



LEADING THE WAY



DAWN OF A **NEW ERA**

CARBON FIBRE AGM DEEP CYCLE BATTERIES
SOLAR AND MARINE SERIES



a world of new opportunities

Dear valued customer

We are delighted to offer the latest Elecsol technology, carbon fibre Agm batteries for applications from marine and solar to such diverse areas as floor scrubbing machines, portable traffic lights, coachbuilders and emergency service vehicles.

We have worked tirelessly to create the ultimate in deep cycle battery technology that is currently available around the world today and we are pleased we have managed to launch a complete range sooner than anticipated from 105amp through to 250amp (c20).

We anticipate a global distribution network by mid 2012.

We are offering an incredible unlimited 7 year warranty on a battery so advanced it can complete 1,400 cycles to 11.vdc and still possess as much as 75-80% of its original manufactured capacity.

Naturally our focus remains on you, our existing and new customers, making sure all our product ranges meet your requirements of quality, customer support, back up warranty service, and of course price. Our aftercare customer support programme is defined by ensuring you always receive quality of service throughout all stages of the buying and aftercare process.

Thank-you for your continued support and we look forward to the future together with you our customers.

A handwritten signature in white ink, appearing to read "Steve Gallimore". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Steve Gallimore
MANAGING DIRECTOR



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OUR MARKETS

Vision by Elecsol

Elecsol is a large global manufacturer and distributor of industrial batteries combining new and patented technology. Our business is integrated into four key groups; Transportation, Industrial Energy, Renewables and Speciality markets.

Our products serve a global marketplace and we install our technology nationally, as well as internationally through a network of strategic partners and distributors worldwide, who ensure impeccable support for all our customers requirements.



MAIN MARKETS

SOLAR (OFF-GRID)

MARINE

PORTABLE TRAFFIC LIGHTS

RECREATIONAL VEHICLES

AERIAL ACCESS PLATFORMS

FLOOR SCRUBBING MACHINES

ELECTRIC VEHICLES

EMERGENCY VEHICLES



PRODUCTS AND PRICING

product range/specifications

| Product | Capacity | Dimensions L x W x H | Weight | RRP Sterling Inclusive of VAT | RRP Euros Inclusive of VAT |
|---------|----------|-------------------------|--------|----------------------------------|-------------------------------|
| EL105F | 105AH | 350 x 167 x 180mm | 24kg | £179.00 | €229.00 |
| EL115F | 115AH | 328 x 172 x 222mm | 30kg | £194.00 | €246.00 |
| EL135F | 135AH | 328 x 172 x 222mm | 33kg | £210.00 | €259.00 |
| EL250F | 250AH | 522 x 240 x 219mm | 60kg | £387.00 | €489.00 |



VALVE
REGULATED



GRID PLATE



NOMINAL
CAPACITY
60-330 Ah



BLOCK
BATTERY



1200 CYCLES
ACC. TO
IEC 896-2



MAINTENANCE
FREE
(NO TOPPING UP)



PROOF AGAINST
DEEP DISCHARGE
ACC. TO DIN 43 539 T5



RECYCLABLE

battery inverter selection guidelines

| Inverter Size | Optimum Battery Bank Size | Battery Type |
|---------------|---------------------------|--------------|
| 1000W | 420 amps | 4 x EL105F |
| 1500W | 540 amps | 4 x EL135F |
| 2000W | 750 amps | 3 x EL250F |
| 2500W | 1000 amps | 4 x EL250F |



EL105F



EL115F



EL135F



EL250F

ELI05F

CARBON FIBRE (A_gm series) 12V105Ah (C20)

ELI05F is a carbon fibre A_gm deep cycle battery with a 15 year floating design life. The carbon fibre technology employed in this new range of advanced batteries significantly increases the cycle life compared to conventional A_gm and Gel designs. This is achieved by the provision of a reinforced carbon fibre matrix within the oxide paste eliminating completely oxide shredding whilst inhibiting sulphation of the plates permanently. The battery has been designed for use in Solar Energy (off-grid), Marine, Golf carts, and Electric vehicle (EV) applications. An unrivalled 7 year warranty is offered globally throughout our network of international dealers.



Specifications

| | | | |
|-----------------------------|---|--|---|
| Cells Per Unit | 6 | Normal Operating Temperature Range | 25°C±5°C |
| Voltage Per Unit | 12 | Float Charging Voltage | 13.20 to 13.40 VDC/unit Average at 25°C |
| Capacity | 105Ah@20hr-rate to 1.75V per cell @25°C | Recommended Maximum Charging Current Limit | 24A |
| Weight | Approx. 24.0 Kg | Equalisation and Cycle Service | 14.20 to 14.40 VDC/unit Average at 25°C |
| Max. Discharge Current | 1000A (5 sec) | Self Discharge | Elecsol batteries can be stored for more than 6 months at 25°C. Self-discharge ratio less than 1.70% per month at 25°C. Please charge batteries before using. |
| Internal Resistance | Approx. 5.5 mV | Terminal | A Terminal |
| Operating Temperature Range | Discharge: -20°C~60°C Charge: -0°C~50°C Storage: -20°C~60°C | Container Material | A.B.S. (UL94-HB), Flammability resistance of UL94-V1 can be available upon request. |

For Technical Graphs please see pages 16 & 17



VALVE
REGULATED



GRID PLATE



NOMINAL
CAPACITY
60-330 Ah



BLOCK
BATTERY



1200 CYCLES
ACC. TO
IEC 896-2



MAINTENANCE
FREE
(NO TOPPING UP)



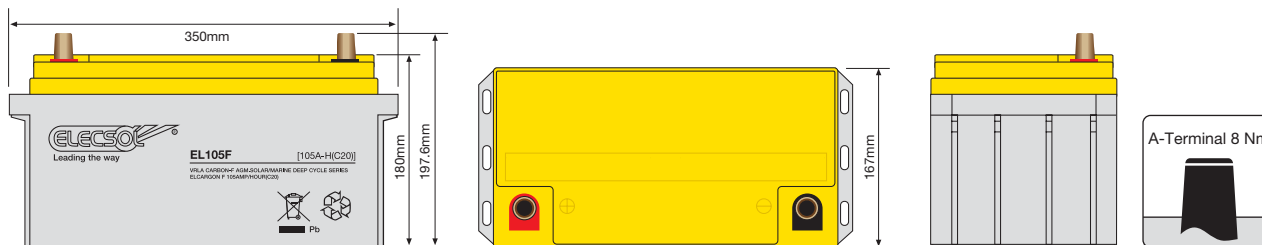
PROOF AGAINST
DEEP DISCHARGE
ACC. TO DIN 43 539 T5



RECYCLABLE

DIMENSIONS

Dimensions: 350mm(L) x 167mm(W) x 180mm(H). Overall height including terminal 197.6mm



Constant Current Discharge Characteristics: A (25°C)

| FV/Time | 5 MIN | 10 MIN | 15 MIN | 30 MIN | 1 HR | 2 HR | 3 HR | 4 HR | 5 HR | 8 HR | 10 HR | 20 HR |
|---------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 9.60V | 275.7 | 197.6 | 143.8 | 88.32 | 49.92 | 28.31 | 20.04 | 16.59 | 13.06 | 9.540 | 8.066 | 4.266 |
| 10.0V | 268.4 | 188.0 | 140.8 | 86.86 | 49.69 | 28.09 | 19.97 | 16.51 | 12.98 | 9.462 | 7.989 | 4.188 |
| 10.2V | 252.9 | 181.4 | 138.6 | 86.09 | 49.23 | 27.87 | 19.81 | 16.44 | 12.90 | 9.385 | 7.911 | 4.111 |
| 10.5V | 227.1 | 167.4 | 132.0 | 83.94 | 48.77 | 27.65 | 19.74 | 16.28 | 12.75 | 9.307 | 7.834 | 4.033 |
| 10.8V | 205.0 | 152.6 | 121.7 | 80.26 | 47.62 | 27.14 | 19.20 | 15.90 | 12.52 | 9.152 | 7.756 | 3.956 |
| 11.1V | 178.4 | 136.4 | 109.1 | 75.19 | 45.24 | 26.70 | 18.36 | 15.13 | 11.98 | 8.764 | 7.523 | 3.723 |

Constant Power Discharge Characteristics: W (25°C)

| FV/Time | 5 MIN | 10 MIN | 15 MIN | 30 MIN | 1 HR | 2 HR | 3 HR | 4 HR | 5 HR | 8 HR | 10 HR | 20 HR |
|---------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 9.60V | 2873 | 2101 | 1547 | 996.7 | 570.9 | 334.9 | 231.3 | 191.7 | 151.1 | 110.7 | 90.70 | 47.91 |
| 10.0V | 2815 | 2007 | 1515 | 984.3 | 568.2 | 333.6 | 230.9 | 191.2 | 150.2 | 110.2 | 89.77 | 47.44 |
| 10.2V | 2657 | 1940 | 1494 | 972.7 | 564.0 | 330.5 | 229.5 | 190.3 | 149.8 | 109.3 | 89.31 | 46.98 |
| 10.5V | 2393 | 1793 | 1425 | 950.6 | 558.5 | 327.4 | 228.1 | 188.9 | 148.4 | 108.4 | 88.37 | 46.51 |
| 10.8V | 2152 | 1628 | 1309 | 907.3 | 544.7 | 322.6 | 222.6 | 183.9 | 146.1 | 106.0 | 87.44 | 46.05 |
| 11.1V | 1858 | 1445 | 1169 | 850.2 | 516.1 | 307.7 | 211.5 | 175.1 | 138.7 | 102.3 | 84.65 | 44.19 |

ELI 15F CARBON FIBRE (Agm series) 12V 15Ah (C20)

ELI 15F is a carbon fibre Agm deep cycle battery with a 15 year floating design life. The carbon fibre technology employed in this new range of advanced batteries significantly increases the cycle life compared to conventional Agm and Gel designs. This is achieved by the provision of a reinforced carbon fibre matrix within the oxide paste eliminating completely oxide shredding whilst inhibiting sulphation of the plates permanently. The battery has been designed for use in Solar Energy (off-grid), Marine, Golf carts, and Electric vehicle (EV) applications. An unrivalled 7 year warranty is offered globally throughout our network of international dealers.



Specifications

| | | | |
|-----------------------------|---|--|---|
| Cells Per Unit | 6 | Normal Operating Temperature Range | 25°C±5°C |
| Voltage Per Unit | 12 | Float Charging Voltage | 13.20-13.40 VDC/unit Average at 25°C |
| Capacity | 115Ah@20hr-rate to 1.75V per cell @25°C | Recommended Maximum Charging Current Limit | 30A |
| Weight | Approx. 30.0 Kg | Equalisation and Cycle Service | 14.20 to 14.40 VDC/unit Average at 25°C |
| Max. Discharge Current | 1200A (5 sec) | Self Discharge | Elecsol batteries can be stored for more than 6 months at 25°C. Self-discharge ratio less than 1.70% per month at 25°C. Please charge batteries before using. |
| Internal Resistance | Approx. 5 mV | Terminal | A Terminal |
| Operating Temperature Range | Discharge: -20°C~60°C Charge: -0°C~50°C Storage: -20°C~60°C | Container Material | A.B.S. (UL94-HB), Flammability resistance of UL94-V1 can be available upon request. |

For Technical Graphs please see pages 16 & 17



VALVE
REGULATED



GRID PLATE



NOMINAL
CAPACITY
60-330 Ah



BLOCK
BATTERY



1200 CYCLES
ACC. TO
IEC 896-2



MAINTENANCE
FREE
(NO TOPPING UP)



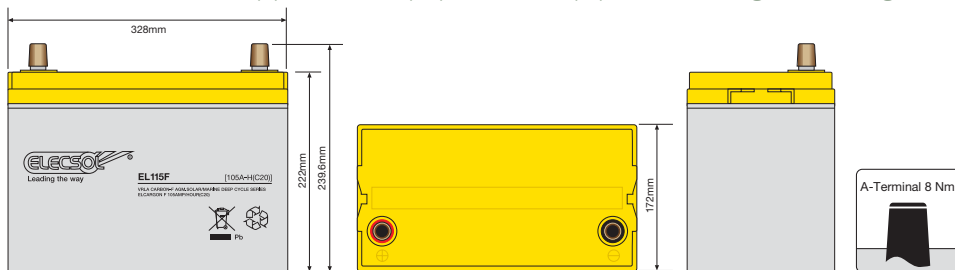
PROOF AGAINST
DEEP DISCHARGE
ACC. TO DIN 43 539 T5



RECYCLABLE

DIMENSIONS

Dimensions: 328mm(L) x 172mm(W) x 222mm(H). Overall height including terminal 239.6mm



Constant Current Discharge Characteristics: A (25°C)

| FV/Time | 5 MIN | 10 MIN | 15 MIN | 30 MIN | 1 HR | 2 HR | 3 HR | 4 HR | 5 HR | 8 HR | 10 HR | 20 HR |
|---------|-------|--------|--------|--------|-------|--------|--------|-------|-------|-------|---------|-------|
| 9.60V | 344.7 | 24 7.0 | 179.7 | 110.4 | 62.40 | 35.3 9 | 25 .06 | 20.74 | 16.32 | 11.92 | 10.0 83 | 5.332 |
| 10.0V | 335.5 | 23 5.0 | 176.0 | 108.6 | 62.11 | 35.1 2 | 24 .96 | 20.64 | 16.22 | 11.83 | 9.986 | 5.235 |
| 10.2V | 316.1 | 22 6.7 | 173.3 | 107.6 | 61.54 | 34.8 4 | 24 .77 | 20.54 | 16.13 | 11.73 | 9.889 | 5.138 |
| 10.5V | 283.9 | 20 9.2 | 165.0 | 104.9 | 60.96 | 34.5 7 | 24 .67 | 20.35 | 15.94 | 11.63 | 9.792 | 5.041 |
| 10.8V | 256.2 | 19 0.8 | 152.1 | 100.3 | 59.52 | 33.9 3 | 24 .00 | 19.87 | 15.65 | 11.44 | 9.695 | 4.944 |
| 11.1V | 223.0 | 17 0.5 | 136.4 | 93.98 | 56.54 | 33.3 8 | 22 .94 | 18.91 | 14.98 | 10.96 | 9.404 | 4.654 |

Constant Power Discharge Characteristics: W (25°C)

| FV/Time | 5 MIN | 10 MIN | 15 MIN | 30 MIN | 1 HR | 2 HR | 3 HR | 4 HR | 5 HR | 8 HR | 10 HR | 20 HR |
|---------|-------|--------|--------|--------|--------|-------|--------|-------|-------|--------|-------|-------|
| 9.60V | 35 92 | 2626 | 1934 | 124 6 | 713 .7 | 418.6 | 28 9.2 | 239.6 | 188.9 | 138 .4 | 113.4 | 59.89 |
| 10.0V | 35 18 | 2509 | 1894 | 123 0 | 710 .2 | 417.0 | 28 8.6 | 239.0 | 187.8 | 137 .8 | 112.2 | 59.30 |
| 10.2V | 33 21 | 2425 | 1868 | 121 6 | 705 .0 | 413.1 | 28 6.8 | 237.9 | 187.2 | 136 .6 | 111.6 | 58.72 |
| 10.5V | 29 91 | 2241 | 1781 | 118 8 | 698 .1 | 409.3 | 28 5.1 | 236.2 | 185.5 | 135 .5 | 110.5 | 58.14 |
| 10.8V | 26 90 | 2035 | 1637 | 113 4 | 680 .8 | 403.3 | 27 8.2 | 229.8 | 182.6 | 132 .6 | 109.3 | 57.56 |
| 11.1V | 23 22 | 1807 | 1461 | 106 3 | 645 .1 | 384.7 | 26 4.4 | 218.9 | 173.4 | 127 .9 | 105.8 | 55.23 |

ELI 35F

CARBON FIBRE (Agm series) 12V135Ah (C20)

ELI 35F is a carbon fibre Agm deep cycle battery with a 15 year floating design life. The carbon fibre technology employed in this new range of advanced batteries significantly increases the cycle life compared to conventional Agm and Gel designs. This is achieved by the provision of a reinforced carbon fibre matrix within the oxide paste eliminating completely oxide shredding whilst inhibiting sulphation of the plates permanently. The battery has been designed for use in Solar Energy (off-grid), Marine, Golf carts, and Electric vehicle (EV) applications. An unrivalled 7 year warranty is offered globally throughout our network of international dealers.



Specifications

| | | | |
|-----------------------------|---|--|---|
| Cells Per Unit | 6 | Normal Operating Temperature Range | 25°C±5°C |
| Voltage Per Unit | 12 | Float Charging Voltage | 13.20-13.40 VDC/unit Average at 25°C |
| Capacity | 135Ah@20hr-rate to 1.75V per cell @25°C | Recommended Maximum Charging Current Limit | 36A |
| Weight | Approx. 33.0 Kg | Equalisation and Cycle Service | 14.20 to 14.40 VDC/unit Average at 25°C |
| Max. Discharge Current | 1400A (5 sec) | Self Discharge | Elecsol batteries can be stored for more than 6 months at 25°C. Self-discharge ratio less than 1.70% per month at 25°C. Please charge batteries before using. |
| Internal Resistance | Approx. 4 mV | Terminal | A Terminal |
| Operating Temperature Range | Discharge: -20°C~60°C Charge: -0°C~50°C Storage: -20°C~60°C | Container Material | A.B.S. (UL94-HB), Flammability resistance of UL94-V1 can be available upon request. |

For Technical Graphs please see pages 16 & 17



VALVE
REGULATED



GRID PLATE



NOMINAL
CAPACITY
60-330 Ah



BLOCK
BATTERY



1200 CYCLES
ACC. TO
IEC 896-2



MAINTENANCE
FREE
(NO TOPPING UP)



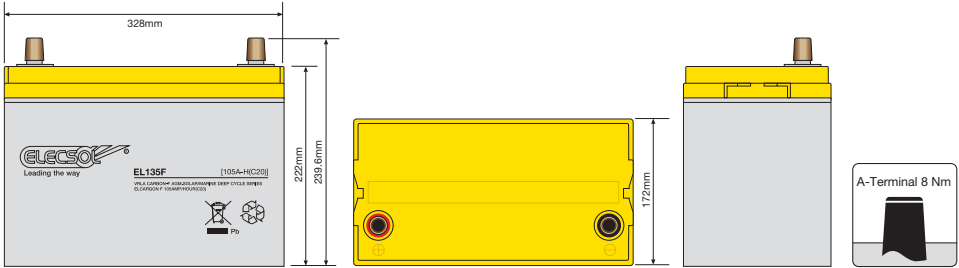
PROOF AGAINST
DEEP DISCHARGE
ACC. TO DIN 43 539 T5



RECYCLABLE

DIMENSIONS

Dimensions: 328mm(L) x 172mm(W) x 222mm(H). Overall height including terminal 239.6mm



Constant Current Discharge Characteristics: A (25°C)

| FV/Time | 5 MIN | 10 MIN | 15 MIN | 30 MIN | 1 HR | 2 HR | 3 HR | 4 HR | 5 HR | 8 HR | 10 HR | 20 HR |
|---------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 9.60V | 413.6 | 296.4 | 215.7 | 132.5 | 74.88 | 42.75 | 30.07 | 24.88 | 19.58 | 14.31 | 12.10 | 6.40 |
| 10.0V | 402.6 | 282.0 | 211.2 | 130.3 | 74.53 | 42.43 | 29.95 | 24.77 | 19.47 | 14.19 | 11.98 | 6.28 |
| 10.2V | 379.3 | 272.1 | 207.9 | 129.1 | 73.84 | 42.10 | 29.72 | 24.65 | 19.35 | 14.08 | 11.87 | 6.17 |
| 10.5V | 340.6 | 251.0 | 198.0 | 125.9 | 73.15 | 41.78 | 29.61 | 24.42 | 19.12 | 13.96 | 11.75 | 6.05 |
| 10.8V | 307.4 | 228.9 | 182.5 | 120.4 | 71.42 | 41.03 | 28.80 | 23.85 | 18.78 | 13.73 | 11.63 | 5.93 |
| 11.1V | 267.6 | 204.6 | 163.7 | 112.8 | 67.85 | 39.21 | 27.53 | 22.69 | 17.97 | 13.15 | 11.29 | 5.58 |

Constant Power Discharge Characteristics: W (25°C)

| FV/Time | 5 MIN | 10 MIN | 15 MIN | 30 MIN | 1 HR | 2 HR | 3 HR | 4 HR | 5 HR | 8 HR | 10 HR | 20 HR |
|---------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 9.60V | 3939 | 2881 | 2121 | 1495 | 856.4 | 491.8 | 347.0 | 287.5 | 226.7 | 166.1 | 136.1 | 71.86 |
| 10.0V | 3859 | 2751 | 2077 | 1476 | 852.2 | 489.8 | 346.3 | 286.8 | 225.3 | 165.4 | 134.7 | 71.17 |
| 10.2V | 3643 | 2660 | 2049 | 1459 | 846.0 | 485.3 | 344.2 | 285.5 | 224.6 | 164.0 | 134.0 | 70.47 |
| 10.5V | 3280 | 2458 | 1954 | 1426 | 837.7 | 480.8 | 342.1 | 283.4 | 222.6 | 162.6 | 132.6 | 69.77 |
| 10.8V | 2951 | 2231 | 1795 | 1361 | 817.0 | 473.8 | 333.8 | 275.8 | 219.1 | 159.1 | 131.2 | 69.07 |
| 11.1V | 2547 | 1982 | 1603 | 1275 | 774.1 | 451.9 | 317.3 | 262.7 | 208.1 | 153.5 | 127.0 | 66.28 |

EL250F

CARBON FIBRE (Agm series) 12V250Ah (C20)

EL250F is a carbon fibre Agm deep cycle battery with a 15 year floating design life. The carbon fibre technology employed in this new range of advanced batteries significantly increases the cycle life compared to conventional Agm and Gel designs. This is achieved by the provision of a reinforced carbon fibre matrix within the oxide paste eliminating completely oxide shredding whilst inhibiting sulphation of the plates permanently. The battery has been designed for use in Solar Energy (off-grid), Marine, Golf carts, and Electric vehicle (EV) applications. An unrivalled 7 year warranty is offered globally throughout our network of international dealers.



Specifications

| | | | |
|-----------------------------|---|--|---|
| Cells Per Unit | 6 | Normal Operating Temperature Range | 25°C±5°C |
| Voltage Per Unit | 12 | Float Charging Voltage | 13.20-13.60 VDC/unit Average at 25°C |
| Capacity | 250Ah@20hr-rate to 1.75V per cell @25°C | Recommended Maximum Charging Current Limit | 60A |
| Weight | Approx. 60.0 Kg | Equalisation and Cycle Service | 14.20 to 14.40 VDC/unit Average at 25°C |
| Max. Discharge Current | 2200A (5 sec) | Self Discharge | Elecsol batteries can be stored for more than 6 months at 25°C. Self-discharge ratio less than 1.70% per month at 25°C. Please charge batteries before using. |
| Internal Resistance | Approx. 4 mV | Terminal | A Terminal |
| Operating Temperature Range | Discharge: -20°C~60°C Charge: -0°C~50°C Storage: -20°C~60°C | Container Material | A.B.S. (UL94-HB), Flammability resistance of UL94-V1 can be available upon request. |

For Technical Graphs please see pages 16 & 17



VALVE
REGULATED



GRID PLATE



NOMINAL
CAPACITY
60-330 Ah



BLOCK
BATTERY



1200 CYCLES
ACC. TO
IEC 896-2



MAINTENANCE
FREE
(NO TOPPING UP)



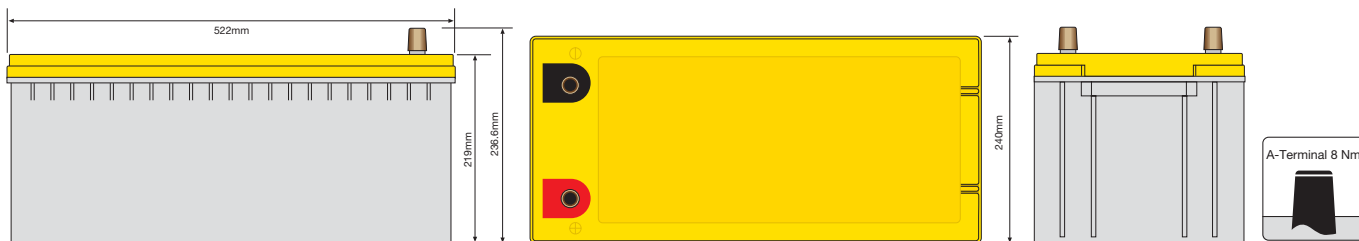
PROOF AGAINST
DEEP DISCHARGE
ACC. TO DIN 43 539 T5



RECYCLABLE

DIMENSIONS

Dimensions: 522mm(L) x 240mm(W) x 219mm(H). Overall height including terminal 236.6mm



Constant Current Discharge Characteristics: A (25°C)

| FV/Time | 5 MIN | 10 MIN | 15 MIN | 30 MIN | 1 HR | 2 HR | 3 HR | 4 HR | 5 HR | 8 HR | 10 HR | 20 HR |
|---------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|--------|
| 9.60V | 626.9 | 449.2 | 355.7 | 223.1 | 130.0 | 72.62 | 52.20 | 43.20 | 35.36 | 24.84 | 21.01 | 11.11 |
| 10.0V | 610.1 | 427.4 | 348.4 | 219.4 | 129.4 | 72.07 | 52.00 | 43.00 | 35.15 | 24.64 | 20.80 | 10.91 |
| 10.2V | 574.9 | 412.3 | 342.9 | 217.5 | 128.2 | 71.53 | 51.60 | 42.80 | 34.94 | 24.44 | 20.60 | 10.70 |
| 10.5V | 516.3 | 380.5 | 326.5 | 212.0 | 127.0 | 70.98 | 51.40 | 42.40 | 34.53 | 24.24 | 20.40 | 10.50 |
| 10.8V | 480.4 | 347.0 | 301.0 | 202.7 | 124.0 | 69.71 | 50.00 | 41.40 | 33.90 | 23.83 | 20.20 | 10.301 |
| 11.1V | 418.2 | 310.1 | 270.0 | 189.9 | 117.8 | 66.61 | 47.80 | 39.40 | 32.45 | 22.82 | 19.59 | 9.695 |

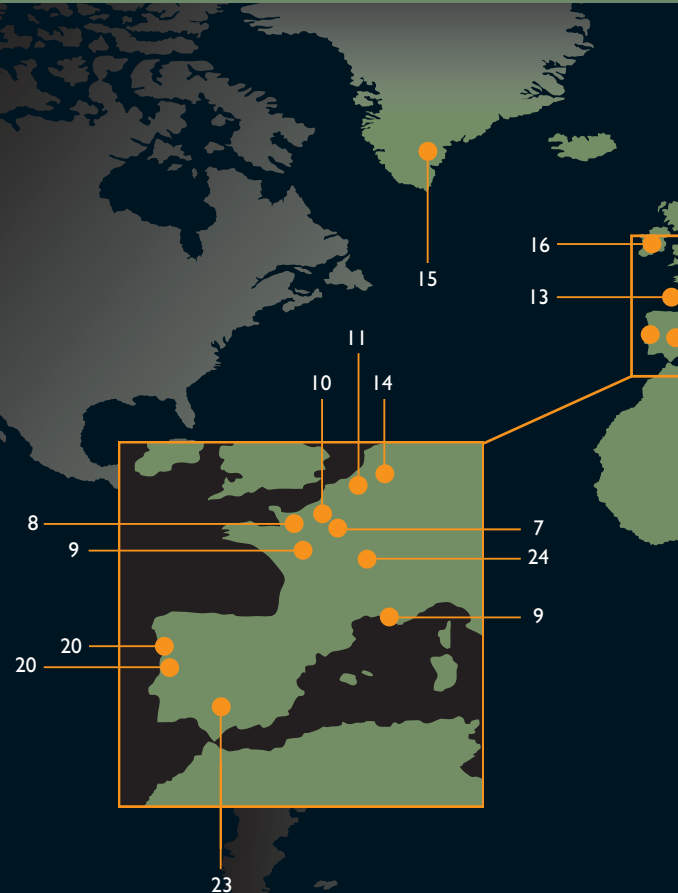
Constant Power Discharge Characteristics: W (25°C)

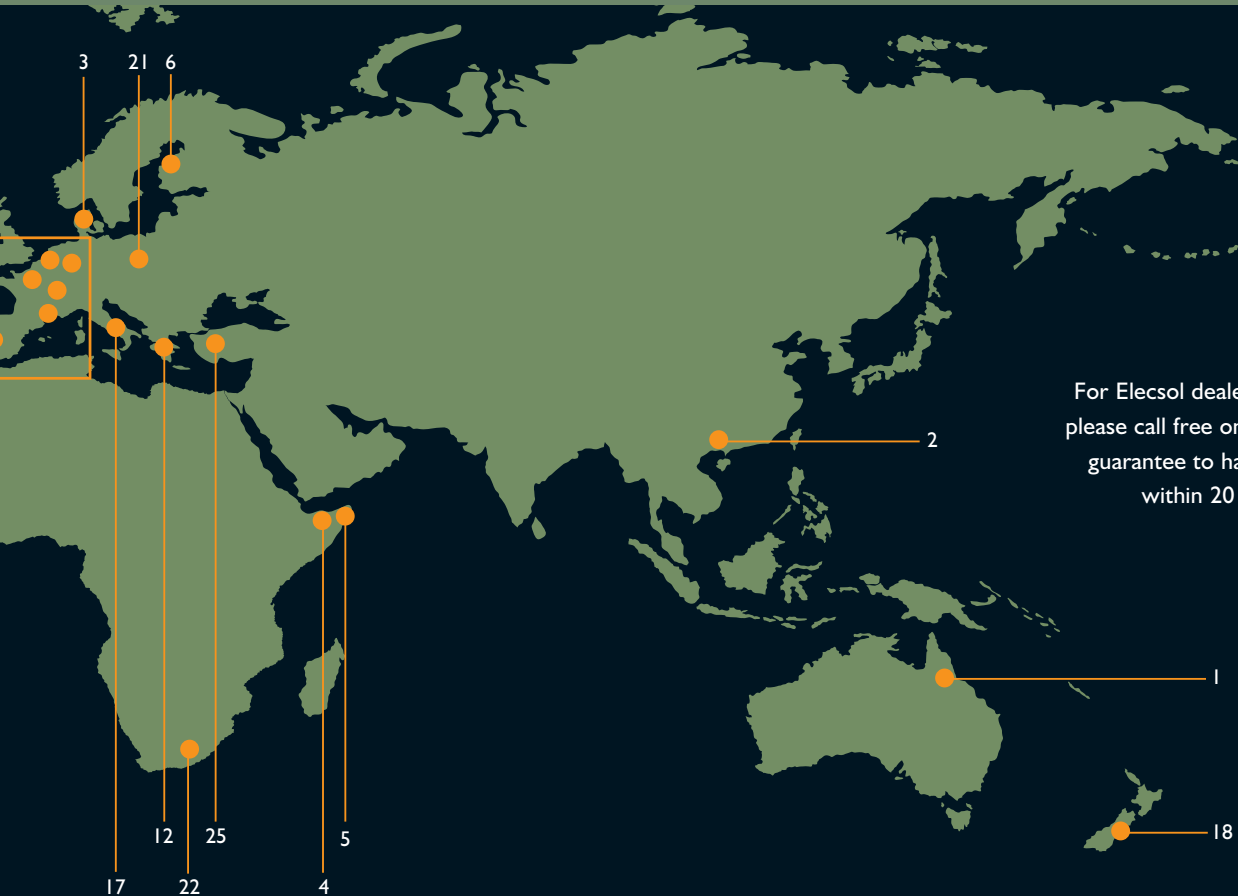
| FV/Time | 5 MIN | 10 MIN | 15 MIN | 30 MIN | 1 HR | 2 HR | 3 HR | 4 HR | 5 HR | 8 HR | 10 HR | 20 HR |
|---------|-------|--------|--------|--------|------|-------|-------|-------|-------|-------|-------|-------|
| 9.60V | 5971 | 4501 | 3751 | 2466 | 1487 | 835.4 | 602.4 | 499.2 | 409.3 | 288.3 | 236.2 | 124.8 |
| 10.0V | 5849 | 4299 | 3673 | 2435 | 1480 | 832.1 | 601.2 | 498.0 | 406.8 | 287.1 | 233.8 | 123.6 |
| 10.2V | 5521 | 4156 | 3623 | 2407 | 1469 | 824.5 | 597.6 | 495.6 | 405.6 | 284.7 | 232.6 | 122.3 |
| 10.5V | 4971 | 3840 | 3455 | 2352 | 1454 | 816.8 | 594.0 | 492.0 | 401.9 | 282.2 | 230.1 | 121.1 |
| 10.8V | 4610 | 3487 | 3174 | 2245 | 1418 | 804.8 | 579.6 | 478.8 | 395.6 | 276.2 | 227.7 | 119.9 |
| 11.1V | 3980 | 3096 | 2834 | 2103 | 1344 | 767.7 | 550.8 | 456.0 | 375.6 | 266.5 | 220.5 | 115.1 |

STRATEGIC PARTNERS

Elecsol distributors and partners around the world.

- | | | | |
|----|----------------------------------|----|-------------------------------------|
| 1 | Australia, Absorbed Power Units | 14 | Holland, Centurion Akku |
| 2 | China, Shenzhen Royal Technology | 15 | Iceland, Naust Marine |
| 3 | Denmark, Scanpocon | 16 | Ireland, Surface Power Technologies |
| 4 | Dubai, Modolights | 17 | Italy, Saim Roma |
| 5 | Dubai, Nathher Tech Services | 18 | New Zealand, Alpatron Pacific |
| 6 | Finland, Euro Solar | 19 | Portugal, Autosil |
| 7 | France, Chantier Naval | 20 | Portugal, Energyvolt Iberica SA |
| 8 | France, Démi Cley | 21 | Poland, Sonar |
| 9 | France, Sea-Energy | 22 | South Africa, Business Marine |
| 10 | France, SECMA | 23 | Spain, Technibat |
| 11 | Germany, Stange Energie Technik | 24 | Switzerland, Hollinger Solar |
| 12 | Greece, Proosis SA | 25 | Turkey, Marine Deniz |
| 13 | Guernsey, RG Ellis Limited | | |

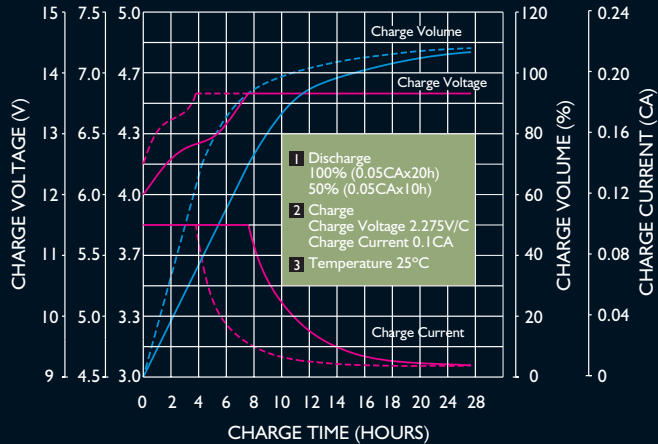




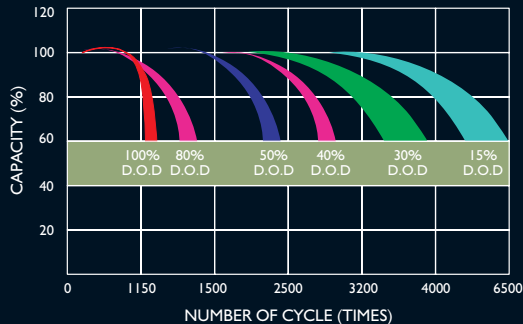
For Elecsol dealers in the UK and Ireland please call free on 0800 16 32 98. We can guarantee to have a stockist nationwide within 20 miles of your post code.

TECHNICAL CHARTS

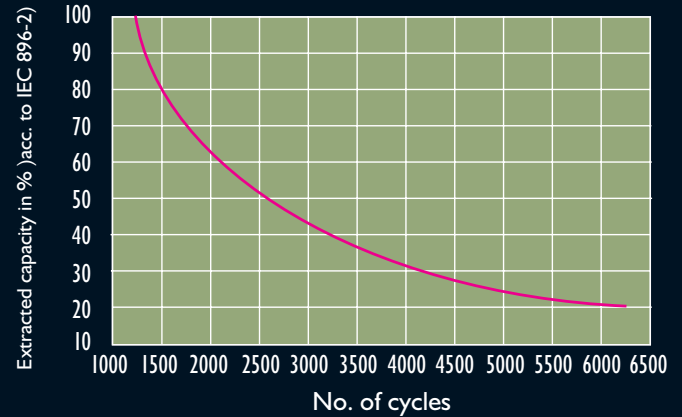
Charge characteristic curve for standby use



Life characteristics of cycle use



Endurance cycles



Discharge characteristic curve

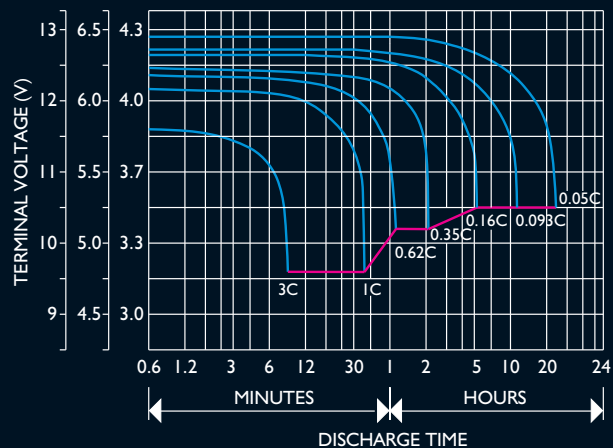
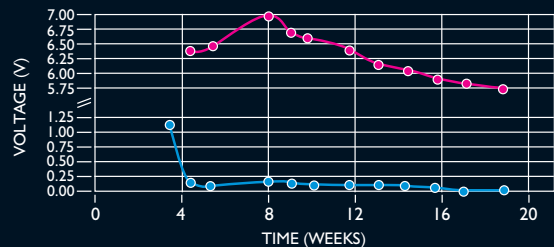


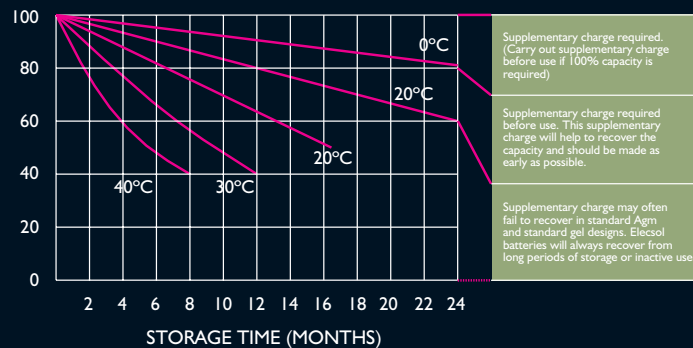
Plate sulphation



—●— ELECSOL ELI 15F Agm —●— Standard Type

Batteries were submerged in a heated bath at 40°C for three months and short circuited to 0.00 volts. The ability to recover charging voltage was then measured.

Storage characteristic



TECHNOLOGY OVERVIEW AND BENEFITS

Overview

The latest range of Elecsol batteries and the technical research and development programme we implemented in launching this new technology has taken performance and cycling expectations beyond our initial expectations.

We are achieving stable cycling of 1150 cycles at 100% DoD (Depth of Discharge) and over 6,500 cycles at 15% DoD.

Carbon fibre is not only a very strong material, but also an excellent electrical conductor. When used in the manufacturing process, it reinforces the lead plates and helps prevent the plates from shredding the oxide paste. Millions of strands of carbon fibre build up a conductive network within the grid itself. This gives greater plate surface area able to absorb the charging current faster and more efficiently. Carbon fibres act as an osmosis pump ensuring acid is drawn deeper into the plate, utilising more of the potential capacity.



ULTIMATE 7 YEAR GUARANTEE

A full 7 year guarantee is offered worldwide on our Agm technology for deep cycle applications.



UNRIVALLED PERFORMANCE WITH SOLAR

Elecsol batteries complement the use of solar panels, they are capable of accepting even the smallest amount of charging current - allowing for overcast conditions whilst ensuring optimum power output at all times.



INVERTER USE

Elecsol batteries offer the perfect solution for use with inverters, they can accept higher charging currents whilst ensuring they can be continuously over discharged or even left in a discharged state permanently with no loss of capacity on recharge.



INNOVATION BY Elecsol (NO PLATE SULPHATION)

Incredible but true! The major failure of traditional batteries is plate sulphation. This is caused by continuously discharging the battery or leaving the battery in a flat condition. Upon recharging, the capacity loss is significant as a large portion of the battery plates have a permanent deposition of lead sulphate. Carbon fibre technology incorporated in the Elecsol range of batteries ensures the battery can be deeper discharged without permanent damage resulting. Highly conductive carbon fibres allow acid to flow deeper into the plate forming a conductive network within the grid preventing the build up of lead sulphation.



IMPROVED CYCLE LIFE

The carbon fibre technology employed in the Elecsol Agm series provide for 1150 deep cycles to 100% DoD of discharging and 6500 cycles to 15% DoD.



A WORLD OF APPLICATIONS

Employed worldwide by a diverse consumer and industrial user platform, our products can be used successfully in the following applications; Solar, Marine, RV's, EV's, Access platforms, Floor scrubbing machines, Portable traffic lights and emergency services including police and ambulances.



A BATTERY SO ADVANCED IT'S GUARANTEED 7 YEARS AHEAD

Elecsol batteries have proven themselves over the last 15 years to offer more life, consistent power and an unrivalled worldwide warranty. Our latest range integrates pioneering battery technology and brings the highest possible performance currently available.



BATTERY RECOVERY

Long periods of storage or inactivity will not affect the recovery rate of Elecsol batteries, compared to standard Agm and standard gel designs which may fail to recover.



SAFETY

Since all the electrostatic acid is contained in glass mats (boron silicate), the battery cannot spill even when broken. This makes Elecsol Agm batteries non hazardous and suitable for transportation on aircraft.



A RECOMBIENT BATTERY

The Elecsol Agm battery is recombinant, this means that the oxygen and hydrogen recombine inside the battery. The new batteries use gas phase transfer of oxygen to negative plates to recombine them back to water while charging and preventing the loss of water through electrolysis. The recombining is typically 99% efficient, so no water is lost.



CHARGING VOLTAGES

The charging voltages are the same for any standard battery. There is no need for any special adjustments or problems with incompatible chargers or charge controllers. Since the internal resistance is extremely low there is almost no heating of the battery, even under heavy charge or discharge currents. The Elecsol Agm batteries have no charge or discharge current restriction.



EXCEPTIONALLY LOW SELF DISCHARGE

The Elecsol range of Agm batteries discharge only 0.5% - 0.7% per month. This means they can stay in storage for much longer without the need for recharging. The plates are tightly packed and can withstand shock and irritation better than a standard battery.

Elecsol AND SOLAR ENERGY

Because of its charging characteristics, Elecsol Agm batteries are very well suited to act as a means of energy storage in solar applications, independent from grid or in off-grid applications.

The solar panel

In an autonomous photo-voltaic installation, in most cases the solar panels are connected in series / parallel. A regular 55W solar panel produces a maximum current of 3A at 17Volt. Of course there are more powerful solar panels but the concept is the same.

For instance, 10 solar panels can be used in parallel (dependent on the controller used): all positive and negative connections from the panels on the controller are made at the same point and the whole

system can supply 17V/30Apeak. The advantage, when applied in a 2 x 5 series / parallel system, is that thinner cabling can be used because of reduced current (34V/30Apeak).

Please read the documentation that comes with the solar panel / controller very carefully because wrong connections can cause severe damage to the system.

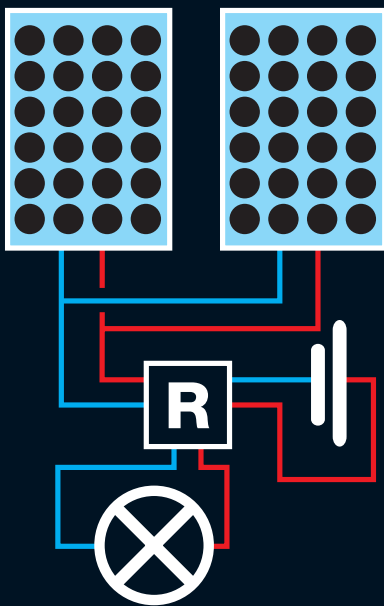
The controller

The controller of a solar installation controls both charging of the batteries and depth of discharge (DoD). The effectiveness of the deep discharge protection is however dependent on the system chosen. Often this device is nothing more than a protection against reversed polarity so that the batteries can be discharged extremely deep. An item to take into account very carefully,

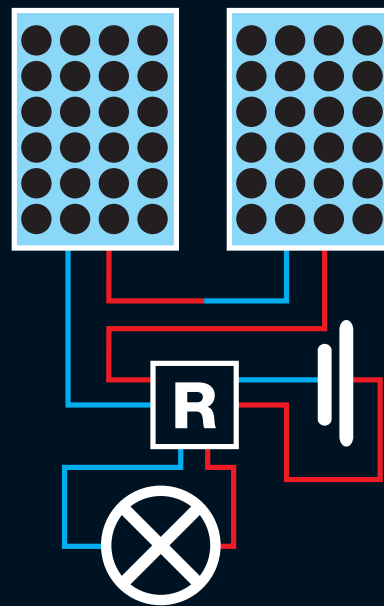
Often the controller can be adjusted for both charging and cut-off voltage. For setting the charging parameters follow the chapter 'charging'

from the manual. The 100% state of charging needs to be reached during daytime: when not fully charged, discharging cycles will go deeper and deeper and the battery may fail prematurely. A proper setting of a deep discharge protection is a cut-off voltage of around 11.5V per 12V battery. Over the range discharge currents (C20 / C100) 11.5V corresponds with a depth of discharge of 50%. If the controller is programmable, it is best to add an equalisation step to the charging parameters to boost the battery to 100% once a week.

12V SYSTEM
PANELS IN PARALLEL



24V SYSTEM
PANELS IN SERIES



TECHNICAL ADVICE

Monoblock requirements

Whenever a choice CAN be made, always design a parallel system as small as possible. Still, a single monoblock system is to be preferred. Small differences in the parallel system may cause problems that could easily be prevented by using a single battery, i.e. one battery instead of two batteries in parallel.

For the correct functioning of Elecsol batteries connected in parallel it is very important that performances of the connected monoblocks are equal. This means the modules have to be taken into service as 'set' of the same age and type. Mixing battery types causes trouble, the smaller one is overcharged and the bigger one is starved and will lose capacity.

Certainly in this case requirements have to be met by the batteries used to make the system. When i.e. three brand new batteries are placed in a system with one older battery, performance will never exceed that of the worst one in the set-up.

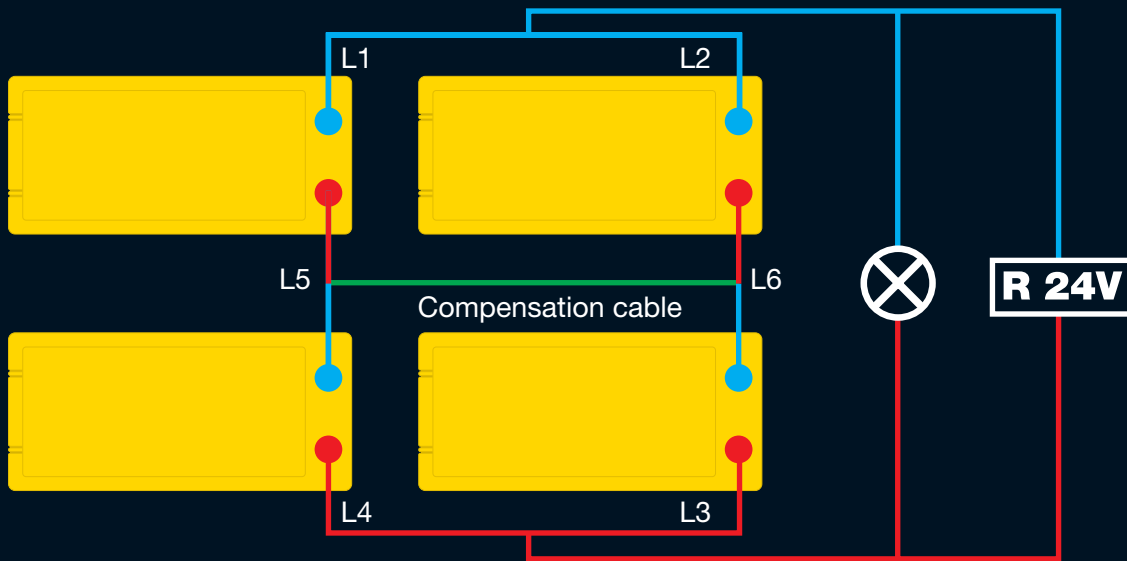
- Choose the number of batteries placed in as small as possible.
- Use only batteries of same make, type and age.

The Series/parallel connection

With a series/parallel connection the advantages of the both connection types can be combined: both voltage and capacity are being increased. Four Elecsol monoblocks in a series/parallel connection result in a 24V/450Ah system. A very important but often forgotten part in a series/parallel set-up is the so-called compensation cable. This cable, mounted between the series strings, takes care of voltage differences over both strings by equalisation. In an ideal situation, with 100% identical batteries, this cable is currentless.

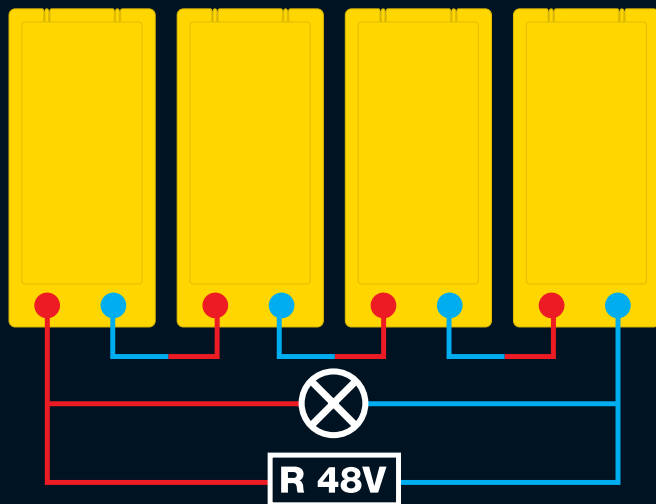
The rules for cabling a series, parallel, or series / parallel connection are identical to those for a charger: the diameter of the cable has to match the highest current, in this case also the discharging current instead of charging current:

- Calculate the diameter of the cables according to the question:
[HIGHEST current] x 0.25 x metres.
- If the result is not a standard diameter, choose for the higher standard one.
- Use cable lengths $L1 = L2 = L3 = L4$ and $L5 = L6$
($L1 - 4$ do not necessarily have to match $L5-6$).
- Use the same cable type for ALL connections.
- Only use good quality cable without defects or damages.



Always be very careful when making these connections and be sure they are properly fused and can be disconnected over a main switch. A wrong connection can result in a short circuit and fire.

In very small solar systems like the ones used in caravans or campers, a single battery provides enough energy. A more demanding application like an off-grid bungalow has a higher need for power and therefore needs more batteries. For a long battery life certain rules must be observed strictly, especially when batteries are connected in parallel.



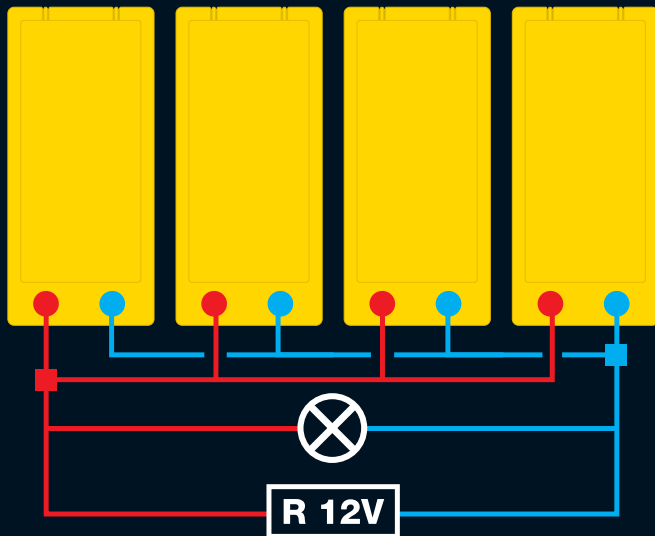
Connection in series

A connection in series has been made when the power, supplied to or taken from the batteries, becomes very high and resistance of the wiring could be a problem. Compare this to i.e. the starter system of a truck versus a car: the system in a car consists of one starter battery in a 12V system and a starter motor of 1.2kW. The current needed to start the engine $1200W / 12V = 100A$. The engine of a truck is much heavier as is the starter motor. A break-away power of 14kW is not unusual. In a 12V / 14.4kW set-up this would mean the battery has to deliver 1200A. This is not only an extremely high current for one battery, but it would also require large diameter wiring.

To reduce the wiring diameters in solar applications, connection in series is usual. The scheme opposite shows the wiring of a 48 Volt system with 4 Elecsol batteries connected series. Compared to a 12V installation of the same power range, the current is only 25%, which means wiring diameter and cost can be reduced. In private applications 24 Volt systems are commonly used. Their layout, comprising two Elecsol batteries, is comparable to the 48V system shown.

Monoblock requirements

For the correct functioning of Elecsol batteries connected in series, it is very important that performances of the connected monoblocks are equal. This means the modules have to be taken into service as a 'set' of the same age and type. Mixing battery types causes trouble because the smaller one is overcharged and the bigger one is starved and will lose capacity.



Parallel connection

A connection in parallel is made when the number of solar panels is a system or the need for power exceeds the performance of a single battery. A parallel connection doesn't increase the voltage like a connection in series, but increases the capacity.

Two Elecsol 250 Agm batteries connected in parallel act as if the set were a single 500Ah/C100 monoblock. The capacity has doubled. When making a connection in parallel, specific attention is needed for the cabling used. It is of the utmost importance that ALL the wires from the terminal to the central conductor are of the same length.

A difference in length means a difference in resistance which results in an undercharged battery on one end of the chain and an overcharged battery on the other end. This comes from the fact that in parallel connection the voltage is constant and current varies:

$V = I \times R$ (voltage = current x resistance).

CARBON FIBRE AGM TRANSPORTATION

Elcesol batteries contain sulphuric acid electrolyte, which is suspended in gel medium. In this way the electrolyte is completely immobilised and no spillage can occur even if the case is ruptured.

BY AIR



“Batteries, wet, non-spillage, electric storage”

- UN No. 2800
- Class 8, Corrosive
- Packaging Group III
- Packaging instruction 806
- Non-hazardous for passengers of cargo transportation (provision A67 refers)
- See ICAO Doc 9284-AN/905

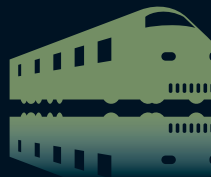
BY ROAD



“Batteries, wet, non-spillage, electric storage”

- UN No. 2800
- Class 8
- Exempt from ADR requirements

BY RAIL



“Batteries, wet, non-spillage, electric storage”

- UN No. 2800
- Class 8
- Exempt from RID requirements

BY SEA



“Batteries, wet, non-spillage, electric storage”

- IMDG Code 8121
- UN No. 2800
- Class 8
- Packaging Group III
- EMS No. 8-10
- MFAG Table No. None

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we want to make a real difference to how our
customers enjoy their leisure time.

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