# ADDO



SEALED MAINTENANCE FREE AND DRY CHARGE BATTERIES





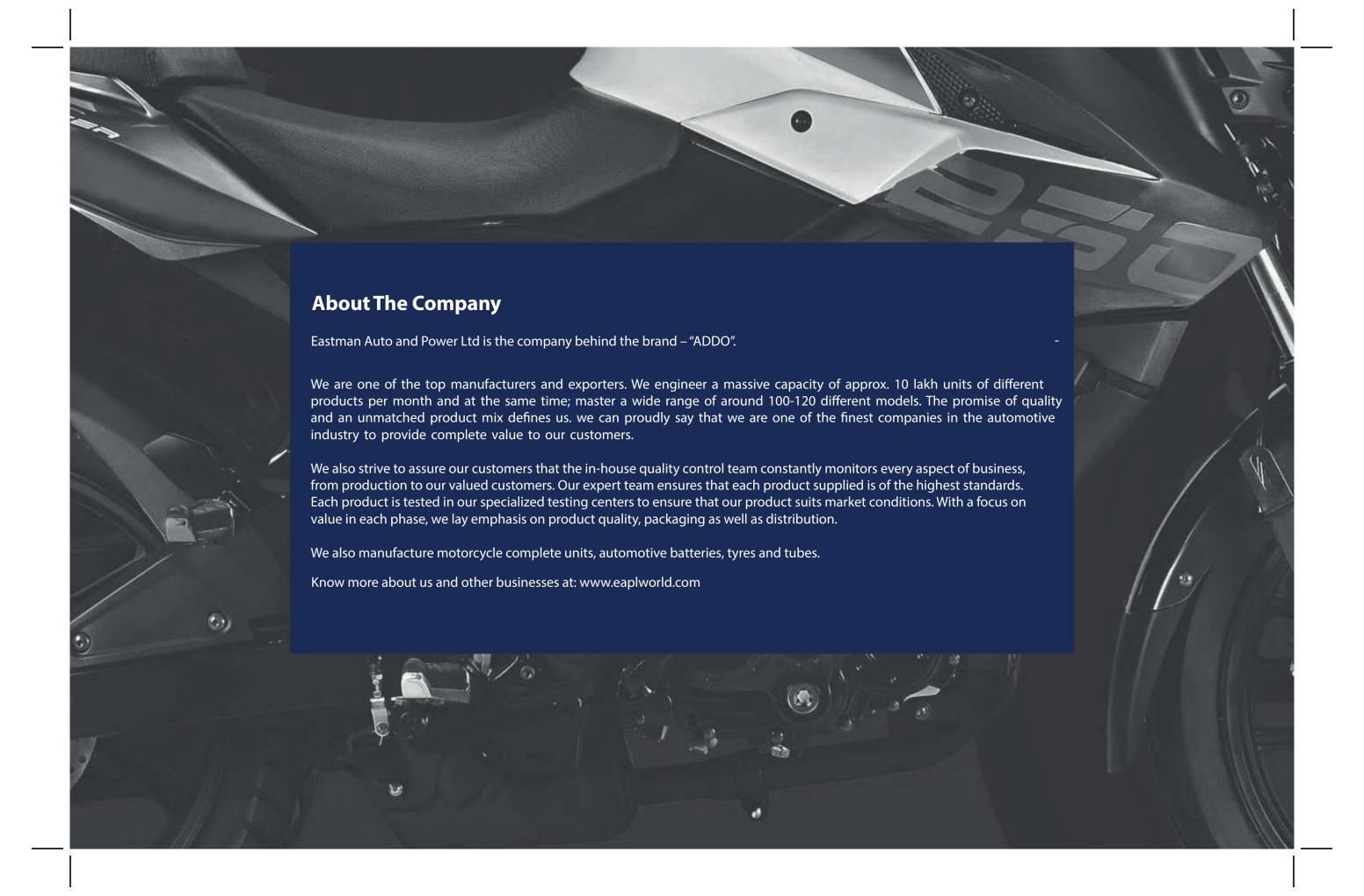






## **Contents**

COMPANY	4-5 OUR BATTERY RANGE	6-7 SEALED MAINTENANCE FREE BATTERY
8-9 DRY CHARGE BATTERY	10-11 BATTERY CHARGER	12-13 HOW TO CHARGE A BATTERY
14-15 TECHNICAL FEATURES	16-17 BATTERY SAFETY	18 BATTERY TESTING
19 QUALITY CERTIFICATIONS		





### **Reliable And Secure**

ADDO batteries are the trusted choice around the world for standby power in applications where system integrity is a paramount. Our batteries incorporate high energy density, advanced plate technology and a sealed construction to provide complete peace of mind. Other features include:

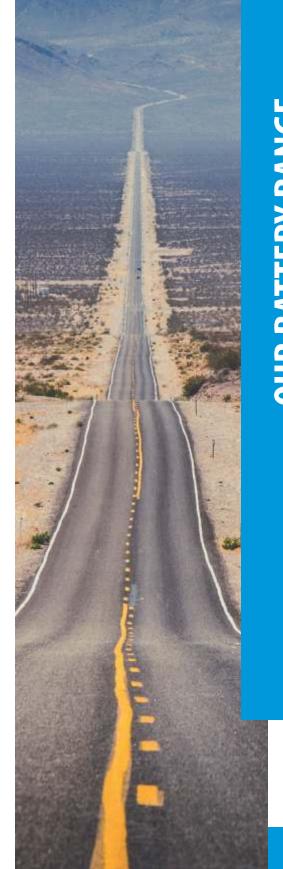
- Superb recovery from deep discharge
- Electrolyte suspension system
- No watering due to gas recombination
- <sup>n</sup> Usable in any orientation but not continuously inverted
- Superior energy density
- Application specific designs

Presenting our range of batteries to outlive every other battery:

- 1. Sealed Maintenance Free (SMF) Battery
- 2. Dry Charge Battery

Every product is a result of countless hours of research combined with an innumerable dedication from our employees. With the following features, we promise complete reliability of our batteries.

Component	Features	Benefits
Cast Grid	Special Grid Design	Severe vibration resistance & improved conductivity
Active Material	Proprietary Formulation	Reduced shedding, maximum utilization, & long service life
Pasted Plates	Specified Thickness & Weight	Ensures vibration resistance through precise compression & proper service life through specified active material balance
Dry-Charged Plates	Tank Formed & Dried Plates	Properly dried plates in a sealed battery have a virtually limitless shelf-life, while still retaining 70-80% state of charge when initially filled with acid
Top Lead Connections	Through-Partition Construction, Large Straps	Shorter current path for increased electrical conductivity & higher starting currents, heavier parts for maximum durability
Case-Cover Seal	Thermal bonded Plastic	Air tight seal to prevent air ingress & acid seepage
Terminal-Cover Seal	Poly-Seal Terminal	Eliminates acid seepage, reduces corrosion, and extends battery life
Case & Cover	Polypropylene	Superior resistance to gasoline & oil, impacts resistant in extreme weather conditions
Additive	Sulphate Stop (Some models)	Sulphate stop is added to reduce the solubility of lead into the acid, which then reduces battery sulphation potential
Grid System	Computer-Designed Radial Grids	Increased conductivity for starting wattage, better vibration resistance
Separator	Puncture Resistant Material	High puncture resistant separator for increased service in high vibration applications





### Product

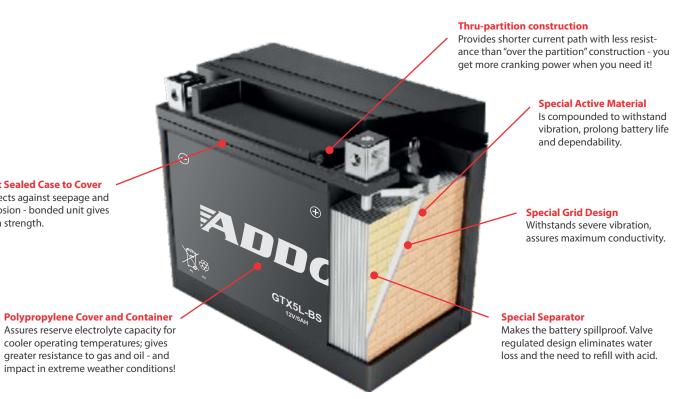
**Heat Sealed Case to Cover** Protects against seepage and corrosion - bonded unit gives

extra strength.

We offer a vast range of Sealed Maintenance Free Batteries (SMF) with no requirement to add water and it's completely sealed. SMF batteries look different than other battery types. They are more compact because there is no free electrolyte (it is used in the form of gel which fills the cavity of plates) making them more "volume efficient" and taking less space for their energy storing capacity. Because they are filled with electrolyte only one time during activation, so there are no filler caps. Instead a sealing plug permanently covers the filler ports. Also, there is no vent tube in this battery.

The construction of this type battery causes internal freed gas to recombine inside the battery, so no vent tube is required. SMF battery can be sealed because inside the battery, the negative plates are never fully charged and therefore don't produce hydrogen gas. The positive plates create oxygen during the discharge process but instead of the oxygen being forced out a vent tube, it reacts with the charged active material on the plates to become water until the battery is charged and the water is transformed into acid. This process is called recombinant technology and this design is what makes our batteries unique.

A "factory activated" battery does not require filling before installation. An extensive activation process ensures complete absorption of the electrolyte so no liquid acid is contained within the battery. This process allows these batteries to be shipped from the factory ready to install.



### **Features:**

- Fully Sealed & Maintenance Free
- Lead-calcium technology
- Good charge acceptance
- High corrosion resistance
- Higher cold cranking start up

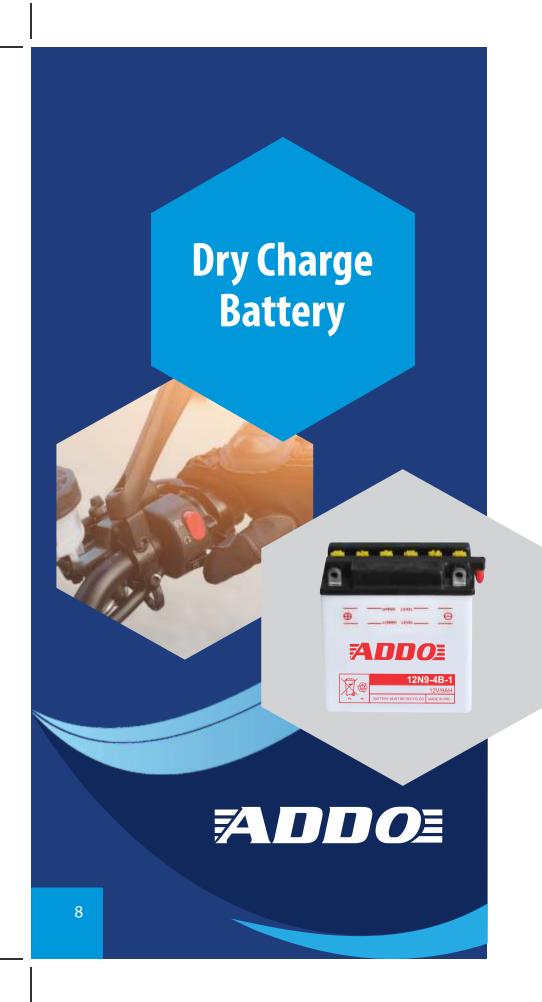
- High vibration resistance
- Spill-Proof
- Higher performance/capacity plus
- Factory charged ready to use
- Low self discharge

- Improved safety
- Leakage proof
- Extreme durability
- Absolute safety and convenience
- Hassle-free installation and use

S No         Model         Type         (V)         (Ah)         Terminal         L         W         H           1         6N4-2A-4         SMF         6         4         +,-         71         71         96           2         12N5-3B         SMF         12         5         -,+         120         61         130           3         YBSL-BS         SMF         12         5         -,+         120         61         130           4         YB7B-B         SMF         12         7         +,-         150         60         130           5         12N7-3A         SMF         12         7         -,+         150         60         130           6         12N7-3B         SMF         12         7         -,+         137         77         126           7         12N7-4B         SMF         12         7         +,-         137         77         126           8         12N7-3B         SMF         12         9         +,-         133         77         136           10         12N9-4B         SMF         12         9         +,-         133         77 <td< th=""><th></th><th></th><th></th><th>Voltage</th><th>Capacity</th><th></th><th></th><th>Size (mm)</th><th></th></td<>				Voltage	Capacity			Size (mm)	
2       12N5-3B       SMF       12       5       -,+       120       61       130         3       Y85L-8S       SMF       12       5       -,+       120       61       130         4       Y87B-B       SMF       12       7       +,-       150       60       130         5       12N7-3A       SMF       12       7       -,+       150       60       130         6       12N7-3A       SMF       12       7       -,+       137       77       126         7       12N7-4B       SMF       12       7       +,-       137       77       126         8       12N9-4B       SMF       12       9       +,-       133       77       136         9       12N9-4B       SMF       12       9       +,-       133       77       136         10       12N9-4B-1       SMF       12       9       +,-       133       77       136         11       12N9-3B       SMF       12       9       +,-       133       77       136         12       12N9-3B       SMF       12       9       +,-       133 <td< th=""><th>S No</th><th>Model</th><th>Туре</th><th>(V)</th><th>(Ah)</th><th>Terminal</th><th>L</th><th>w</th><th>н</th></td<>	S No	Model	Туре	(V)	(Ah)	Terminal	L	w	н
3         YB5L-BS         SMF         12         5         -,+         120         61         130           4         YB7B-B         SMF         12         7         +,-         150         60         130           5         12N7A-3A         SMF         12         7         -,+         150         60         130           6         12N7-3A         SMF         12         7         -,+         137         77         126           7         12N7-4B         SMF         12         7         -,+         137         77         126           8         12N7-3B         SMF         12         9         +,-         133         77         126           9         12N9-4B         SMF         12         9         +,-         133         77         136           10         12N9-4B-1         SMF         12         9         +,-         133         77         136           11         12N9-4B-1         SMF         12         9         +,-         133         77         136           11         12N9-8B         SMF         12         9         +,-         133         77	1	6N4-2A-4	SMF	6	4	+ ,-	71	71	96
4         YB7B-B         SMF         12         7         +,*         150         60         130           5         12N7A-3A         SMF         12         7         -,+         150         60         130           6         12N7-3A         SMF         12         7         -,+         137         77         126           7         12N7-4B         SMF         12         7         -,+         137         77         126           8         12N7-3B         SMF         12         9         +,-         133         77         126           9         12N9-4B         SMF         12         9         +,-         133         77         136           10         12N9-4B-1         SMF         12         9         +,-         133         77         136           11         12N9-4B-1         SMF         12         9         +,-         133         77         136           12         12N9-3B         SMF         12         9         +,-         133         77         136           13         YB2.5L-BS         SMF         12         2.5         -,+         80         70	2	12N5-3B	SMF	12	5	-,+	120	61	130
5         12N7A-3A         SMF         12         7         -,+         150         60         130           6         12N7-3A         SMF         12         7         -,+         137         77         126           7         12N7-4B         SMF         12         7         +,-         137         77         126           8         12N7-3B         SMF         12         7         -,+         137         77         126           9         12N9-4B         SMF         12         9         +,-         133         77         136           10         12N9-4B-1         SMF         12         9         +,-         133         77         136           11         12N9-8S         SMF         12         9         +,-         133         77         136           12         12N9-3B         SMF         12         9         +,-         133         77         136           12         12N9-3B         SMF         12         9         +,-         133         77         136           12         14N9-3B         SMF         12         9         +,-         133         77	3	YB5L-BS	SMF	12	5	-,+	120	61	130
6 12N7-3A SMF 12 7 -,+ 137 77 126 7 12N7-4B SMF 12 7 +,- 137 77 126 8 12N7-3B SMF 12 7 -,+ 137 77 126 8 12N7-3B SMF 12 7 -,+ 137 77 126 9 12N9-4B SMF 12 9 +,- 133 77 136 10 12N9-4B-1 SMF 12 9 +,- 133 77 136 11 12N9-8S SMF 12 9 +,- 133 77 136 11 12N9-8S SMF 12 9 +,- 133 77 136 12 12N9-3B SMF 12 9 +,- 133 77 136 13 YB2.5L-BS SMF 12 9 +,- 133 77 136 14 GTX3L-BS SMF 12 2.5 -,+ 80 70 105 14 GTX3L-BS SMF 12 3 -,+ 98.5 56 109 15 GT4L-BS SMF 12 4 -,+ 114 70 85 16 GTX4L-BS SMF 12 4 -,+ 114 70 85 17 GTZ5S-BS SMF 12 4 -,+ 114 70 85 18 GTZ7S SMF 12 4 -,+ 114 70 105 19 GTX5L-BS SMF 12 5 -,+ 114 70 105 20 GT5AL-BS SMF 12 5 -,+ 114 70 105 21 GB6.5L-B SMF 12 5 -,+ 114 70 105 21 GB6.5L-B SMF 12 6.5 -,+ 139 66 100 22 12N6.5L-BS SMF 12 6.5 -,+ 139 66 100 23 GTXA-BS SMF 12 7 +,- 150 87 93 24 GTZ10 SMF 12 8 +,- 150 87 93 25 GTX7L-BS SMF 12 7 -,+ 114 70 130 26 GTX12-BS SMF 12 7 -,- 150 87 93 26 GTX12-BS SMF 12 10 +,- 150 87 130 27 GTX9-BS SMF 12 10 +,- 150 87 130 28 GTX12-BS SMF 12 12 +,- 150 87 130 29 GTX14-BS SMF 12 12 +,- 150 87 130 29 GTX14-BS SMF 12 12 +,- 150 87 130 29 GTX14-BS SMF 12 12 +,- 150 87 130	4	YB7B-B	SMF	12	7	+ ,-	150	60	130
7         12N7-4B         SMF         12         7         +,-         137         77         126           8         12N7-3B         SMF         12         7         -,+         137         77         126           9         12N9-4B         SMF         12         9         +,-         133         77         136           10         12N9-4B-1         SMF         12         9         +,-         133         77         136           11         12N9-8S         SMF         12         9         +,-         133         77         136           12         12N9-3B         SMF         12         9         +,-         133         77         136           12         12N9-3B         SMF         12         9         +,-         133         77         136           12         12N9-3B         SMF         12         9         +,-         133         77         136           12         14         -,-         133         77         136         10         105         11         13         YB2-51-85         SMF         12         2.5         -,+         80         70         105	5	12N7A-3A	SMF	12	7	-,+	150	60	130
8       12N7-3B       SMF       12       7       -,+       137       77       126         9       12N9-4B       SMF       12       9       +,-       133       77       136         10       12N9-4B-1       SMF       12       9       +,-       133       77       136         11       12N9-3B       SMF       12       9       +,-       133       77       136         12       12N9-3B       SMF       12       9       +,-       133       77       136         12       12N9-3B       SMF       12       9       +,-       133       77       136         12       12N9-3B       SMF       12       9       +,-       133       77       136         12       12N9-3B       SMF       12       9       +,-       133       77       136         12       12N9-3B       SMF       12       9       +,-       133       77       136         12       12N9-3B       SMF       12       2       5       -,+       80       70       105         15       GTX1-BS       SMF       12       4       -,+	6	12N7-3A	SMF	12	7	-,+	137	77	126
9 12N9-4B SMF 12 9 +,- 133 77 136 10 12N9-4B-1 SMF 12 9 +,- 133 77 136 11 12N9-BS SMF 12 9 +,- 133 77 136 11 12N9-BS SMF 12 9 +,- 133 77 136 12 12N9-3B SMF 12 9 +,- 133 77 136 13 Y82,5L-BS SMF 12 2,5 -,+ 80 70 105 14 GTX3L-BS SMF 12 3 -,+ 98.5 56 109 15 GT4L-BS SMF 12 4 -,+ 114 70 85 16 GTX4L-BS SMF 12 4 -,+ 114 70 85 17 GTZ5S-BS SMF 12 4 -,+ 114 70 85 18 GTZ7S SMF 12 5 -,+ 114 70 105 19 GTX5L-BS SMF 12 5 -,+ 114 70 105 20 GTSAL-BS SMF 12 5 -,+ 114 70 105 21 GB6.5L-B SMF 12 5 -,+ 114 70 105 21 GB6.5L-B SMF 12 6.5 -,+ 139 66 100 22 12N6.5L-BS SMF 12 6.5 -,+ 139 66 100 23 GTX7A-BS SMF 12 7 +,- 150 87 93 24 GTZ10 SMF 12 8 +,- 150 87 93 25 GTX1L-BS SMF 12 7 -,+ 114 70 130 26 GTX1L-BS SMF 12 7 -,+ 114 70 130 26 GTX1L-BS SMF 12 7 -,+ 114 70 130 26 GTX1L-BS SMF 12 7 -,+ 114 70 130 26 GTX1L-BS SMF 12 7 -,+ 150 87 93 25 GTX7L-BS SMF 12 7 -,+ 114 70 130 26 GTX1L-BS SMF 12 10 +,- 150 87 105 27 GTX9-BS SMF 12 10 +,- 150 87 105 28 GTX1L-BS SMF 12 10 +,- 150 87 105 28 GTX1L-BS SMF 12 12 4,- 150 87 105 28 GTX1L-BS SMF 12 12 4,- 150 87 130 29 GTX1L-BS SMF 12 12 4,- 150 87 130	7	12N7-4B	SMF	12	7	+ ,-	137	77	126
10 12N9-4B-1 SMF 12 9 +,- 133 77 136 11 12N9-BS SMF 12 9 +,- 133 77 136 12 12N9-3B SMF 12 9 +,- 133 77 136 13 YB2.5L-BS SMF 12 9 +,- 133 77 136 13 YB2.5L-BS SMF 12 2.5 -,+ 80 70 105 14 GTX3L-BS SMF 12 3 -,+ 98.5 56 109 15 GT4L-BS SMF 12 4 -,+ 114 70 85 16 GTX4L-BS SMF 12 4 -,+ 114 70 85 17 GT25S-BS SMF 12 4 -,+ 114 70 85 18 GTZ7S SMF 12 4 -,+ 114 70 105 19 GTX5L-BS SMF 12 5 -,+ 114 70 105 20 GTSAL-BS SMF 12 5 -,+ 114 70 105 21 GB6.5L-B SMF 12 5 -,+ 114 70 105 22 12N6.5L-BS SMF 12 6.5 -,+ 139 66 100 23 GTX7A-BS SMF 12 6.5 -,+ 139 66 100 23 GTX7A-BS SMF 12 7 +,- 150 87 93 24 GT210 SMF 12 7 +,- 150 87 93 25 GTX1L-BS SMF 12 7 -,+ 114 70 130 26 GTX12-BS SMF 12 7 -,+ 114 70 130 26 GTX12-BS SMF 12 7 -,+ 150 87 93 27 GTX9-BS SMF 12 7 -,+ 150 87 130 28 GTX12-BS SMF 12 10 +,- 150 87 130 29 GTX12-BS SMF 12 12 +,- 150 87 130 29 GTX12-BS SMF 12 12 +,- 150 87 130 29 GTX14-BS SMF 12 12 +,- 150 87 130	8	12N7-3B	SMF	12	7	-,+	137	77	126
11       12N9-BS       SMF       12       9       +,-       133       77       136         12       12N9-3B       SMF       12       9       +,-       133       77       136         13       YB2.5L-BS       SMF       12       2.5       -,+       80       70       105         14       GTX3L-BS       SMF       12       3       -,+       98.5       56       109         15       GT4L-BS       SMF       12       4       -,+       114       70       85         16       GTX4L-BS       SMF       12       4       -,+       114       70       85         17       GTZ5S-BS       SMF       12       4       -,+       114       70       85         18       GTZ7S       SMF       12       5       -,+       114       70       85         18       GTZ7S       SMF       12       5       -,+       114       70       105         19       GTX5L-BS       SMF       12       5       -,+       114       70       105         20       GT5AL-BS       SMF       12       5       -,+       114	9	12N9-4B	SMF	12	9	+ ,-	133	77	136
12     12N9-3B     SMF     12     9     +,-     133     77     136       13     YB2.5L-BS     SMF     12     2.5     -,+     80     70     105       14     GTX3L-BS     SMF     12     3     -,+     98.5     56     109       15     GT4L-BS     SMF     12     4     -,+     114     70     85       16     GTX4L-BS     SMF     12     4     -,+     114     70     85       17     GT25S-BS     SMF     12     4     -,+     114     70     85       18     GT27S     SMF     12     5     -,+     114     70     105       19     GTX5L-BS     SMF     12     5     -,+     114     70     105       20     GT5AL-BS     SMF     12     5     -,+     114     70     105       21     GB6.5L-B     SMF     12     6.5     -,+     139     66     100       22     12N6.5L-BS     SMF     12     6.5     -,+     139     66     100       23     GTX7A-BS     SMF     12     7     +,-     150     87     93       24     <	10	12N9-4B-1	SMF	12	9	+ ,-	133	77	136
13         YB2.5L-BS         SMF         12         2.5         -,+         80         70         105           14         GTX3L-BS         SMF         12         3         -,+         98.5         56         109           15         GT4L-BS         SMF         12         4         -,+         114         70         85           16         GTX4L-BS         SMF         12         4         -,+         114         70         85           17         GT25S-BS         SMF         12         4         -,+         114         70         85           18         GT27S         SMF         12         5         -,+         114         70         105           19         GTX5L-BS         SMF         12         5         -,+         114         70         105           20         GT5AL-BS         SMF         12         5         -,+         114         70         105           21         GB6.5L-B         SMF         12         6.5         -,+         139         66         100           22         12N6.5L-BS         SMF         12         7         +,-         150         87<	11	12N9-BS	SMF	12	9	+ ,-	133	77	136
14       GTX3L-BS       SMF       12       3       -,+       98.5       56       109         15       GT4L-BS       SMF       12       4       -,+       114       70       85         16       GTX4L-BS       SMF       12       4       -,+       114       70       85         17       GTZ5S-BS       SMF       12       4       -,+       114       70       85         18       GTZ7S       SMF       12       5       -,+       114       70       105         19       GTX5L-BS       SMF       12       5       -,+       114       70       105         20       GT5AL-BS       SMF       12       5       -,+       114       70       105         21       GB6.5L-B       SMF       12       6.5       -,+       139       66       100         22       12N6.5L-BS       SMF       12       7       -,+       139       66       100         23       GTX7A-BS       SMF       12       7       +,-       150       87       93         24       GTZ10       SMF       12       8       +,-       150 <td>12</td> <td>12N9-3B</td> <td>SMF</td> <td>12</td> <td>9</td> <td>+ ,-</td> <td>133</td> <td>77</td> <td>136</td>	12	12N9-3B	SMF	12	9	+ ,-	133	77	136
15         GT4L-BS         SMF         12         4         -,+         114         70         85           16         GTX4L-BS         SMF         12         4         -,+         114         70         85           17         GTZ5S-BS         SMF         12         4         -,+         114         70         85           18         GTZ7S         SMF         12         5         -,+         114         70         105           19         GTX5L-BS         SMF         12         5         -,+         114         70         105           20         GT5AL-BS         SMF         12         5         -,+         114         70         105           21         GB6.5L-B         SMF         12         6.5         -,+         139         66         100           22         12N6.5L-BS         SMF         12         7         +,-         150         87         93           24         GTZ10         SMF         12         7         +,-         150         87         93           25         GTX1-BS         SMF         12         7         -,+         114         70	13	YB2.5L-BS	SMF	12	2.5	-,+	80	70	105
16       GTX4L-BS       SMF       12       4       -,+       114       70       85         17       GTZ5S-BS       SMF       12       4       -,+       114       70       85         18       GTZ7S       SMF       12       5       -,+       114       70       105         19       GTX5L-BS       SMF       12       5       -,+       114       70       105         20       GT5AL-BS       SMF       12       5       -,+       114       70       105         21       GB6.5L-B       SMF       12       6.5       -,+       139       66       100         22       12N6.5L-BS       SMF       12       6.5       -,+       139       66       100         23       GTX7A-BS       SMF       12       7       +,-       150       87       93         24       GTZ10       SMF       12       8       +,-       150       87       93         25       GTX12-BS       SMF       12       7       -,+       114       70       130         26       GTX12A-BS       SMF       12       9       +,-       150	14	GTX3L-BS	SMF	12	3	-,+	98.5	56	109
17     GTZ5S-BS     SMF     12     4     -,+     114     70     85       18     GTZ7S     SMF     12     5     -,+     114     70     105       19     GTX5L-BS     SMF     12     5     -,+     114     70     105       20     GT5AL-BS     SMF     12     5     -,+     114     70     105       21     GB6.5L-B     SMF     12     6.5     -,+     139     66     100       22     12N6.5L-BS     SMF     12     6.5     -,+     139     66     100       23     GTX7A-BS     SMF     12     7     +,-     150     87     93       24     GTZ10     SMF     12     8     +,-     150     87     93       25     GTX7L-BS     SMF     12     7     -,+     114     70     130       26     GTX12A-BS     SMF     12     10     +,-     150     87     105       27     GTX9-BS     SMF     12     9     +,-     150     87     105       28     GTX12-BS     SMF     12     12     +,-     150     87     130       29 <t< td=""><td>15</td><td>GT4L-BS</td><td>SMF</td><td>12</td><td>4</td><td>-,+</td><td>114</td><td>70</td><td>85</td></t<>	15	GT4L-BS	SMF	12	4	-,+	114	70	85
18         GTZ7S         SMF         12         5         -,+         114         70         105           19         GTXSL-BS         SMF         12         5         -,+         114         70         105           20         GT5AL-BS         SMF         12         5         -,+         114         70         105           21         GB6.5L-B         SMF         12         6.5         -,+         139         66         100           22         12N6.5L-BS         SMF         12         6.5         -,+         139         66         100           23         GTX7A-BS         SMF         12         7         +,-         150         87         93           24         GTZ10         SMF         12         8         +,-         150         87         93           25         GTX7L-BS         SMF         12         7         -,+         114         70         130           26         GTX12A-BS         SMF         12         10         +,-         150         87         105           27         GTX9-BS         SMF         12         9         +,-         150         87 </td <td>16</td> <td>GTX4L-BS</td> <td>SMF</td> <td>12</td> <td>4</td> <td>-,+</td> <td>114</td> <td>70</td> <td>85</td>	16	GTX4L-BS	SMF	12	4	-,+	114	70	85
19     GTX5L-BS     SMF     12     5     -,+     114     70     105       20     GT5AL-BS     SMF     12     5     -,+     114     70     105       21     GB6.5L-B     SMF     12     6.5     -,+     139     66     100       22     12N6.5L-BS     SMF     12     6.5     -,+     139     66     100       23     GTX7A-BS     SMF     12     7     +,-     150     87     93       24     GTZ10     SMF     12     8     +,-     150     87     93       25     GTX7L-BS     SMF     12     7     -,+     114     70     130       26     GTX12A-BS     SMF     12     10     +,-     150     87     105       27     GTX9-BS     SMF     12     9     +,-     150     87     105       28     GTX12-BS     SMF     12     12     +,-     150     87     130       29     GTX14-BS     SMF     12     14     +,-     152     87     145	17	GTZ5S-BS	SMF	12	4	-,+	114	70	85
20     GT5AL-BS     SMF     12     5     -,+     114     70     105       21     GB6.5L-B     SMF     12     6.5     -,+     139     66     100       22     12N6.5L-BS     SMF     12     6.5     -,+     139     66     100       23     GTX7A-BS     SMF     12     7     +,-     150     87     93       24     GTZ10     SMF     12     8     +,-     150     87     93       25     GTX7L-BS     SMF     12     7     -,+     114     70     130       26     GTX12A-BS     SMF     12     10     +,-     150     87     105       27     GTX9-BS     SMF     12     9     +,-     150     87     105       28     GTX12-BS     SMF     12     12     +,-     150     87     130       29     GTX14-BS     SMF     12     14     +,-     152     87     145	18	GTZ7S	SMF	12	5	-,+	114	70	105
21     GB6.5L-B     SMF     12     6.5     -,+     139     66     100       22     12N6.5L-BS     SMF     12     6.5     -,+     139     66     100       23     GTX7A-BS     SMF     12     7     +,-     150     87     93       24     GTZ10     SMF     12     8     +,-     150     87     93       25     GTX7L-BS     SMF     12     7     -,+     114     70     130       26     GTX12A-BS     SMF     12     10     +,-     150     87     105       27     GTX9-BS     SMF     12     9     +,-     150     87     105       28     GTX12-BS     SMF     12     12     +,-     150     87     130       29     GTX14-BS     SMF     12     14     +,-     152     87     145	19	GTX5L-BS	SMF	12	5	-,+	114	70	105
22     12N6.5L-BS     SMF     12     6.5     -,+     139     66     100       23     GTX7A-BS     SMF     12     7     +,-     150     87     93       24     GTZ10     SMF     12     8     +,-     150     87     93       25     GTX7L-BS     SMF     12     7     -,+     114     70     130       26     GTX12A-BS     SMF     12     10     +,-     150     87     105       27     GTX9-BS     SMF     12     9     +,-     150     87     105       28     GTX12-BS     SMF     12     12     +,-     150     87     130       29     GTX14-BS     SMF     12     14     +,-     152     87     145	20	GT5AL-BS	SMF	12	5	-,+	114	70	105
23     GTX7A-BS     SMF     12     7     +,-     150     87     93       24     GTZ10     SMF     12     8     +,-     150     87     93       25     GTX7L-BS     SMF     12     7     -,+     114     70     130       26     GTX12A-BS     SMF     12     10     +,-     150     87     105       27     GTX9-BS     SMF     12     9     +,-     150     87     105       28     GTX12-BS     SMF     12     12     +,-     150     87     130       29     GTX14-BS     SMF     12     14     +,-     152     87     145	21	GB6.5L-B	SMF	12	6.5	-,+	139	66	100
24     GTZ10     SMF     12     8     +,-     150     87     93       25     GTX7L-BS     SMF     12     7     -,+     114     70     130       26     GTX12A-BS     SMF     12     10     +,-     150     87     105       27     GTX9-BS     SMF     12     9     +,-     150     87     105       28     GTX12-BS     SMF     12     12     +,-     150     87     130       29     GTX14-BS     SMF     12     14     +,-     152     87     145	22	12N6.5L-BS	SMF	12	6.5	-,+	139	66	100
25     GTX7L-BS     SMF     12     7     -,+     114     70     130       26     GTX12A-BS     SMF     12     10     +,-     150     87     105       27     GTX9-BS     SMF     12     9     +,-     150     87     105       28     GTX12-BS     SMF     12     12     +,-     150     87     130       29     GTX14-BS     SMF     12     14     +,-     152     87     145	23	GTX7A-BS	SMF	12	7	+ ,-	150	87	93
26     GTX12A-BS     SMF     12     10     +,-     150     87     105       27     GTX9-BS     SMF     12     9     +,-     150     87     105       28     GTX12-BS     SMF     12     12     +,-     150     87     130       29     GTX14-BS     SMF     12     14     +,-     152     87     145	24	GTZ10	SMF	12	8	+ ,-	150	87	93
27     GTX9-BS     SMF     12     9     +,-     150     87     105       28     GTX12-BS     SMF     12     12     +,-     150     87     130       29     GTX14-BS     SMF     12     14     +,-     152     87     145	25	GTX7L-BS	SMF	12	7	-,+	114	70	130
28 GTX12-BS SMF 12 12 +,- 150 87 130 29 GTX14-BS SMF 12 14 +,- 152 87 145	26	GTX12A-BS	SMF	12	10	+ ,-	150	87	105
29 GTX14-BS SMF 12 14 +,- 152 87 145	27	GTX9-BS	SMF	12	9	+ ,-	150	87	105
	28	GTX12-BS	SMF	12	12	+ ,-	150	87	130
30 GTZ14S SMF 12 11 +,- 150 87 110	29	GTX14-BS	SMF	12	14	+ ,-	152	87	145
	30	GTZ14S	SMF	12	11	+ ,-	150	87	110



SEALED MAINTENANCE FREE BATTERY



### **Product**

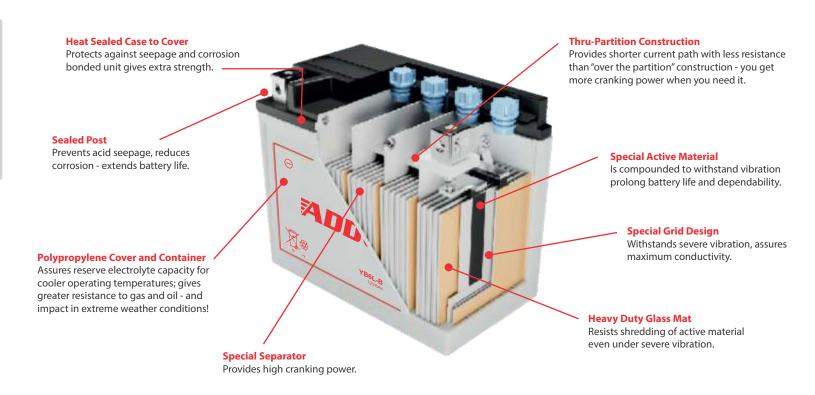
We offer vast range of Dry Charge Batteries or Conventional Batteries. Our batteries are designed to have filler caps and vent tubes. Not all vehicles require SMF batteries and the Dry Charge/Conventional Batteries offer good performance and longevity but at a lower price point.

Important aspects of the our battery include sealed posts to resist corrosion, tough polypropylene covers, containers and heat sealed construction for a strong, bonded unit. In addition, design features include special separators and through-partition construction.

Our batteries have more cranking power (up to 30%) for their physical size than other standard Conventional battery. The plate surface area in the battery is increased by the use of thin, high-tech separators that make room for extra plates within each cell.

### **Features:**

- □ 20% 30% more starting power than conventional batteries
- ¤ More plates per cell
- **¤** High cranking under different climatic conditions
- ¤ Anti Sulfation Protection given for consistent performance
- mage Battery Containers designed for ultra-low vibrations, high durability and longer service life
- **x** Low self-discharge means longer ideal life even after adding electrolyte



			Voltage	Capacity		Size (mm)		
S No	Model	Туре	(V)	(Ah)	Terminal	L	w	н
1	6N4-2A	DC	6	4	+ ,-	71	71	96
2	6N4-2A-2	DC	6	4	+ ,-	71	71	96
3	6N4-2A-4	DC	6	4	+ ,-	71	71	96
4	6N4-2A-7	DC	6	4	+ ,-	71	71	96
5	6N6-3B-1	DC	6	4	-,+	99	57	111
6	12N5-3B	DC	12	5	-,+	120	61	130
7	12N5-4B	DC	12	5	+ ,-	120	61	130
8	YB5L-B	DC-HD	12	5	-,+	120	61	130
9	12N6-3B	DC	12	6	-,+	137	72	95
10	YB6L-B	DC-HD	12	6	-,+	137	72	95
11	12N6.5-3B	DC	12	6.5	-,+	138	73	107
12	YB6.5L-B	DC-HD	12	6.5	-,+	138	73	107
13	12N7A-3A	DC	12	7	-,+	150	60	130
14	12N7B-3A	DC	12	7	-,+	150	60	130
15	12N7A-4A	DC	12	7	+ ,-	150	60	130
16	12N7B-4A	DC	12	7	+ ,-	150	60	130
17	YB7B-B	DC-HD	12	7	+ ,-	150	60	130
18	12N7-3A	DC	12	7	-,+	135	75	133
19	12N7-3B	DC	12	7	-,+	135	75	133
20	12N7-4A	DC	12	7	+ ,-	135	75	133
21	12N7-4B	DC	12	7	+ ,-	135	75	133
22	YB7L-B	DC-HD	12	7	-,+	135	75	133
23	12N9-3A	DC	12	9	-,+	135	75	139
24	12N9-3B	DC	12	9	-,+	135	75	139
25	12N9-4B	DC	12	9	+ ,-	135	75	139
26	12N9-4B-1	DC	12	9	+ ,-	135	75	139
27	YB9-B	DC-HD	12	9	+ ,-	135	75	139
28	12N10-3B	DC	12	10	-,+	134	90	145
29	YB10L-B	DC-HD	12	10	-,+	134	90	145
30	12N12A-4A-1	DC	12	12	+ ,-	136	76	160
31	YB12A-A	DC-HD	12	12	-,+	134	76	160
32	YB12AL-A	DC-HD	12	12	-,+	134	76	160
33	12N14-3A	DC	12	14	-,+	136	90	164
34	12N14-3B	DC	12	14	-,+	136	90	164
35	YB14-A2	DC-HD	12	14	+ ,-	136	90	164
36	YB14L-A2	DC-HD	12	14	-,+	136	90	164
37	YB2.5L-C	DC-HD	12	2.5	-,+	80	70	105
38	YB2.5L-C2	DC-HD	12	2.5	-,+	80	70	105
39	12N3-3A	DC	12	3	-,+	98	56	110
40	YB3L-A	DC-HD	12	3	-,+	98	56	110
41	YB3L-B	DC-HD	12	3	-,+	98	56	110
42	YB3L-C	DC-HD	12	3	<del>-</del> ,+	98	56	110
43	YB4L-B	DC-HD	12	4	-,+	120	70	92
44	YB16L-B	DC-HD	12	16	<del>-</del> ,+	175	100	155
45	12N16-3B	DC	12	16	-,+	175	100	155
46	51913	DC	12	19	-,+	185	82	170
47	YB16AL-A2	DC	12	16	-,+	205	70	162



# **Battery** Charger ADDO 10

### A patented product by Eastman.

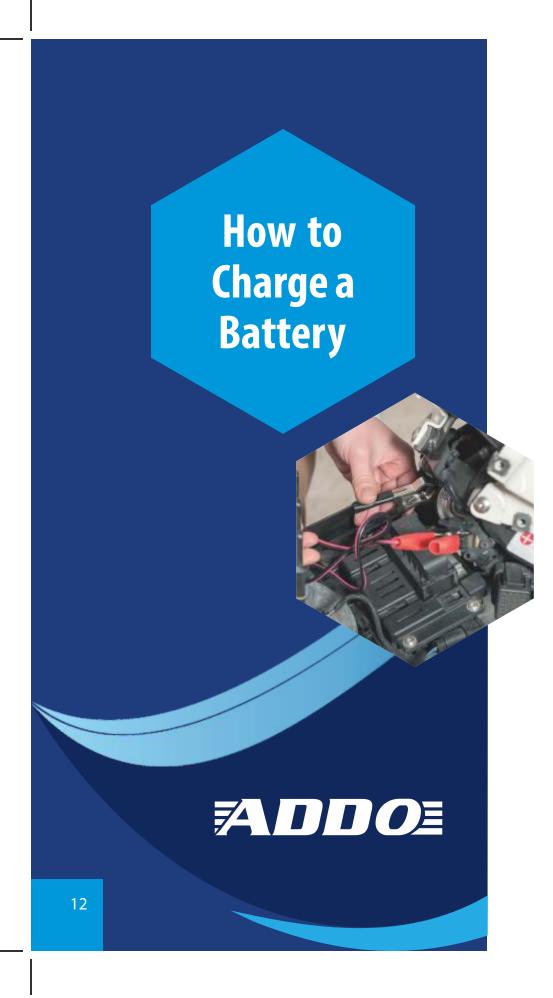
Eastman's Automatic 12V 1.5 Amp Battery Charger incorporates superior 9-stage charging technology with 10-port charge. This high power unit provides error proof operation to fully charge sealed maintenance free and conventional or dry charge batteries. Controlled by a microprocessor chip, the charger detects the charging mode required to charge the battery. The Chip monitors the state of the battery charge and begins charging automatically when the battery charge drops to a specific voltage. **Below are a few features of this Automatic 12V 1.5 Amp battery charger:** 

- Designed to prevent overcharging
- a AC power LED indicator
- Reverse polarity protection
- Spark-free operation
- n 10 ports to charge many batteries at once
- Intelligent charger, controlled by microprocessor chip
- Automatic cut to avoid overload
- z Load completion indicator
- Defective battery indicator
- Battery accessory leads and fused ring connectors included









### **Sealed Battery Charging Procedure:**

Sealed Type Batteries require higher charge than Dry Charge or Conventional types. Make sure you never charge this battery type with Conventional Battery Charger. You should rather choose professional quality chargers.

Sealed types of batteries come pre-activated from factory which means electrolytes are already added in the battery and the case is sealed. Given below are a few instructions to follow:

- 1. Connect cables to the battery terminals before turning on the charger, red cable goes to positive (+) terminal and black to negative terminal (-)
- 2. Gel batteries or SMF batteries should never be charged at more than 14.4V as it can damage the battery
- 3. Initially go for low amperage when charging or look at instructions provided with the battery to charge at a specific amperage
- 4. Load test the battery at 3 times its ampere hour rating for 15 secs or use and automatic battery tester to determine the battery condition and then check the voltage
- 5. Voltage should be minimum 12.4V on a 12V battery
- 6. Battery is then ready to be fitted
- 7. If the voltage reading is below 12.4V or the battery fails the automatic battery test, loosen the filler caps and repeat the charging and test cycle.



# W TO CHARGE A BATTERY

### **Dry Charge/Conventional Battery Charging Procedure**

- Place it on a level surface
- Remove the yellow filler caps, placing them safely on one side
- Remove the sealing cap from the vent, never replace this after the battery has been filled with electrolyte as it may cause the battery to rupture
- Fill each cell with electrolyte to the fill level as indicated on the battery case (Always wear protective eyewear and gloves when working with electrolytes)
- The electrolyte should have a specific gravity of 1.265 and be between 62 86°F
- Leave the battery for a minimum of 30 minutes and gently tap occasionally on the case to remove any bubbles trapped between the plates
- If after 30 minutes the electrolyte level has fallen, fill it to the upper fill level as indicated on the battery case
- <sup>n</sup> Replace the filler caps loosely and begin to charge the battery at 1/10 of its rated capacity for 3-5 hours. Charging at higher rate could damage the battery
- Do not connect or disconnect the battery while the charger is switched on as this may cause sparks that could ignite the hydrogen gas emitted from the cells during charging.
- max Monitor the electrolyte level during charging and top up the fill line as necessary
- <sup>n</sup> When charging is complete, turn off the charger and disconnect it from the battery
- Push or screw down the yellow filler caps. Make sure not to over-tighten them
- Clean off any spilled electrolyte with water and baking soda solution
- Allow the battery to stand of at least 30 minutes
- Load test the battery at 3 times its ampere hour rating for 15 seconds or use an automatic battery tester to determine the battery condition and then check the voltage
- <sup>n</sup> Voltage should be minimum 12.4V on a 12V battery
- Battery is then ready to be fitted
- If the voltage reading is below 12.4V or the battery fails the automatic battery test, loosen the filler caps and repeat the charging and test cycle



**A** 



### **Technical Features**

### 1. Sealed Construction

The unique construction and sealing technique ensures no electrolyte leakage from case or terminals.

### 2. Electrolyte Suspension System

All batteries utilize ADDO unique electrolyte suspension system incorporating a microfine glass mat to retain the maximum amount of electrolyte in the cells. The electrolyte is retained in the separator material and there is no free electrolyte to escape from the cells. No gels or other contaminants are added.

### 3. Recombination Technology

The design of Addo batteries incorporates the very latest oxygen recombination technology to effectively eliminate the need for watering during normal use.

### 4. Low Maintenance Operation

Due to the perfectly sealed construction and the recombination of gasses within the cell, the battery is almost maintenance free.

### 5. Terminals

Batteries are manufactured using a range of terminals which vary in size and type. Please refer to details as shown below:

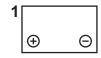
### **Terminal Configurations**

Terminal shapes vary from one battery to another. By identifying the correct replacement battery from the listing in this book, you are assured of the proper terminal configuration.

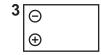
		Terminal					Dallam, T.m.		
Туре	Illustration	Front	Side	Тор			Battery Type		
1	•	B		E	YB7C-A YB14L-A1	YTX16-BS-1			
2	0				YB9L-A2 12N5.5-4A YB16AL-A2				
3	•			E	Y60-N24AL-B 12N24-3	Y60 N24-A 12N24-3A			
4	0	0			GYZ20L YB30L-B YTX15L-BS YTX20L-BS	Y50-N1 8L A3 YIX30L-BS YTX16-BS YTX24HL-BS	YB12C-A YIX30L-BS-PW YTX20-BS YTX20HL-BS	YB16B-A YTX14AHL-B YTX20H-BS	YB30CL-B YTX14AH BS YTX20HL-BS-PW
5	0				GYZ16H GYZ16HL YB4L B YTX14L -BS	YTX 7L BS KMX14-BS YT12A-BS YTX20CH-BS	YTX9-BS YB16C-B YTX12-BS YTX4L-BS	YTZ5S YTZ7S YB16CL-B YTX14-BS	YTX.5L BS YB4L-A YTX.14H-BS YTX7A-BS
6	0		_f_		YB3L-A YB7L B YB12A-A YB16-B 12N7-3B 12N7-4A 12N9-4B-1 6N6-3B B54-6	YB3L B YB9A-A YB12AL-A YB-16-B-CX 12N5-4B 12N7-4B 12N10-3A 6NG-3B-1 B38-6A	YB5L B YB9-B YB12AL-A2* YB16L B 12N5.5-3B 12N70-3B 12N10-3A-1 6N11A-1B	YB7-A YB9L B YB12A-B YB16HL-A-CX 12N5-5A-3B 12N9-3A-1 12N12A-4A-1 6N11-2D	YB7B-B YB10L-B YB14A-A1 SYB16 LB 12N7-3B 12N9-3B 6N12A-2D B39-6
7	•			0	HYB16A-AB Y50-N18A-A	YB16B-A1** Y50-N18L-A	YB18-A Y50 N18L-A-CX	YB18L-A SY50-N18L-AT	
8	•				YB10A-A2 YB14-A2 YB14-B2 12N14-3A	YB10L-A2 YB14A-A2 YB14L-B2	YB10L-B2 YB14L-A2 12N10-3A-2	YB12B-B2 SYB14L-A2 12N11-3A-1	
9	•			0 0	YHD-12H 12N9-3A				
10	•	E			51814	51913	53030	YT19BL-BS	
11	0				YT9B- B YT7B- B Note: Terminal is Bra	YTZ10S ss Plated Steel	YTZ12S YT12B-BS	YTZ14S	YT14B-BS
12		Œ			YTR4A-BS				
13					YT4B-BS				
14	6	[o]			GYZ20H GYZ20HL Note: Encapsulated E	GYZ32HL Brass Nut			

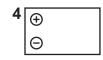
<sup>\*</sup> Includes terminal adaptor for converting to side mount.
Includes terminal adaptor for converting to top mount.

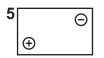
### **Battery Layouts**

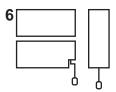


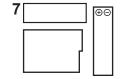




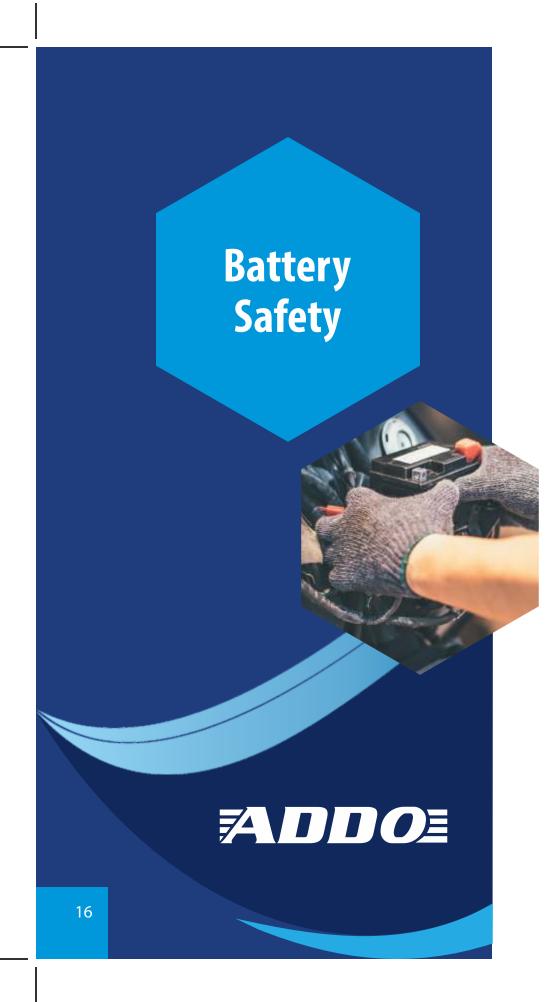












Batteries can be dangerous, so you have to make sure that some simple safety precautions are always followed. Working with batteries poses two hazards: potentially explosive gases that are given o during charging, and sulfuric acid that are very corrosive.

### Here's an 8-point list that'll help keep those hazards under control:

- 1. Absolutely no smoking, sparks or open flames around batteries. Batteries can produce hydrogen and oxygen; if they ignite the battery can rupture.
- 2. On conventional batteries, loosen vent caps when charging and ventilate the entire charging area. A build-up of hydrogen and oxygen levels in the battery or in the room where it's being charged can create a hazard.
- 3. If a battery feels hot to touch during charging, stop charging and allow it to cool before resuming. Heat damages the plates, and a battery that's too hot can rupture.
- 4. Never put the red sealing cap back on the battery once you take it off. If you do, gases trapped inside can explode. Make sure the vent tube isn't kinked or blocked, for the same reason.
- 5. Connect the charger to battery properly: positive to positive, negative to negative. Unplug the charger or turn it off before you disconnect the lead; that cuts down on the chance of sparks.
- 6. Always wear eye protection, protective gloves and protective clothing.
- 7. Clean up acid spills immediately, using a water and baking soda solution to neutralize (1 lb. baking soda in 1 gal. water).
- 8. Make sure acid container is clearly marked and the work area is well lighted.

If sulfuric acid is swallowed or splashed in the eyes, take immediate action. While the diluted sulfuric acid used as electrolyte can burn the skin, this type of injury is generally less serious. Sulfuric acid in the eyes can cause blindness. Serious internal injuries or death can result from ingesting sulfuric acid.

### **Antidotes**

- **External** Flush with water.
- Internal Drink large quantities of milk or water, followed by milk of magnesia, vegetable oil or beaten eggs. Call a poison control center or doctor immediately.
- **Eyes** –Flush for several minutes with water, get immediate medical attention.

### **Points To Remember**

- ventilate battery charging area.
- <sup>n</sup> Charging gives off gases no smoking, sparks or flames.
- Safety glasses or face shields protect against eye damage.
- <sup>n</sup> Acid swallowed or in the eyes requires immediate antidotes and medical care.
- <sup>n</sup> All safety considerations are important... review them frequently.

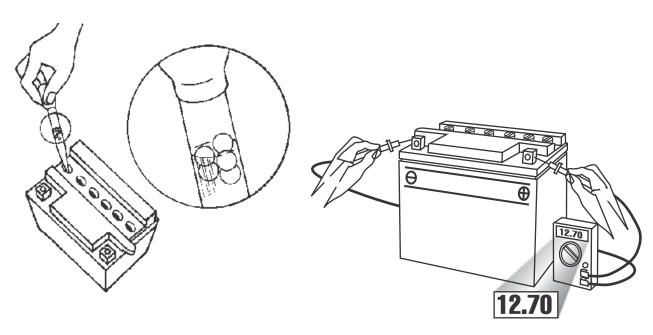
### **Battery Testing Devices**

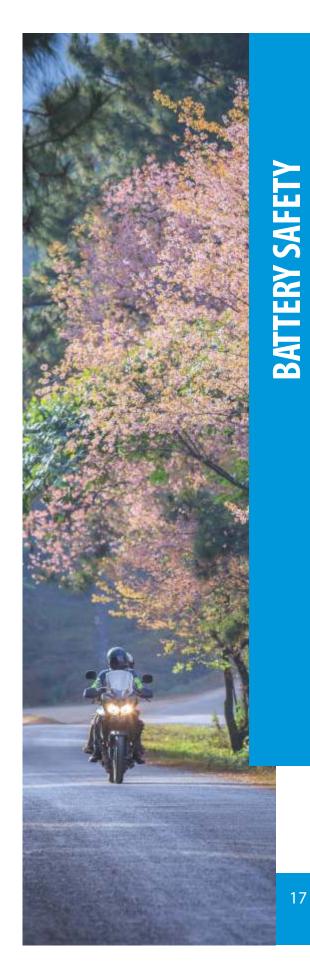
How much of a charge does a battery have? There are two easy and reliable ways to find out: 1) A hydrometer, which comes in floating ball and calibrated float types, or 2) a voltmeter (or multimeter, which gives DC voltage readings).

### Which is the best?

If you're choosing between two hydrometers, opt for the calibrated float type. It gives you an exact specific gravity reading (that is, the density of the electrolyte compared to water), that's much more accurate than floating balls. A voltmeter or multimeter can be used where a hydrometer can't. Most sealed VRLA or low maintenance batteries have to be tested with a voltmeter.

Battery testing requires a voltmeter that can measure DC voltage. Remember to always connect a voltmeter parallel to the circuit being tested, observing polarity; otherwise, the pointer will travel in the wrong direction. It's a good idea to periodically check a voltmeter against another one of known accuracy.







There are two types of battery tests: Unloaded and Loaded. An Unloaded Test is made on a battery without discharging current. It's simplest and most commonly used. And if you need a precise reading, Loaded testing is the answer. It's more accurate.

### **Unloaded Testing**

Check charge condition using either a hydrometer or voltmeter. With a voltmeter, voltage readings appear instantly to show the state of charge. Remember to hook the positive lead to the battery's positive terminal, and the negative lead to the negative terminal.

A hydrometer measures the specific gravity of each cell. The specific gravity tells the degree of charge; generally, a specific gravity of about 1.265 to 1.280 indicates a full charge. A reading of 1.230 to 1.260 indicates the battery should be charged before testing. The chart below shows the charge level as measured by syringe float hydrometer, digital voltmeter and five-ball hydrometer.

### **Methods of Checking Battery Condition**

State of Charge	Syringe Hydrometer	Digital Voltmeter	5-Ball Hydrometer
100% Charged w/Sulfate Stop	1.280	12.80v	5 Balls Floating
100% Charged	1.265	12.60v	4 Balls Floating
75% Charged	1.210	12.40v	3 Balls Floating
50% Charged	1.160	12.10v	2 Balls Floating
25% Charged	1.120	11.90v	1 Balls Floating
0% Charged	less than 1.100	less than 11.80v	0 Balls Floating

A battery's specific gravity changes with temperature. Ideally, readings should be taken at 77°F. Is it really going to matter if you're off a couple of degrees one way or another? Probably not. If you're working somewhere that's uncomfortably hot or cold, it's time to use the old conversion factors: add .001 to the specific gravity reading for each 3°F above 77°F or subtract .001 from the specific gravity reading for each 3°F below 77°F. Cell voltage can be found by adding .84 to the specific gravity.

Note: too, that ADDO "Sulfate Stop," a chemical additive that increases battery life by drastically reducing sulfate buildup, changes the specific gravity readings; they'll be higher than with ordinary batteries.



