



Haze Battery Company Ltd



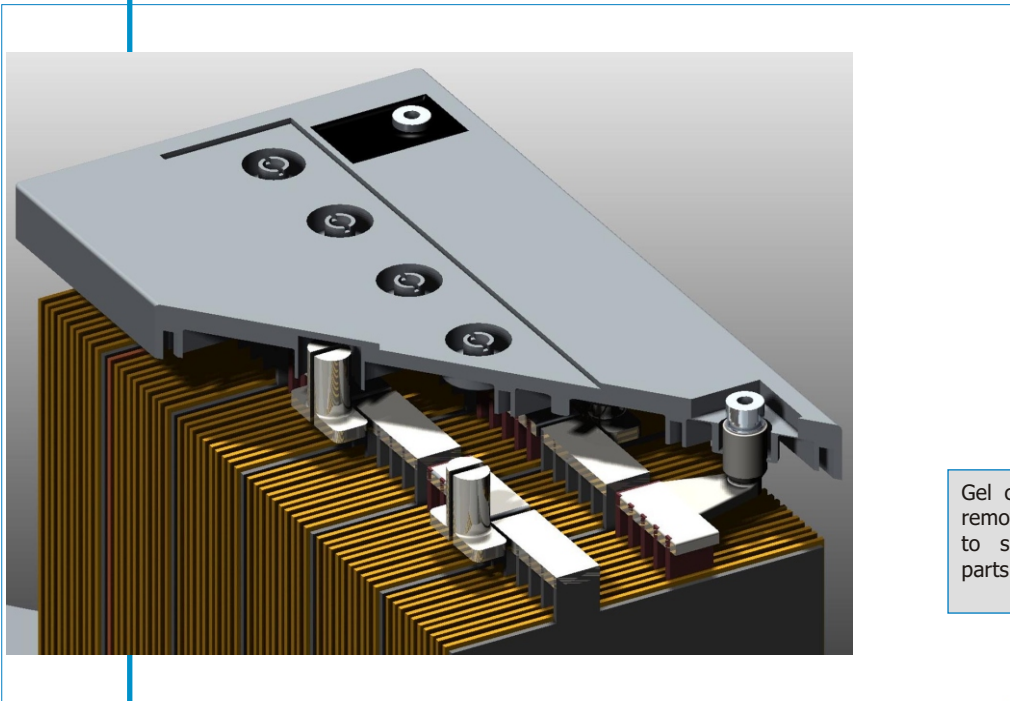
**Sealed Lead Acid 6 & 12 Volt
Monobloc
Gelled Electrolyte Range**

CONSTRUCTION - Gel battery construction is as shown in the diagram. The positive and negative grids are cast from a calcium/tin lead alloy to reduce grid growth and corrosion. The active material is manufactured from a high purity lead (99.9999%) to minimize the negative effects of impurities.

Separator is manufactured by a world leader in the field, utilizing the latest German technology. The base material is a microporous duroplastic exhibiting excellent high temperature stability and mechanical strength, resulting in very good resistance to vibration and mechanical shock. The integrity of the battery will be maintained under extreme conditions.

The purpose of the separator is to maintain a constant distance between the positive and negative plates, totally eliminating the possibility of short circuits whilst allowing the active materials to fully react with the gelled electrolyte.

The separator also has an open construction, which allows little resistance to the flow of the electrolyte during filling. A thin layer (typically 0.4mm) of non-woven glass mat is an integral part of the separator and is placed against the positive plate for improved surface contact.

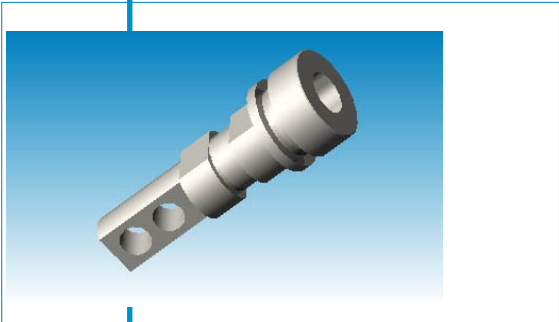


Typical separator properties are:

- Acid displacement - 150 ml /sqm
- Pore volume - 70%
- Average pore size - 0.5 micro m
- Maximum pore Diameter - 1 micro m

Gel construction with case removed and cover cut away to show internal battery parts.

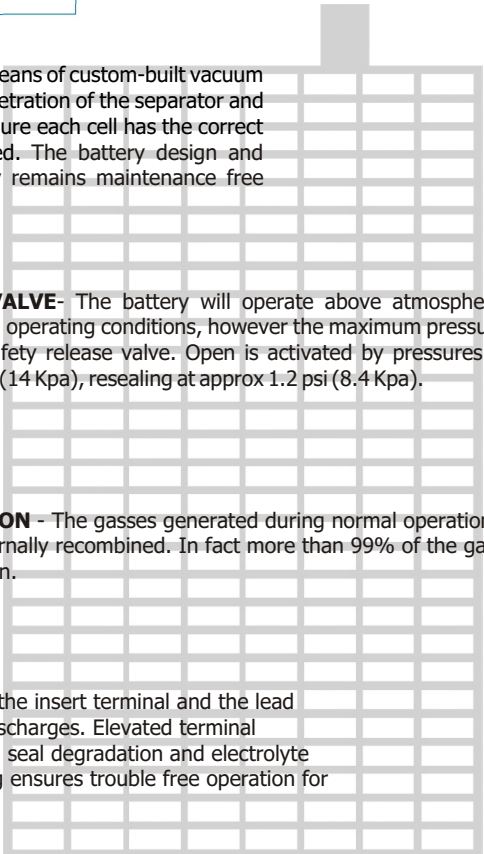
ELECTROLYTE FILLING - Gelled electrolyte is introduced to the cell by means of custom-built vacuum filling machines. It is vitally important that the electrolyte achieves full penetration of the separator and plates; therefore, vacuum cycling is utilized after the filling process. To ensure each cell has the correct amount of gel, they are first overfilled, the extra gel is then removed. The battery design and construction negates the need for electrolyte addition and the battery remains maintenance free throughout its design life.



SAFETY RELEASE VALVE- The battery will operate above atmospheric pressure under normal operating conditions, however the maximum pressure is governed by the safety release valve. Open is activated by pressures in excess of approx. 2 psi (14 Kpa), resealing at approx 1.2 psi (8.4 Kpa).

GAS RECOMBINATION - The gasses generated during normal operation of the battery are internally recombined. In fact more than 99% of the gas achieves recombination.

TERMINAL CONSTRUCTION - The contact quality between the insert terminal and the lead post is of vital importance during short duration / high Amp discharges. Elevated terminal temperatures are the result of poor contact, eventually causing seal degradation and electrolyte leaks. Haze design and assembly technique for terminal casting ensures trouble free operation for the design life of the battery.



Gel Vs AGM

Each battery has its advantages and disadvantages, it is therefore important to choose the right battery for the application. Advantages of Gel Batteries:

- Full recovery from deep discharge, even when the battery is not recharged immediately.
- Ideal for repeat cycling daily use.
- Excellent performance over long discharges
- Good tolerance to higher temperature applications
- Suitable where mains power is unstable
- Zero stratification due to immobilized electrolyte
- No equalization charge necessary
- Reduced self-discharge
- Limiting design protects the positive plates to greatly improve cycle life
- Thicker plates for reduced grid corrosion and increased cycle life
- Improved charge acceptance due to low internal resistance
- High resistance to water loss with the right charging set up
- Ultra stable polymer separator with glass mat for increased performance
- High resistance to shorting due to superior mechanical strength of the polymer separator
- Increased tolerance to poor charging parameters
- Can be discharged even when full recharge has not been achieved, without loss of battery capacity

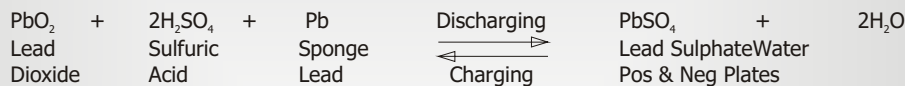


Applications

- Cycling / Float service
 - Residential
 - Telecommunications
 - Refrigeration
 - Photovoltaic
 - Solar
 - Wind
 - Engine Starting
 - Wheelchair
 - Electric Vehicle
 - Floor Cleaning Machines
 - Water Pumping
 - Golf Caddy
 - Portable Medical Equipment
 - Cathodic Protection
 - Boats
 - General Marine
 - Navigation Aids
- Many other deep cycle applications

Discharge Time	Capacity temperature correction Factor to be applied to Data at 20 Degrees C									
	0 °C	5 °C	10 °C	15 °C	20 °C	25 °C	30 °C	35 °C	40 °C	
5 minutes to 59 minutes	0.8	0.86	0.91	0.96	1	1.037	1.063	1.085	1.1	
1 Hour to 100 Hours	0.86	0.9	0.93	0.97	1	1.028	1.05	1.063	1.07	

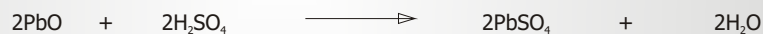
CHEMICAL REACTION- The chemical reaction for the Discharge / Recharge process is represented by the following formula:



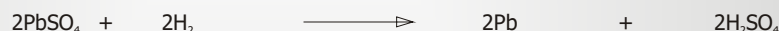
Under normal float charge conditions the oxygen passes through the separator from the positive to the negative plate where it reacts with the negative active material to form lead oxide.



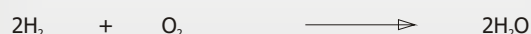
In the acid conditions the lead oxide reacts with the sulfuric acid to form lead sulphate.

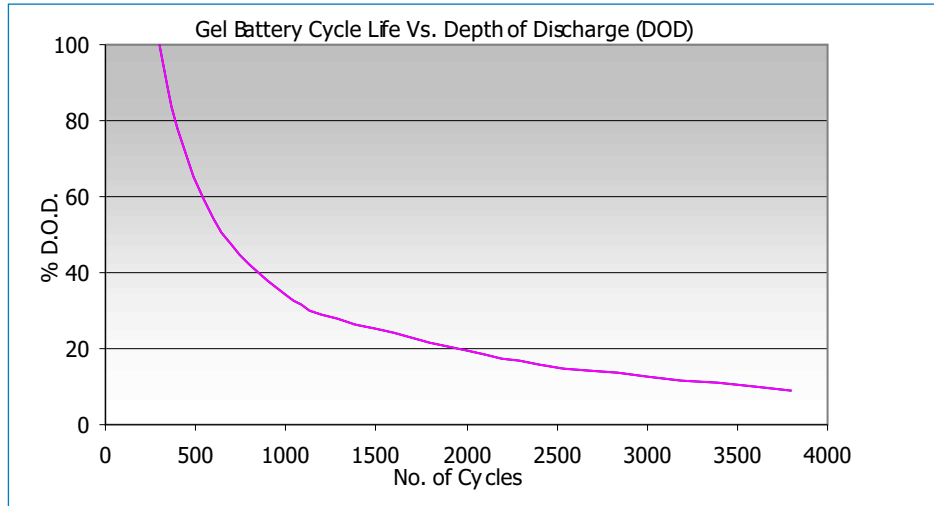


The lead sulphate formed on the negative is then reduced to lead and sulfuric acid by the evolving hydrogen.



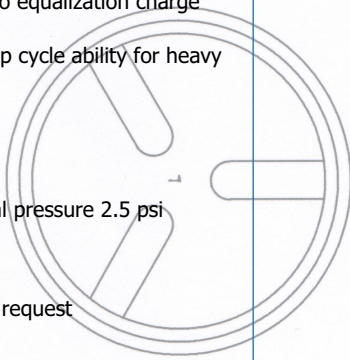
If the equations are resolved and like terms cancelled out on both sides of the equation the result is:





Innovative Features

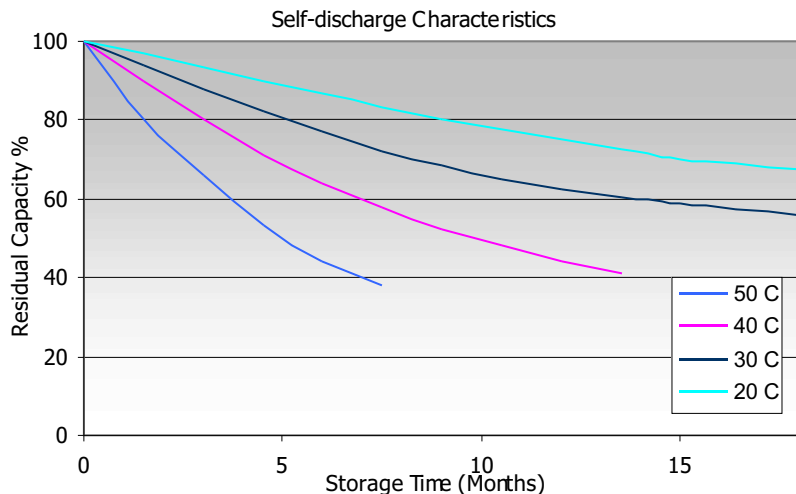
- Completely maintenance free, sealed
- Construction eliminates the need for watering
- Electrolyte will not stratify, no equalization charge required
- Increased durability and deep cycle ability for heavy demand applications
- Fully tank formed plates
- Gelled thixotropic electrolyte
- Spill proof / leak proof
- Valve regulated Max internal pressure 2.5 psi
- Multi-position usage
- Multi-cell container
- ABS Case and cover - VO on request
- Low self discharge
- Utilising the latest in German technology
- FAA and IATA approved as non-hazardous



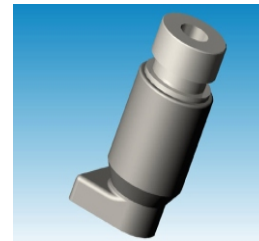
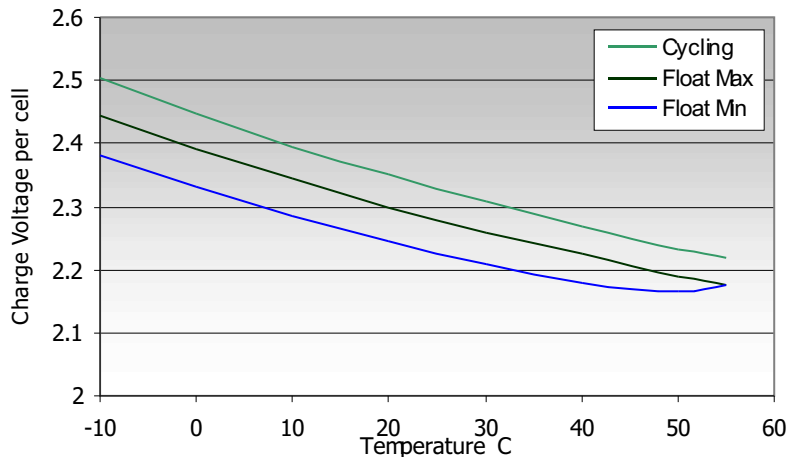
Specifications

Nominal Voltage	6 & 12 Volts
Design Life	12 Years
Operating Temperature	-20 °C to 50 °C
Grid alloy	Calcium / Tin lead alloy
Plates	Flat Pasted
Separator	Microporous Duroplastic
Active material	Very high purity lead
Case and cover	ABS (VO on request)
Charge Voltage	Float 2.27 - 2.30 VPC @20 °C Cycling 2.4 @20 °C
Electrolyte	Max. 2.4 VPC Max ripple 0.05C (A) Sulphuric acid Analytical grade purity
Venting Valve	EPDM Rubber 1.5 to 2 psi (10.5 - 14 KPa) release pressure. Resealing at 1 psi (7 KPa)
Terminal	Various types Epoxy sealed by extended mechanical paths
Torque setting	The recommended torque value for all types is 5-7 Nm
Cables	Insulated cables / connectors supplied on request.

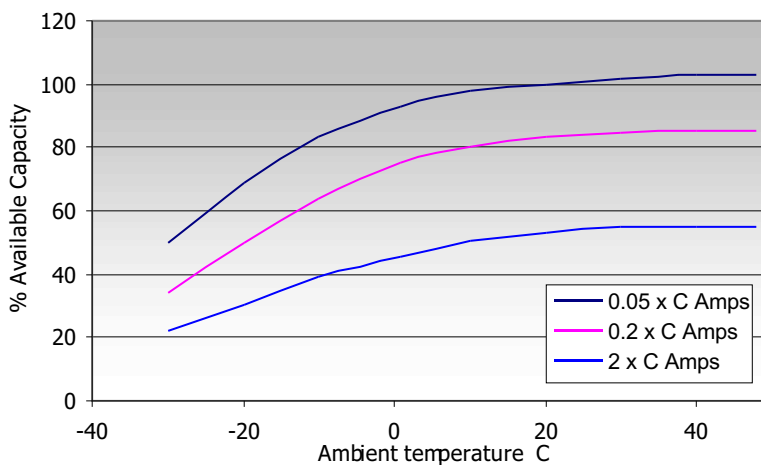
Haze Battery Company keenly encourages environmental awareness; PLEASE follow guidelines for the recycling /disposal of lead.



Relationship Between Charge Voltage and Temperature



Capacity Vs Ambient Temperature



CHARGING CHARACTERISTICS

Floating - The optimum float voltage for a battery is temperature dependant, at 15 - 24°C the recommended value is 2.27 - 2.30V. It is recommended that battery installation sites are temperature controlled, however float voltage can be increased or decreased to compensate for temperature variations. Adjustment is calculated at +/- 3 mV per degree C.

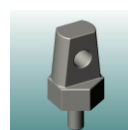
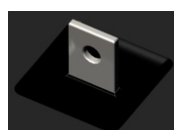
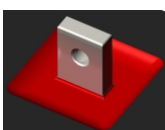
Terminal Options (left to right)

- ▶ Lead Flag
- ▶ Automotive
- ▶ J Type
- ▶ Copper Flag
- ▶ J Type Adapter
- ▶ Insert

Insert are made from brass with copper, nickel and silver plating giving excellent mechanical, electrical and corrosion resistant properties.

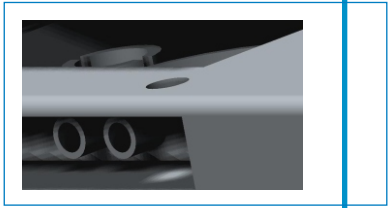
Operating Temperature	Recommended Applied Float Voltage VPC
0-9	2.33 - 2.35
10-14	2.30 - 2.33
15-19	2.27 - 2.30
20-24	2.27 - 2.30
25-29	2.25 - 2.27
30-34	2.23 - 2.25
35-40	2.21 - 2.23

The most suitable charging method for battery life and performance is the constant voltage method with a limited initial current, usually limited to a maximum of $C_{20}/4$.



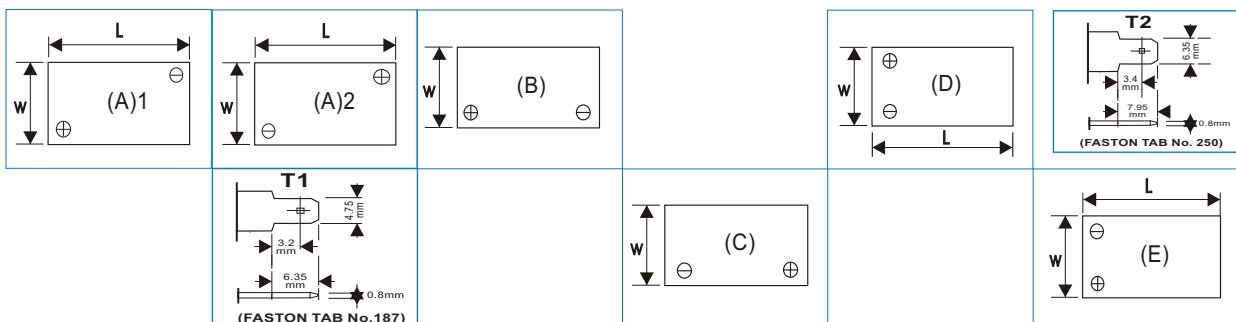


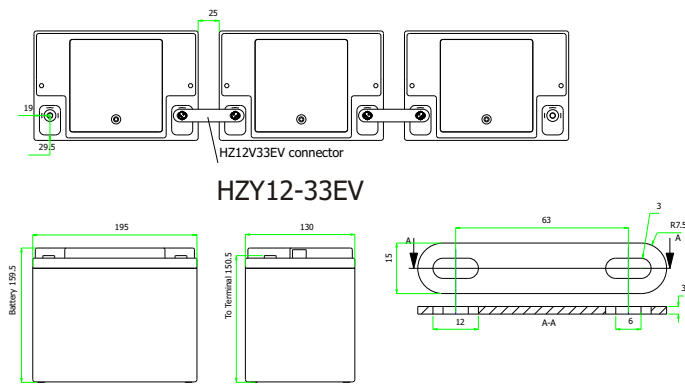
Central Gassing - Haze produce some models with a integral central gassing system. This system is a useful feature when batteries are installed in an IP66 cabinet. Sealing prevents any escaping gas from exiting the enclosure. Central gassing allows a tube carrying the emissions to pass through a seal to atmosphere. Haze are adding this feature to a number of sizes, if you require this feature please contact us for an up-to-date list of models included.



Battery Model	Qty Per Box	Dimensions (mm) & weight (Kg)				Dimensions (Inches) & weight (Lbs)				Terminal Details	BCI Group Size	Internal Resistance mOhms	Maximum Charge Current	CCA at 0 °C	Short Circuit Amps
		Length	Width	Height	Weight	Length	Width	Height	Weight						
HZY6-7.5	10	150	34	96 (101)	1.3	5.91	1.34	3.7 (3.9)	2.8	B-T1	-	13	1.5	NA	275
HZY6-10	10	151	50	97 (101)	1.9	5.94	1.97	3.7 (3.9)	4.2	B-T1	-	10	2	NA	325
HZY6-12	10	151	50	98 (101)	2.0	5.94	1.97	3.7 (3.9)	4.4	B-T2	-	10	2.4	NA	500
HZY12-7.5	8	151	65	99 (101)	2.5	5.94	2.56	3.7 (3.9)	5.5	D-T1	-	28	1.5	NA	275
HZY12-12	4	150	97	100 (101)	4.0	5.91	3.82	3.7 (3.9)	8.8	D-T2	-	20	2.4	NA	500
HZY12-18	2	181	76	167	5.9	7.13	2.99	6.57	13.0	C - M5	-	12	4.5	270	700
HZY12-26	1	166	176	126	8.8	6.54	6.93	4.96	19.4	C - M5	-	9.5	6.5	300	900
HZY12-33	1	195	130	160	10.9	7.68	5.12	6.30	24.1	B - M6	U1	8.5	8	320	1100
HZY12-44	1	197	165	170	14.0	7.76	6.50	6.69	30.9	C - M6	-	7.5	11	350	1400
HZY12-55	1	228	137	207	17.5	8.98	5.39	8.15	38.7	B - M6	22NF	6.5	14	380	1700
HZY12-70J	1	350	167	179	22.1	13.78	6.57	7.05	48.8	Flag 1/4" C - M6	-	5	18	550	2100
HZY12-70	1	259	168	208	21.5	10.20	6.61	8.19	47.5	B - M6	24	5	18	550	2100
HZY12-80	1	259	168	208	23.3	10.20	6.61	8.19	51.5	B - M6	24	5	20	620	2400
HZY12-90	1	305	168	208	27	12.01	6.61	8.19	59.7	B - M6	27	4	22	680	2650
HZY12-100	1	305	168	208	28.4	12.01	6.61	8.19	62.8	B - M6	27	5	25	780	2900
HZY12-110	1	332	174	213	32.2	13.07	6.85	8.39	71.2	B - M6	31	4	27	960	3000
HZY12-120	1	408	176	227	35.4	16.06	6.93	8.94	78.2	B - M6	-	3	30	1020	3300
HZY12-135	1	340	173	280	39.8	13.39	6.81	11.02	88.0	C - M6	-	2.5	35	1160	3750
HZY12-150	1	482	170	242	44.3	18.98	6.69	9.53	97.8	B - M6	-	2	38	1300	4200
HZY12-160	1	530	209	214	57.4	20.87	8.23	8.43	126.9	E - M6	4D	2	40	1440	4700
HZY12-200	1	520	240	220	66.0	20.47	9.45	8.66	145.9	E - M8	-	<2	50	1670	5400
HZY12-230	1	521	269	203	71.0	20.51	10.59	7.99	156.9	E - M8	8D	<2	57	1870	5900
HZY6-110	1	193	168	205	16.0	7.60	6.61	8.07	35.4	A1 - M6	-	4	27	1010	3200
HZY6-160	1	298	171	226	26.0	11.73	6.73	8.90	57.5	A2 - M6	-	2	40	1290	4600
HZY6-200	1	318	170	225	31.0	12.52	6.69	8.86	68.5	A2 - M8	-	<2	50	1600	5000

Terminal Layout details





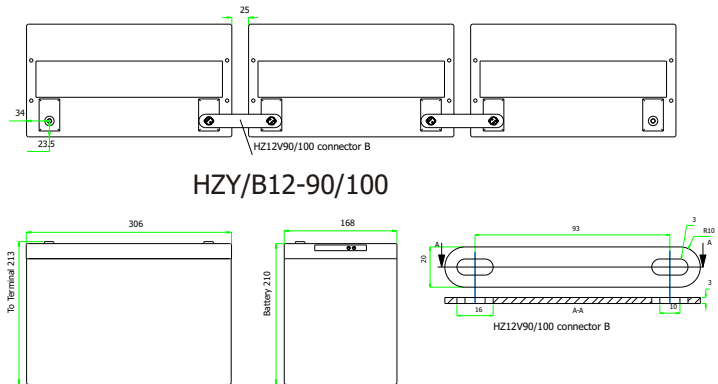
HZY12-33EV

Battery installations have many variables : space available, autonomy times, load carrying requirements etc.

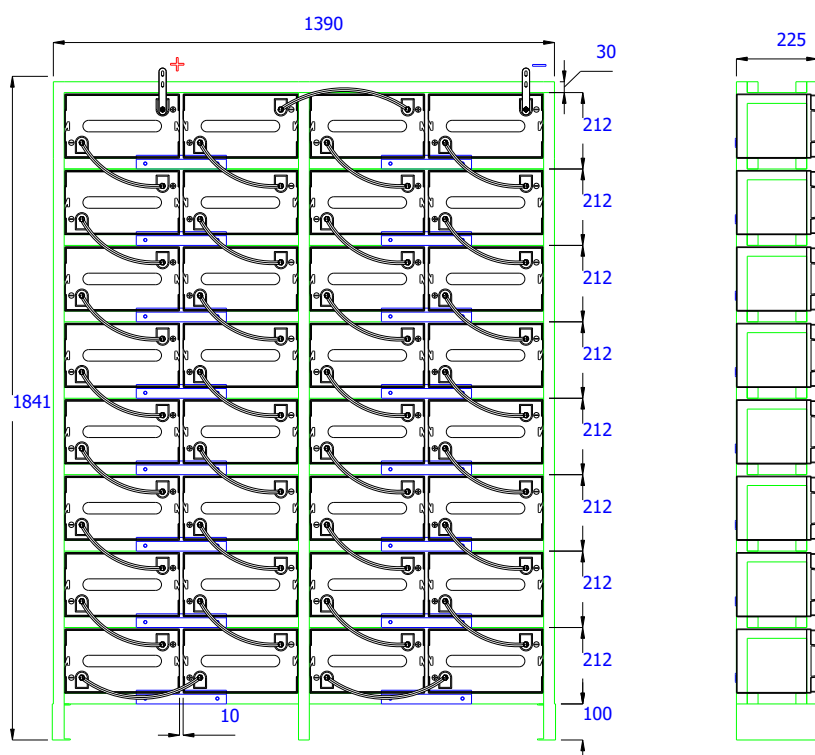
Haze Engineering department is at the customers disposal to find the best solution, provide dimensioned layout drawings and wiring diagrams.

A tailor made solution to meet the customers requirements.

All drawings are submitted for customer approval to ensure trouble free installation.



HZY/B12-90/100



Racking is available to suit available space and required configuration.

Special cables and / or standard connectors can be provided on request along with wiring diagrams.

A range of terminal covers are available to cover large and small batteries and cables or connectors.

The example rack shown is for HZB/Y6-200.