outputs. Linked batteries are capable of supplying 12A, enough to power a camera and multiple accessories simultaneously.



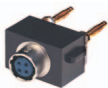
The PowerHub is an accessory power plate that provides multiple outputs suitable for powering 12V camera accessories such as on-board lights, monitors, audio and transmission devices. It is designed to be used sandwiched between two PAGlink batteries, to maintain the hot-swap capability.



USB (2A) Module

The PowerHub features four plug-in D-Tap output units, which are interchangeable with Hirose, Lemo and 2.1mm options, available individually. The output units can be repositioned to the left or right side of the camera, with the V-Mount option, allowing you to customise the PowerHub to your individual requirement. The outputs are all situated on the right side of the Gold Mount option. A USB output is incorporated for powering 5V camera accessories that draw up to 2A continuously, 3A peak.

Alternative Output Units for V-Mount PowerHub:



9709H Hirose



9709L Lemo



9709P 2.1mm

Alternative Output Units for Gold Mount PowerHub:



9712H Hirose



9712L Lemo



9712U USB



Model 9709

PowerHub V-Mount

- 4 x D-Taps, 1 x USB (5V 2A)
- 112 x 83 x 18mm / 100g

Individual Output Units:

9709D D-Tap

9709L Lemo (2-pin)

9709H Hirose (4-pin)

9709P 2.1mm (PP90)

9709U USB (5V 2A)

Model 9712

PowerHub Gold Mount

- 4 x D-Taps, 1 x USB (5V 2A)
- 114 x 89 x 25mm / 140g

Individual Output Units:

9712D D-Tap

9712L Lemo (2-pin)

9712H Hirose (4-pin)

9712U USB (5V 2A)

9712P 2.1mm (PP90)



PAGlink Battery Reader



Manage Your Battery Inventory More Efficiently

Managing your batteries efficiently requires knowledge of their condition and history. Information such as the number of charge/discharge cycles is vital. PAG has made this easier for you with the introduction of its new PAGlink Battery Reader.

The Battery Reader enables you to display data stored in the microprocessor of PAGlink intelligent digital batteries, as well as the batteries of some other manufacturers. It is a compact and lightweight tool that you slide onto the contacts of the battery.

The easy-to-understand alphanumeric display will firstly reveal the battery state of charge, as a percentage.

The up and down buttons can then be used to reveal the other categories. The following data is available:

1. State of charge as a percentage
2. Available capacity in ampere-hours
3. Cell temperature in degrees Celsius
4. Number of charge/discharge cycles
5. Voltage
6. Full capacity in ampere-hours
7. Date of birth (manufacture)
8. Software version

This information makes the tracking of battery usage and performance easy for you.

Knowing the battery's software version will help you to discover if it is running the latest program. It is then possible to update the battery software, and benefit from PAG's continually developing technology, by obtaining an update.

The PAGlink V-Mount Battery Reader can also be used to read data stored by non-linking PAG V-Mount Li-Ion batteries and Sony Professional Info Batteries.

The PAGlink Gold Mount Battery Reader can also be used to read data stored by non-linking PAG Gold Mount Li-Ion batteries and Anton/Bauer batteries.

The Reader can also be used to put PAGlink batteries into sleep mode for storage or transit.

Battery Readers



Model 9647 V-Mount Reader



Model 9647A Gold Mount Reader



INTELLIGENT LINKING BATTERIES

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