

## Stationary lead-acid batteries of БП (GroE) series

applied as dc power supply at power engineering facilities, communication facilities, etc.

### Designation

**First figure** – positive electrode quantity

**БП letters** – GroE, large surface positive electrodes with 25 A.h. or 100 A.h. capacity

**Second figure** – nominal battery capacity ( $C_{10}$ , A.h.)

### Construction

БП (hereinafter GroE (by international classification)) stationary lead-acid batteries have very low internal resistance, providing constant voltage at high currents in short discharge modes. The batteries consist of Plante positive electrodes and pasted negative electrodes. Electrodes are gathered into block and are welded by their tags to bridges from lead alloy, which have terminals with threaded bush, coming outside through the holes in the lid. Side ledges of positive electrodes are supported by the inner shoulders of the container and the negative electrodes stand on prismatic bottom supporters. The first and the last plates are negative electrodes. Heteropolar electrodes are isolated from each other by sheets of ribbed porous separator. The capacity of GroE batteries ranges from 75 to 2600 A.h.

The lid and the container are made of shock-proof plastic and hermetically sealed. The container is made of transparent material (SAN). The container has the marks “max” and “min”, allowing visual check-up of electrolyte level. Electrolyte density is  $1,22 \pm 0,005 \text{g/cm}^3$ . It consists of sulfuric acid (GOST 677-73, premium class), diluted in distilled water (GOST 6709-72). The batteries are equipped with wave traps, stopping sulfuric acid aerosols during operation at continuous charge with 2,25V max voltage and in charging mode at 2,4V voltage per cell. The wave traps provide non-water refilling battery usage during 3-5 years. The intercell connection is bolted, using copper isolated straight arcs.

The placement category is 4.2 for the operation at  $-5$  to  $+45$  C°. The batteries are cold and thermal-resistant, so they can be transported at  $-40$  to  $+50$  C°.

The batteries are earthquake-proof, i. e. they retain efficiency under seismic impact with acceleration magnitude of 0,9g horizontally and 0,6g vertically.

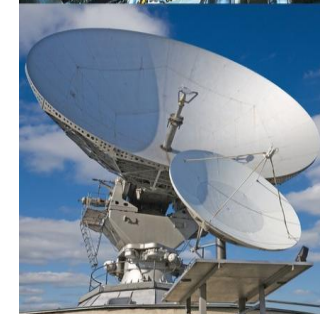
The batteries are produced in one of the following modifications at the time of delivery to the consumer: discharged and without electrolyte (P); dry-charged without electrolyte (C); with electrolyte and fully charged (T). When in operation, the difference between these modifications lies only within commissioning procedures. See the operating manual. The modification is determined by the contract upon agreement between the customer and the producer. The batteries have excellent durability and highest reliability.



# **БП (GroE) Series Batteries Specification**

Table 1

Battery type	Dimensions,mm			Number of pairs of terminals	Max weight													
	Length, L	Width, W	Height, H		Without electrolyte	With electrolyte												
3БП 75	155	184	410	1	10,8	17,5												
4БП 100					13,2	19,7												
5БП 125					15,6	21,9												
6БП 150					18,0	24,1												
7БП 175					20,4	26,3												
8БП 200					23,5	33,2												
9БП 225	230			184	410	1	25,9	35,4										
10БП 250							28,3	37,6										
11БП 275							30,7	39,8										
12БП 300							33,1	42,0										
13БП 325							340	184	410	2	38,2	52,5						
14БП 350											40,6	54,7						
15БП 375	43,0					56,9												
16БП 400	45,4					59,1												
17БП 425	47,8					61,3												
18БП 450	50,2					63,5												
5БП 500	270					330	590			1	59,0	95,0						
6БП 600											68,9	104,0						
7БП 700		2	330							590	2	78,8	113,0					
8БП 800												88,7	122,0					
9БП 900												98,6	131,0					
10БП 1000												108,5	140,0					
11БП 1100												118,4	149,0					
12БП 1200		350									330	590	3	128,6	170,0			
13БП 1300				138,5	179,0													
14БП 1400				148,4	188,0													
15БП 1500				158,3	197,0													
16БП 1600	440			330	590									3	170,0	222,0		
17БП 1700								179,9	231,0									
18БП 1800		189,8						240,0										
19БП 1900		199,7						249,0										
20БП 2000		209,6						258,0										
21БП 2100	530	330						590	4				221,8	285,0				
22БП 2200													231,7	294,0				
23БП 2300													241,6	303,0				
24БП 2400													251,5	312,0				
25БП 2500													575	330	590	4	259,0	325,0
26БП 2600																	268,9	334,0



## Internal d.c. resistance and short-circuit current

Table 2



Battery type	Internal resistance, Ri, mOm	Short-circuit current Is/c, A	Battery type	Internal resistance, Ri, mOm	Short-circuit current Is/c, A
3БП 75	1,158	1727	8БП 800	0,140	14285
4БП 100	0,868	2304	9БП 900	0,125	16000
5БП 125	0,695	2878	10БП 1000	0,112	17857
6БП 150	0,579	3454	11БП 1100	0,102	19607
7БП 175	0,496	4032	12БП 1200	0,094	21276
8БП 200	0,434	4608	13БП 1300	0,086	23255
9БП 225	0,386	5181	14БП 1400	0,080	25000
10БП 250	0,347	5763	15БП 1500	0,075	26666
11БП 275	0,316	6329	16БП 1600	0,070	28571
12БП 300	0,289	6920	17БП 1700	0,066	30303
13БП 325	0,267	7490	18БП 1800	0,062	32258
14БП 350	0,248	8064	19БП 1900	0,059	33898
15БП 375	0,232	8620	20БП 2000	0,056	35714
16БП 400	0,217	9216	21БП 2100	0,053	37735
17БП 425	0,204	9803	22БП 2200	0,051	39215
18БП 450	0,193	10362	23БП 2300	0,049	40816
5БП 500	0,225	8888	24БП 2400	0,047	42553
6БП 600	0,187	10695	25БП 2500	0,045	44444
7БП 700	0,160	12500	26БП 2600	0,043	46511

The storability time of the batteries without electrolyte is 4 years, whereupon the storability time of the battery (modification C) dry-charge is 1 year since the production date.

The battery warranty period lasts 5 years from the commissioning date.

Average max service lifetime of the battery in continuous charge mode at electrolyte temperature of 20°C and charge voltage of 2,23V is minimum 25 years.

## БП (GroE) Series Electrical Performance

Table 3

Battery type	Discharge mode								Discharge mode						
	Hours				Minutes				Hours				Minutes		
	10	5	3	1	30	15	10	1	10	5	3	1	30	15	10
	Final voltage, V/cell								10	5	3	1	30	15	10
	1,80		1,75		1,70										
Discharge current, A								Capacity C (nominal) / C (actual), A.h.							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3БП 75	7,5	13,8	20,4	46,0	75,0	108,0	134,0	195,0	75 /83	69 /76	61 /67	46 /51	37,5	27,0	22,3
4БП 100	10,0	18,4	27,2	61,2	101,0	144,0	179,0	260,0	100 /110	92 /101	82 /90	61 /67	50,5	38,0	29,8
5БП 125	12,5	23,0	33,9	76,4	125,0	180,0	223,0	325,0	125 /138	115 /127	102 /112	76 /84	62,5	45,0	37,2
6БП 150	15,0	27,6	40,9	91,5	150,0	216,0	268,0	390,0	150 /165	138 /152	123 /135	92 /101	75,0	54,0	44,7
7БП 175	17,5	32,2	47,6	106,7	176,0	252,0	312,0	455,0	175 /193	161 /177	143 /157	107 /118	88,0	63,0	52,0
8БП 200	20,0	36,8	54,3	122,0	201,0	288,0	357,0	520,0	200 /220	184 /202	163 /179	122 /134	100,5	72,0	59,5
9БП 225	22,5	41,4	61,4	137,0	226,0	324,0	402,0	585,0	225 /248	207 /228	184 /202	137 /151	113,0	81,0	67,0
10БП 250	25,0	46,0	68,2	153,0	250,0	360,0	446,0	650,0	250 /275	230 /253	205 /226	153 /168	125,0	90,0	74,3
11БП 275	27,5	50,6	74,9	168,0	276,0	396,0	491,0	715,0	275 /303	253 /278	225 /248	168 /185	138,0	99,0	81,8
12БП 300	30,0	55,2	81,6	183,0	301,0	432,0	536,0	780,0	300 /330	276 /304	245 /270	183 /201	150,5	108,0	89,3
13БП 325	32,5	59,8	88,3	199,0	325,0	468,0	580,0	845,0	325 /358	299 /329	265 /292	199 /219	162,5	117,0	96,7
14БП 350	35,0	64,4	95,0	213,0	352,0	504,0	625,0	910,0	350 /385	322 /354	285 /314	213 /234	176,0	126,0	104,2
15БП 375	37,5	69,0	102,3	229,0	376,0	540,0	670,0	975,0	375 /413	345 /380	307 /337	229 /252	188,0	135,0	111,7
16БП 400	40,0	73,6	109,0	245,0	400,0	576,0	714,0	1040,0	400 /440	368 /405	327 /360	245 /270	200,0	144,0	119,0
17БП 425	42,5	78,2	115,8	259,0	427,0	612,0	759,0	1105,0	425 /468	391 /430	347 /382	259 /285	213,5	153,0	126,5
18БП 450	45,0	82,8	122,5	275,0	451,0	648,0	804,0	1170,0	450 /495	414 /455	368 /405	275 /303	225,5	162,0	134,0
5БП 500	50,0	91,6	132,8	285,0	453,0	571,0	702,0	955,0	500 /550	458 /504	398 /438	285 /314	226,5	143,0	117,0
6БП 600	60,0	109,8	159,4	342,0	541,0	685,0	843,0	1146,0	600 /660	549 /604	478 /526	342 /376	270,5	171,0	140,5
7БП 700	70,0	128,0	185,8	399,0	632,0	800,0	983,0	1338,0	700 /770	640 /704	557 /613	399 /439	316,0	200,0	163,8
8БП 800	80,0	146,4	212,4	456,0	722,0	914,0	1123,0	1529,0	800 /880	732 /805	637 /701	456 /502	361,0	228,0	187,2
9БП 900	90,0	164,8	239,0	513,0	812,0	1028,0	1264,0	1720,0	900 /990	824 /906	717 /789	513 /564	406,0	257,0	211,0
10БП 1000	100,0	183,0	265,5	570,0	902,0	1142,0	1404,0	1911,0	1000 /1100	915 /1007	796 /876	570 /627	451,0	286,0	234,0
11БП 1100	110,0	201,2	291,8	627,0	972,0	1257,0	1545,0	2102,0	1100 /1210	1006 /1107	875 /963	627 /690	486,0	314,0	258,0
12БП 1200	120,0	219,6	318,7	684,0	1083,0	1371,0	1685,0	2293,0	1200 /1320	1048 /1153	956 /1052	684 /752	541,5	343,0	281,0
13БП 1300	130,0	238,0	345,2	741,5	1173,0	1485,0	1826,0	2484,0	1300 /1430	1190 /1309	1035,6	742 /816	586,5	371,0	304,0
14БП 1400	140,0	256,2	371,8	798,6	1263,0	1599,0	1966,0	2675,0	1400 /1540	1281 /1409	1115 /1227	799 /879	631,5	400,0	328,0
15БП 1500	150,0	274,4	398,4	855,6	1354,0	1714,0	2106,0	2866,0	1500 /1650	1372 /1509	1195 /1315	856 /942	677,0	428,0	351,0
16БП 1600	160,0	292,8	425,0	913,0	1444,0	1828,0	2247,0	3216,0	1600 /1760	1464 /1610	1275 /1403	913 /1004	722,0	457,0	374,0
17БП 1700	170,0	311,2	451,5	972,0	1534,0	1942,0	2387,0	3248,0	1700 /1870	1556 /1712	1355 /1490	972 /1069	767,0	486,0	398,0
18БП 1800	180,0	329,4	478,1	1027,0	1659,0	2056,0	2528,0	3440,0	1800 /1980	1647 /1812	1434 /1577	1027 /1130	829,5	514,0	421,0
19БП 1900	190,0	347,6	504,6	1084,0	1715,0	2171,0	2687,0	3631,0	1900 /2090	1738 /1912	1514 /1665	1084 /1192	857,5	543,0	448,0

Table 3 continue

Designation	Discharge mode								Discharge mode						
	Hours				Minutes				Hours				Minutes		
	10	5	3	1	30	15	10	1	10	5	3	1	30	15	10
	Final voltage, V/cell								10	5	3	1	30	15	10
	1,80		1,75		1,70										
Discharge current, A									Capacity C (nominal) / C (actual), A.h.						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
20БП 2000	200,0	366,0	531,2	1141,0	1805,0	2285,0	2809,0	3822,0	2000 /2200	1830 /2013	1594 /1753	1141 /1255	902,5	571,0	468,0
21БП 2100	210,0	384,4	557,8	1198,0	1895,0	2399,0	2949,0	4013,0	2100 /2310	1922 /2114	1673 /1840	1198 /1318	947,5	600,0	492,0
22БП 2200	220,0	402,6	584,2	1255,0	2006,0	2513,0	3089,0	4204,0	2200 /2420	2013 /2214	1753 /1928	1255 /1380	1003,0	628,0	515,0
23БП 2300	230,0	420,8	610,8	1312,0	2076,0	2628,0	3230,0	4395,0	2300 /2530	2104 /2314	1832 /2015	1312 /1443	1038,0	657,0	538,0
24БП 2400	240,0	439,2	637,4	1369,0	2166,0	2742,0	3370,0	4586,0	2400 /2640	2196 /2416	1912 /2103	1369 /1506	1083,0	686,0	562,0
25БП 2500	250,0	457,6	663,9	1426,0	2256,0	2856,0	3511,0	4777,0	2500 /2750	2288 /2517	1992 /2191	1426 /1569	1128,0	714,0	585,0
26БП 2600	260,0	475,8	690,5	1483,0	2346,0	2970,0	3651,0	4968,0	2600 /2860	2384 /2622	2072 /2280	1483 /1631	1173,0	742,0	608,0

## KURSK UNITED MANUFACTURING AREA

### LLC "ISTOK+"

305 OFFICE, 40 LENINSKY KOMSOMOL PROSPEKT  
KURSK 305026, RUSSIA

#### Please, contact us:

**Evgeny Burak** (English, German)  
Phone: +7(4712) 22-77-89 ext. "3"  
E-mail: burak\_ea@accumkursk.ru

### LLC "KURSK ACCUMULATOR PLANT"

116 OFFICE, 40 LENINSKY KOMSOMOL PROSPEKT  
KURSK 305026, RUSSIA

**Valery Kolesnikov** (Russian language)  
Phone: +7 (4712) 22-77-89 ext. "0"  
E-mail: kolesnikov@accumkursk.ru

**Website: [www.akbkursk.ru](http://www.akbkursk.ru)**