AMARA RAJA
Gotta be a better way

Johnson Controls

OPTIMUM POWER SOLUTIONS

ROBUST ENDURING RELIABLE

AMARON VOLT
HDP Series

AMARA RAJA

Gotta be a better way

At Amara Raja, a bright future is real, living, functioning, and built every day. It is the guiding principle at Amara Raja, helping it to ceaselessly innovate and explore the new and never-before.

Amara Raja has put its vision into practice by striding forward in the power management industry and consolidating its position as one of the leading players in the Asia-Pacific region. With Johnson Controls Inc., a world leader, as an Equity Alliance Partner (26%), Amara Raja pioneered the next generation battery technology in India. The collaboration facilitates sharing of knowledge and innovations to accelerate and expand development efforts in the global battery market. It also enables harnessing technologies that acclimatize batteries to operate in harsh tropical conditions.

Working together closely with Johnson Controls, Amara Raja set up India's Finest Battery Plant in Tirupati, the first such facility for Johnson Controls in the last decade. Backed by one of the finest in-house Research & Development centers, the facility constantly and unceasingly thinks out-of-the-box to develop products and services that not only match world-class standards, but also set new industry benchmarks.

The Amara Raja Battery Excellence Center is another first for India. Here, products are put through rigorous tests to ensure that they comply with international standards and design requirements. Armed with state-of-art testing equipment, the center evaluates battery on parameters such as performance, design and longevity. Facilities for application engineering, vehicle system study, simulations and computer aided design, including a full calibration laboratory complete the facility.

AMARON VOLT

HDP Series

OPTIMUM POWER SOLUTIONS

Amara Raja introduces "Amaron Volt" HDP series, a highly reliable, long life battery, that supports high rate discharge performance to meet the demanding applications of critical loads in a Power plant. It is specially designed to meet the needs of mission critical applications like EOP which requires superior high rate discharge performance to support high inrush currents.

AMARON VOLT HDP Series

RELIABILITY, OPTIMIZED

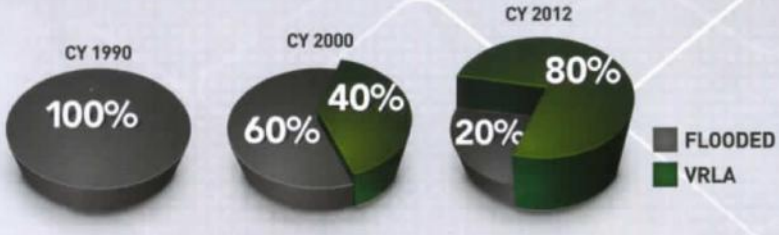
RELIABLE POWER BACKUP FOR MISSION CRITICAL APPLICATIONS

Owing to the criticality of the project, power generation plants are set up with investment worth billions of rupees. To avoid possible breakdowns/disasters, such massive projects necessitate multiple systems of protection, which is an intrinsic part of design for a Plant Design Engineer. One such product which is at the heart of these protection systems is a reliable Battery bank.

Shift of Battery Technology by Users

Over the past few decades, the usage pattern of batteries and the battery technology has undergone a sea change across the world due to several factors such as reliability, durability, better operational cost and green power. The Valve Regulated Lead Acid (VRLA) maintenance-free batteries are accepted as the most reliable battery back-up power solution for all mission-critical applications in Telecom Switching Centres, Data Centres, Rolling Stocks in Railways, Power Utilities & many vital sectors.

Many Indian industries that favoured Non-VRLA batteries are making that much-needed transition to VRLA batteries which today cater to 80% of the back-up power requirements – both Reserve Power & Motive Power.



A STRONG REPUTATION

Amara Raja batteries are accepted by reputed consultants like MNDastur, Fichtner, Avant-Garde, DCPL, NTPC, Mecon, EIL and many others. The batteries have been working relentlessly for the past two decades in several power plants across India. Specific to Power Utilities, Battery plays a vital role to supply emergency DC power backup to critical equipment like turbine lube oil pumps, power plant's control systems, communication systems and emergency lighting. Reliability of this back-up power is absolutely essential for a safe, damage-free shutdown of the units during emergency power outages.

The auxiliaries in power plants, which for a part of this critical chain, require power during emergencies are:

- Emergency lubricating oil pump, a battery-driven centrifugal oil pump, is designed to operate at 40% of oil capacity, essential for smooth running of the turbine
- Compressors for Circuit breakers, Emergency lighting, Communication & telemetry equipment in the power plant

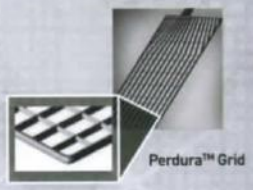
AMARON VOLT HDP Series

PERFOMANCE, OPTIMIZED

DESIGN, PROCESS, QUALITY & TECHNICAL EDGE

Proprietary Perdura™ Grid for High Rate Discharge Performance:

- Semi Radial Squarish grid design employing patented alloy imparts low impedance path which allows shortest path for current flow - thus enabling High rate discharge characteristics.



Perdura™ Grid

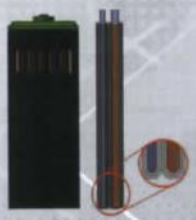
Tetra Crys™ Paste Morphology

Barton oxide with Tetra Crys™ Paste - Recipe for Long life:

- High Dense plate design enables durability for longer life
- Heavy duty plate connectivity Busbars & Posts - to handle high currents
- High purity lead & alloys allow low corrosion, low self discharge and long life
- Enables stable float current for best-in-class float life

Double Layered Hi-Sorb™ AGM Separator for longer life and reliability:

- Double layered AGM separator helps in accommodating high level of saturation, better thermal management inside the cell and avoids cell shorts
- Hi-Sorb™ separator with superior absorption characteristics and high density possesses high volume vacuum filled electrolyte with uniform compression resulting in longer life
- Supports high rate discharges even at low temperatures



Hi-Sorb™ Seperator

Higher plastic surface

Container & Cover for Durability:

- Thick Poly Propylene Reinforced ribbed container and cover for better mechanical strength and compression
- Lip-n-Tongue™ heat sealing for durability and leak proof joints
- Higher plastic surface area results in better thermal conductivity which minimizes water loss and nullifies the thermal runaway impact

Ring-n-Lock™ Terminal Design

Copper insert terminal design for better conductivity:

- High torque and high conductive terminal design with integrated M8 copper insert for better strength and to avoid thread spillages
- Terminal post seal - Sturdy Ring-n-Lock™ method, Terminal design with secondary epoxy seal provides leak proof joint

Safety Valve:

Self resealing, Pressure regulated, explosion proof with integrated Flame Arrester for superior recombination efficiency.

Electrolyte:

High purity Sulphuric Acid.

Charging Method:

For float applications of battery, constant voltage charge method is advantageous as it allows the battery to exert full performance. The charging parameters of battery are given below:

Charge Provision	Charging Voltage	Minimum Charging Current (ADC)
Float Charge	2.23 - 2.25 VPC	0.1 C
Boost Charge	2.30 - 2.32 VPC	0.1 C

C is the rated AH capacity @ 10 hours.
Note: All values and charging parameters are rated at 30°C, for every 1°C rise in temperature. Reduce the float voltage by 0.003VPC and vice versa, ensure the extension of temperature sensor up to battery.

Compliance to Specifications:

- IS 15549 : 2005, IEC 60896-PART 21 & 22
- IEC 61427, IEEE 1188 & 1189
- IS 1651-Table:5 for Type - II HDP cells & Certified to 1652-Table-2 of HDP cells .
- Conforms to CE (Conformité Européenne)

Performance Edge:

- Self-discharge < 2% per month
- Shelf life without recharge upto 6 months
- Operating range: - 40° C to + 60° C
- AH efficiency: >95% and WH efficiency: >85%
- Recombination efficiency >99%

Quality Edge:

- ISO 9001 & ISO/TS16949 certified by RWTUV
- ISO14001 certification signifying the environment consciousness
- OHSAS 18001:2007 certification in accordance with TUV NORD CERT procedures
- Continuous improvement through internationally acclaimed tools like TQM, TPM, TCM, Kaizen, Six Sigma, 5S

AMARON VOLT HDP Series

PRODUCT, OPTIMIZED

RANGE & SPECIFICATIONS

As per IS 1651 Table-5 for Type - II HDP cells & 1652 Table-2 of HDP cells

Nominal AH capacities @ 30°C & Module Dimensions

Sl No.	Cell model	Capacity @ C10 to 1.85 ECV	System Module voltage(V)	Capacity @ C8 to 1.84 ECV	Capacity @ C5 to 1.82 ECV	Capacity @ C3 to 1.8 ECV	Capacity @ C1 to 1.75 ECV	Module dimensions ±5mm			Module Weight ±5 Kgs
								W	D	H	
1.	HDP4009	360	12	355	330	301	216	706	515	282	193
2.	HDP 5009	410	12	409	375	342	246	706	565	282	215
3.	HDP 4013	540	12	539	495	451	324	706	515	374	266
4.	HDP 5013	615	12	611	561	511	368	706	565	374	295
5.	HDP 4017	725	6	718	660	602	435	706	515	261	180
6.	HDP 5017	825	6	817	751	684	495	706	565	261	201
7.	HDP 4021	910	6	898	825	752	545	706	515	306	217
8.	HDP 5021	1025	6	1024	941	857	615	706	565	306	244
9.	HDP 4025	1075	6	1077	990	902	645	706	515	351	250
10.	HDP 5025	1250	6	1230	1130	1030	750	706	565	351	285
11.	HDP 4034	1450	6	1437	1320	1203	870	706	515	522	360
12.	HDP 5034	1650	6	1634	1502	1368	990	706	565	522	402
13.	HDP 4042	1820	6	1796	1650	1504	1090	706	515	612	434
14.	HDP 5042	2050	6	2047	1881	1714	1230	706	565	612	488
15.	HDP 4050	2150	6	2155	1980	1805	1290	706	515	702	500
16.	HDP 5050	2500	6	2460	2261	2060	1500	706	565	702	570

Note: Always use redundant battery bank for EOP application as per standards

CONSTANT CURRENT DISCHARGE (ADC) TO 1.85ECV @30°C

Sl No.	Cell model	Capacity @ C10 to 1.85 ECV	Discharge Current in Amps													
			1 Min	5 Min	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	4 Hr	5 Hr	6 Hr	7 Hr	8 Hr	10 Hr
1	HDP4009	360	404	370	339	323	267	203	127	95	78	63	55	49	44	36
2	HDP5009	410	460	421	386	367	303	231	144	108	88	72	62	55	50	41
3	HDP4013	540	606	556	508	484	400	305	190	143	117	95	82	73	66	54
4	HDP5013	615	687	630	576	548	453	345	216	162	132	108	93	83	75	62
5	HDP4017	725	808	741	678	645	533	406	254	190	155	127	110	98	88	73
6	HDP5017	825	919	843	771	734	607	462	289	217	177	144	125	111	100	83
7	HDP4021	910	1010	926	847	806	667	508	317	238	194	158	137	122	110	91
8	HDP5021	1025	1151	1056	966	919	760	579	362	271	221	181	156	139	125	103
9	HDP4025	1075	1212	1111	1017	968	800	609	381	286	233	190	165	146	132	109
10	HDP5025	1250	1384	1269	1161	1105	913	695	435	326	266	217	188	167	150	125
11	HDP 4034	1450	1616	1481	1356	1290	1067	812	508	381	311	254	220	195	176	145
12	HDP 5034	1650	1818	1667	1525	1452	1200	914	571	429	350	285	247	220	198	165
13	HDP 4042	1820	2020	1852	1695	1613	1333	1015	635	476	388	317	275	244	220	182
14	HDP 5042	2050	2323	2130	1949	1855	1533	1168	730	548	447	365	316	281	253	206
15	HDP 4050	2150	2424	2222	2034	1935	1600	1218	762	571	466	381	330	293	263	218
16	HDP 5050	2500	2778	2546	2331	2218	1833	1396	873	655	534	436	378	336	302	250

Note: The above values are for reference only. Sizing calculations have to be followed as per IEEE485 standards for duty cycle requirement.


AMARON VOLT
HDP Series
TRUST, OPTIMIZED
PERFORMANCE CERTIFICATES
BHUSHAN STEEL LIMITED
ACC
BHUSHAN
UltraTech
Karnataka Power Corporation Limited
Office of the Chief Engineer (O & M)
Raichur Thermal Power Station
Shaktinagar - 584 170. Dist. Raichur.
TAMILNADU ELECTRICITY BOARD
ENNORE THERMAL POWER STATION
CERTIFICATE
TANGEDCO
From
Er.T.R. Sethulakshmi,BE.,MIE.,
Executive Engineer
Electrical Maintenance - I .
NCTPS Chennai-120
To
M/s. Amara Raja Batteries Limited.
Buckingham Terrace.
61, Menichols Road.
Chetpet, Chennai- 600 031.
E.Mail: kjp@amararaja.co.in
Lr.No.EE/ EM-I/ NCTPS / Indent / D.No. 13 /Dt. 04.2013.
Sir,
Sub. NCTPS – ES Circle – EM-I Dn. – Report on Life servicing details of Station Battery set – Regarding
Ref. 1) PO.No. 37.2002-03 D317.0705.02.
2) ARBL pr/l.b NCTPS dt. 19.04.13
Refer on your cited letter above, the Station battery of M/s. Amara Raja make
Application
Location
I&C Date
EOP
Unit-I
NCTPS

AMARON VOLT
HDP Series

INFRASTRUCTURE, OPTIMIZED

WORLD-CLASS MANUFACTURING FACILITY