

AMARA RAJA BATTERIES LIMITED
(An Amara Raja - Johnson Controls Company)

Registered Office:
Manufacturing Facilities & Central Distribution Centre
Karakambadi - 517 520, Tirupati, Andhra Pradesh, India
Tel: +91-877-228 5561 to 65 Fax: +91-877-228 5600
email: amararaja@amararaja.co.in

Corporate Operations Office:
Corporate Marketing Office & Customer Support Centre
12, Kodambakkam High Road, Chennai - 600 034, India
Tel: +91-44-2821 3270 Fax: +91-44-2828 4821
email: mktg@amararaja.co.in

 **Amara Raja**
Powered by Innovation

POWERSTACK 

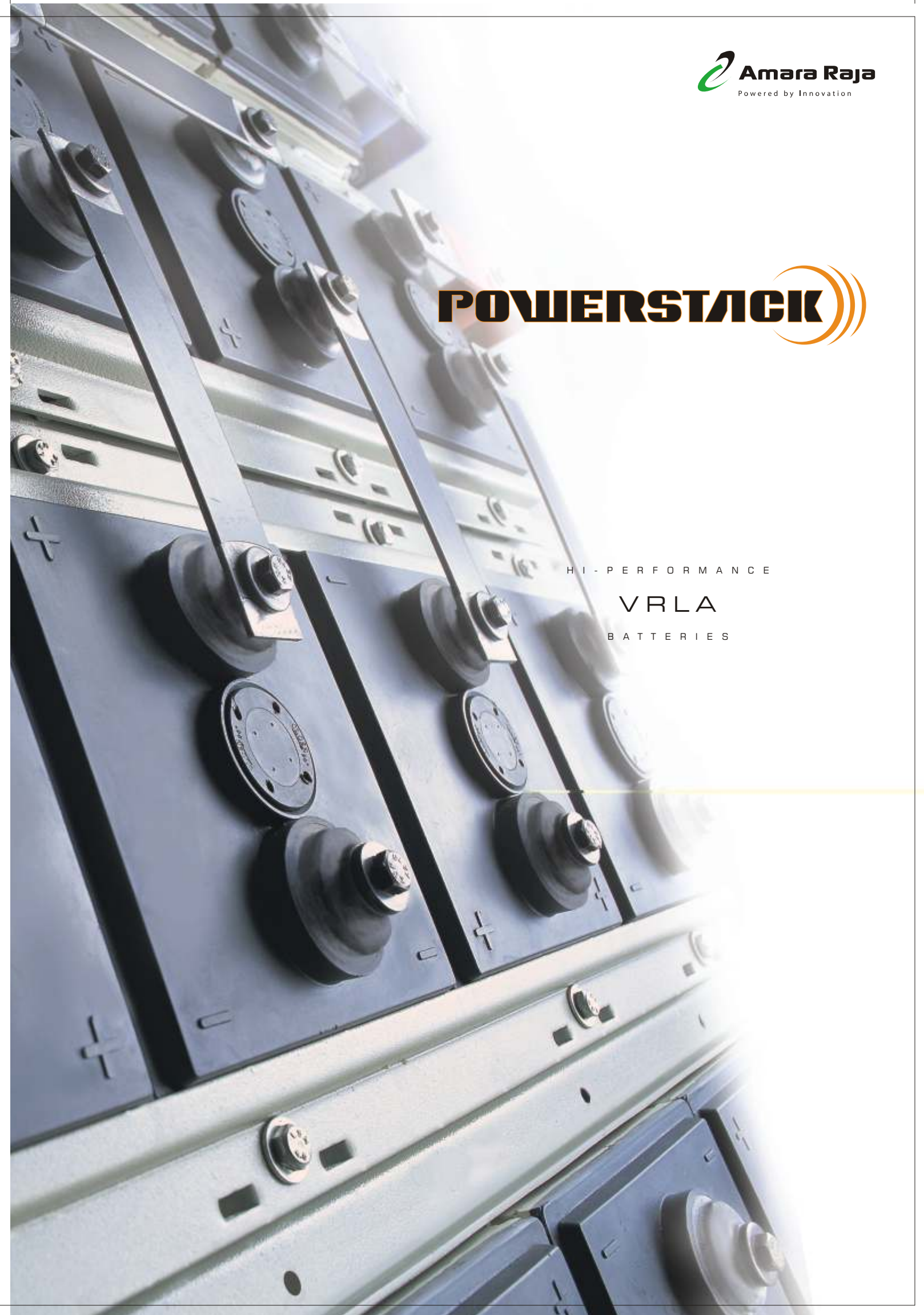
HI - PERFORMANCE

VRLA

BATTERIES



ARBL/IND/EXP/MAR07/2000



Amara Raja - Powered by Innovation

The future belongs to those who stake a claim for it here and now. This axiom has been our guiding principle at Amara Raja helping us 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. This partnership facilitates sharing of knowledge and innovations to accelerate and expand development efforts in the global battery market. It also enables harnessing technology that acclimatizes batteries to operate in harsh tropical conditions.

Working together with alliance partner Johnson Controls, Amara Raja set up India's finest battery plants, the first such facility for Johnson Controls in the last decade. This facility is backed by one of the finest Research and Development centers on site. A center that constantly and unceasingly thinks out of the box and develops products and services that match world-class standards and sets industry benchmarks.

Amara Raja's Battery Excellence Centre is another first for the region. Here, products are put through rigorous tests to ensure that they comply with international standards and design requirements. With the latest testing equipment, the center evaluates battery performance, design and longevity. Apart from this, there are facilities for application engineering, vehicle systems study, simulations and computer-aided design, including a full calibration laboratory. Amara Raja's quality commitment has ensured that it conforms to International quality standards.

Amara Raja today has the distinction of being a prime player in the Johnson Controls led global alliance and is forging ahead into new markets - powered by innovation.



Amara Raja's Powerstack, a hi-performance battery is designed to meet the demands of a wide range of industrial applications. The Powerstack range, modular in structure, is capable of accommodating a wide spectrum of capacities depending on the application. Major application areas include Telecommunications, Power utilities, Railways, Defence and other heavy industries.

POWERSTACK 

POWERSTACK

The Reliable Powerhouse

Performance Edge

- Design float life of 20 years
- Proven performance in harsh tropical conditions
- Deep discharge capability
- Unbeatable track record in applications ranging from Telecom to Railways to off-shore platforms

Quality Edge

- QS 9000 - accredited across all functional areas and business ranging from manufacturing to service.
- World class ISO 14001 accredited facility



Quality Systems certified to
EN ISO 9001 : 1994
and QS-9000 : 1998 by



Amara Raja's commitment to excellence is borne by the prestigious Certifications that it holds to its credit.

- **QS 9000/ISO - 9001 Certification** by RW TUV,
- Certification by **Underwriters' Laboratories** for product safety
- **ISO-14001 Certification** signifying the environmental consciousness
Implementation of Kaizen, Six Sigma programs signifying commitment toward **TQM** culture

Backed by its unflinching commitment to offer the best of technology and quality, Amara Raja offers you Powerstack, the reliable power house.

APPLICATION SPECTRUM

Powerstack provides robust back up power solutions for varied applications.

Major application areas include:

- **Telecommunications:** (Basic Telephony, Cellular Telephony, Transmission, Last Mile Connectivity, Local Network)
- **Uninterruptible Power Supply Systems:** (Data Processing, Process Instrumentation, Automated Banking)
- **Power utilities:** (Switchgear & Instrumentation Controls, Transmission & Distribution)
- **Railways:** (Train lighting & Airconditioning)
- **Solar Photovoltaics (SPV):** (Off shore oil exploration platforms & Cathodic protection)
- **Process & Service Industry**
- **Defence**

TECHNICAL SPECIFICATIONS

Product:

- **Container & Cover :** Polypropylene Co-polymer (Fire-retardant optional)
- **Separator :** Spun glass micro-porous matrix
- **Positive Plate :** Flat-pasted Type
- **Positive Plate Alloy :** Hybrid Alloy with deep discharge and long life characteristics
- **Negative Plate :** Flat-pasted Type
- **Negative Plate Alloy :** Lead Calcium Alloy with Maintenance-Free characteristics
- **Safety valve :** Self resealing, Pressure regulated, explosion-proof
- **Terminals :** Lead terminals with copper inserts
- **Connectors :** Heavy-duty lead plated copper connectors
- **Trays :** Acid resistant MS Trays, self-stackable type



RANGE SPECIFICATIONS

Powerstack is available in varied ranges to meet their customers' complex business needs. Powerstack is available in modular design, with 2V as the basic cell, with capacities ranging from 100Ah to 6000Ah housed in self-stackable MS Trays, as shown in the data sheet.

DISCHARGE DATA: Attached

Performance:

- **Self-discharge:** Less than 1% per week
- **Shelf life without re-charge:** Upto 6 Months*
- **Operating conditions:** -40°C to + 55°C
- **Design Float Life:** Upto 20 Years
- **Design Cycle Life:**
 - 4000 Cycles at 20% Depth Of Discharge
 - 2000 Cycles at 50% Depth Of Discharge
 - 1200 Cycles at 80% Depth of Discharge

Note: All values are rated at 27°C. Charging parameters at 27°C

Method: Constant Potential Current Limited

Charge Provision	Charging Voltage	Maximum Charging current (Amps)
Float charge	2.23 VPC	0.2 C
Boost charge	2.30 VPC	0.2 C

C is the rated capacity @ 10 hour

*Please refer to Operating Instructions for storage instructions



RFANGLER SPECIFICATIONS

POWERSTACK RANGE

Cell type	Nominal Ah Capacity @ C10 to 1.75 ECV at 27C	Module Voltage	Stacking dimensions 5 mm						Module weight 5		Packed unit weight 10	
			Length		Width		Height		KGS	LBS	KGS	LBS
			MM	IN	MM	IN	MM	IN				
5005	100	12	615	24.21	395	15.55	163	6.42	68	150	445	981
5009	200	12	615	24.21	395	15.55	240	9.45	107	236	465	1025
6005	120	12	615	24.21	458	18.03	163	6.42	80	176	515	1136
6009	240	12	615	24.21	458	18.03	240	9.45	127	280	545	1202
6011	300	12	615	24.21	458	18.03	278	10.94	150	331	630	1389
6013	360	12	615	24.21	458	18.03	315	12.40	175	386	735	1621
8009	345	12	615	24.21	580	22.83	240	9.45	168	370	705	1555
8011	430	12	615	24.21	580	22.83	278	10.94	199	439	830	1830
8013	515	12	615	24.21	580	22.83	315	12.40	230	507	955	2106
8015	600	12	615	24.21	580	22.83	353	13.90	261	576	818	1804
8017	690	6	615	24.21	580	22.83	225	8.86	157	346	663	1462
8021	860	6	615	24.21	580	22.83	261	10.28	188	415	785	1731
8025	1030	6	615	24.21	580	22.83	300	11.81	220	485	915	2018
8033	1375	6	615	24.21	580	22.83	376	14.80	284	626	888	1958
8045	1800	12	615	24.21	580	22.83	1060	41.73	783	1727	818	1804
8051	2070	6	615	24.21	580	22.83	675	26.57	471	1039	663	1462
8063	2580	6	615	24.21	580	22.83	783	30.83	564	1244	785	1731
8075	3090	6	615	24.21	580	22.83	900	35.43	660	1455	915	2018
8099	4125	6	615	24.21	580	22.83	1125	44.29	852	1879	888	1958
80126	5160	6	615	24.21	580	22.83	1566	61.65	1128	2487	785	1731
80132	5500	6	615	24.21	580	22.83	1504	59.21	1704	3757	888	1958
9013	570	12	615	24.21	650	25.59	315	12.40	258	569	1062	2342
9015	665	12	615	24.21	650	25.59	353	13.90	294	648	917	2022
9017	760	6	615	24.21	650	25.59	225	8.86	176	388	740	1632
9021	950	6	615	24.21	650	25.59	261	10.28	211	465	880	1940
9025	1140	6	615	24.21	650	25.59	300	11.81	246	542	1020	2249
9033	1520	6	615	24.21	650	25.59	376	14.80	321	708	1000	2205
9039	1710	12	615	24.21	650	25.59	945	37.20	774	1707	1062	2342
9045	1995	12	615	24.21	650	25.59	1060	41.73	882	1945	917	2022
9051	2280	6	615	24.21	650	25.59	675	26.57	528	1164	740	1632
9063	2850	6	615	24.21	650	25.59	783	30.83	633	1396	880	1940
9075	3420	6	615	24.21	650	25.59	900	35.43	738	1627	1020	2249
9099	4560	6	615	24.21	650	25.59	1128	44.41	963	2123	1000	2205
90132	6080	6	615	24.21	650	25.59	1504	59.21	1284	2831	1000	2205



PERFORMANCE SPECIFICATIONS

Cell type	Nominal Ah Capacity to 1.75 @ C10 at 27°C	MINUTES			DISCHARGE CURRENT IN AMPS										
		5	15	30	1h	2h	3h	4h	5h	6h	7h	8h	10h	12h	24h
50															
5005	100	96	81	68	52	32	25	20	16	14	12	11	9.6	8	4.5
5009	200	192	163	136	105	65	50	40	33	29	25	23	19	17	9
60															
6005	120	115	98	82	63	39	30	24	20	17	15	13	11	10	5
6009	240	230	196	164	126	78	60	48	40	34	30	27	23	20	10
6011	300	288	245	205	157	98	75	60	50	43	38	34	28	25	13
6013	360	346	295	246	189	118	90	72	60	52	46	41	34	30	16
80															
8009	345	331	282	236	181	113	86	69	58	50	44	39	33	29	15
8011	430	413	352	294	226	141	107	86	72	62	55	49	41	36	19
8013	515	495	422	352	271	169	128	103	87	74	66	59	49	43	23
8015	600	576	491	410	315	197	150	120	101	87	77	69	57	50	27
8017	690	663	565	472	363	226	172	138	116	100	88	79	66	58	31
8021	860	826	704	589	452	282	215	173	145	124	110	99	83	72	39
8025	1030	990	844	705	542	338	257	207	174	149	132	119	99	87	46
8033	1375	1322	1127	941	723	452	343	276	232	199	177	159	132	116	62
8045	1800	1730	1475	1232	947	592	450	362	304	261	231	208	173	152	81
8051	2070	1990	1696	1417	1089	680	517	416	350	300	266	239	199	175	94
8063	2580	2480	2114	1767	1357	848	645	519	436	374	332	298	249	218	117
8075	3090	2971	2532	2116	1626	1016	772	621	522	448	398	358	298	261	140
8099	4125	3966	3381	2825	2171	1356	1031	829	697	598	531	477	398	349	187
80126	5160	4961	4229	3534	2715	1697	1290	1038	873	748	664	597	498	437	234
80132	5500	5288	4508	3767	2894	1809	1375	1106	930	798	708	637	530	466	250
90															
9013	570	548	467	390	300	187	142	114	96	82	73	66	55	48	25
9015	665	639	545	455	350	218	166	133	112	96	85	77	64	56	30
9017	760	730	622	520	400	250	190	152	128	110	97	88	73	64	34
9021	950	913	778	650	500	312	237	191	160	137	122	110	91	80	43
9025	1140	1096	934	780	600	375	285	229	192	165	146	132	110	96	51
9033	1520	1461	1245	1041	800	500	380	305	257	220	195	176	146	128	69
9045	1995	1918	1635	1366	1050	656	498	401	337	289	257	231	192	169	90
9051	2280	2192	1868	1561	1200	750	570	458	385	330	293	264	220	193	103
9063	2850	2740	2336	1952	1500	937	712	573	482	413	367	330	275	241	129
9075	3420	3288	2803	2342	1800	1125	855	688	578	496	440	396	330	289	155
9099	4560	4384	3737	3123	2400	1500	1140	917	771	661	587	528	440	386	207
90132	6080	5846	4983	4164	3200	2000	1520	1223	1028	882	783	704	586	515	276

AMPERES TO 1.80 ECV @ 27°C

PERFORMANCE SPECIFICATIONS



Cell type	Nominal Ah Capacity to 1.75 @ C10 at 27°C	DISCHARGE CURRENT IN AMPS													
		1h	2 hrs	3 hrs	4 hrs	5 hrs	6 hrs	7 hrs	8 hrs	10 hrs	12 hrs	24 hrs			
50															
5005	100	50	31	23	19	15	13	12	10	9	8	8	8	8	4
5009	200	100	62	47	38	31	27	24	21	18	16	16	16	16	8
60															
6005	120	60	37	28	23	19	16	14	13	10	9	9	9	9	5
6009	240	120	75	56	46	38	32	29	26	21	19	19	19	19	10
6011	300	150	94	71	57	47	41	36	32	27	24	24	24	24	13
6013	360	180	112	85	69	57	49	43	39	32	28	28	28	28	15
80															
8009	345	172	108	81	66	54	47	42	37	31	27	27	27	27	15
8011	430	215	134	101	82	68	58	52	47	38	34	34	34	34	18
8013	515	257	161	122	99	81	70	62	56	46	41	41	41	41	22
8015	600	300	188	142	115	95	82	73	65	54	48	48	48	48	26
8017	690	345	216	163	132	109	94	84	75	62	55	55	55	55	30
8021	860	430	269	203	165	136	117	104	94	77	68	68	68	68	37
8025	1030	515	322	244	198	163	141	125	113	93	82	82	82	82	44
8033	1375	687	431	325	264	218	188	167	151	124	110	110	110	110	59
8045	1800	900	564	426	346	286	246	219	197	162	144	144	144	144	78
8051	2070	1035	648	490	398	329	283	252	227	187	165	165	165	165	90
8063	2580	1290	808	611	496	410	353	314	283	233	206	206	206	206	112
8075	3090	1545	968	732	594	491	423	376	339	279	247	247	247	247	134
8099	4125	2062	1293	977	793	655	565	503	453	373	330	330	330	330	179
80126	5160	2580	1617	1222	992	820	706	629	567	466	412	412	412	412	224
80132	5500	2750	1724	1303	1057	874	753	670	604	497	440	440	440	440	239
90															
9013	570	285	178	135	109	90	78	69	62	51	45	45	45	45	24
9015	665	332	208	157	127	105	91	81	73	60	53	53	53	53	28
9017	760	380	238	180	146	120	104	92	83	68	60	60	60	60	33
9021	950	475	297	225	182	151	130	115	104	85	76	76	76	76	41
9025	1140	570	357	270	219	181	156	139	125	103	91	91	91	91	49
9033	1520	760	476	360	292	241	208	185	167	137	121	121	121	121	66
9045	1995	997	625	472	383	317	273	243	219	180	159	159	159	159	86
9051	2280	1140	714	540	438	362	312	278	250	206	182	182	182	182	99
9063	2850	1425	893	675	548	453	390	347	313	257	228	228	228	228	123
9075	3420	1710	1072	810	657	543	468	417	375	309	273	273	273	273	148
9099	4560	2280	1429	1080	876	724	624	556	501	412	364	364	364	364	198
90132	6080	3040	1905	1440	1169	966	832	741	668	550	486	486	486	486	264

AMPERES TO 1.85 ECV @ 27°C

PERFORMANCE SPECIFICATIONS



Customer referrals

AMPERES TO 1.90 ECV @ 27°C

Cell type	Nominal Ah Capacity to 1.75 @ C10 at 27C	DISCHARGE CURRENT IN AMPS											
		1h	2 hrs	3 hrs	4 hrs	5 hrs	6 hrs	7 hrs	8 hrs	10 hrs	12 hrs	24 hrs	
50													
5005	100	44	28	21	17	14	12	11	10	8	7	3	
5009	200	89	56	42	34	29	25	22	20	16	14	7	
60													
6005	120	53	34	25	20	17	15	13	12	9	8	4	
6009	240	107	68	51	41	35	30	26	24	19	17	9	
6011	300	134	85	63	52	44	37	33	30	24	21	11	
6013	360	161	102	76	62	52	45	40	36	29	25	14	
80													
8009	345	154	98	73	60	50	43	38	34	28	24	13	
8011	430	192	122	91	74	63	54	48	43	35	30	16	
8013	515	230	146	109	89	75	64	57	51	41	36	20	
8015	600	269	170	127	104	88	75	67	60	48	42	23	
8017	690	309	196	147	120	101	87	77	69	56	49	27	
8021	860	385	244	183	149	126	108	96	86	70	61	33	
8025	1030	461	292	219	179	151	129	115	103	83	73	40	
8033	1375	616	390	293	239	201	173	154	138	112	97	53	
8045	1800	807	511	383	313	264	226	201	181	146	128	70	
8051	2070	928	588	441	360	303	261	232	208	168	147	81	
8063	2580	1156	732	550	448	378	325	289	260	210	183	101	
8075	3090	1385	877	658	537	453	389	346	311	251	219	121	
8099	4125	1849	1171	879	717	605	520	462	416	336	293	161	
80126	5160	2313	1465	1100	897	757	650	578	520	420	366	202	
80132	5500	2466	1562	1172	956	807	693	616	554	448	391	215	
90													
9013	570	255	161	121	99	83	71	63	57	46	40	22	
9015	665	298	188	141	115	97	83	74	67	54	47	26	
9017	760	340	215	162	132	111	95	85	76	61	54	29	
9021	950	426	269	202	165	139	119	106	95	77	67	37	
9025	1140	511	323	243	198	167	143	127	115	92	81	44	
9033	1520	681	431	324	264	223	191	170	153	123	108	59	
9045	1995	894	566	425	346	292	251	223	201	162	141	78	
9051	2280	1022	647	486	396	334	287	255	230	185	162	89	
9063	2850	1278	809	607	495	418	359	319	287	232	202	111	
9075	3420	1533	971	729	594	502	431	383	345	278	243	134	
9099	4560	2044	1295	972	793	669	575	511	460	371	324	178	
90132	6080	2726	1727	1296	1057	892	766	681	613	495	432	238	

Note: Due to company's ongoing product improvement process, the design and specifications are subject to change without prior notice. These models are horizontal stacking type.

ALCATEL
Alcatel India Limited
Plot No. 25, Sector-18, Electronic City,
Gurgaon - 122 015, Haryana, India.
Tel.: (91) (124) 2455050, 2347390
Fax.: (91) (124) 2346782, 2397527

COMMAND™
The Hutchison telecom TV

SIEMENS

Lucent Technologies
Bell Labs Innovations
Lucent Technologies Hindustan (Pvt.) Ltd.
Regd. Office:
1, 2 & 4, UGP, Creator Building,
International Technology Park,
Whitefield Road,
Bangalore - 560 086, India
Tel: +91-80-841 0311, 841 0757
Fax: +91-80-841 0838

TO WHOMSOEVER IT MAY CONCERN

WE HEREBY CERTIFY THAT M/S AMARA RAJA BATTERIES LTD HAS BEEN A REGULAR PREFERRED SUPPLIER OF VRLA BATTERIES TO US FOR THE PAST 7 -8 YEARS. WE HAVE BEEN PROCURING BATTERIES OF VARIOUS CAPACITIES RANGING FROM 48V/1000AH TO 48V/3000AH FOR MANY TELECOM APPLICATIONS VIZ., NT SWITCHING, TRANSMISSION, CELLULAR AND LAST MILE CONNECTIVITY ETC., THESE BATTERIES HAVE BEEN INSTALLED ACROSS THE COUNTRY UNDER TROPICAL OPERATING CONDITIONS. WE HAVE FOUND THAT PERFORMANCE OF THEIR BATTERIES AND SERVICES ARE GOOD.

FOR LUCENT TECHNOLOGIES HINDUSTAN (PVT) LTD.

AUTHORIZED SIGNATORY

DATED: 17TH SEP 2003
PLACE: BANGALORE