Classic™

GNB INDUSTRIAL POWER
A Division of Exide Technologies

81700720

Classic Range: GroE, OPzS-LA, OCSM-LA, OGi-LA, Energy Bloc
Operating Instructions
for stationary lead acid batteries

Nominal data

- Nominal voltage U_N : 2.0 V x number of cells
- Nominal capacity $C_N = C_{10}$: 10 h discharge (see type plate on cells and technical data in these instructions)
- Nominal discharge current $I_N = I_{10}$: C_N / 10 h
- Final discharge voltage U_f : see technical data in these instructions
- Nominal temperature t_N : 20° C

Battery type: _____ Number of cells/blocks: _____

Assembly by: _____ GNB order no.: _____ date: _____

Commissioned by: _____ date: _____

Safety signs attached by: _____ date: _____

- Observe these Instructions and keep them located near the battery for future reference!
- Work on the battery should only be carried out by qualified personnel.

- Do not smoke!
- Do not use any naked flame or other sources of ignition. Risk of explosion and fire!

- While working on batteries wear protective goggles and clothing!
- Observe the accident prevention rules as well as EN 50272-2, EN 50110-1!

- Any acid splashes on the skin or in the eyes must be rinsed with plenty of clean water immediately. Then seek medical assistance. Spillages on clothing should be rinsed out with water!

- Explosion and fire hazard, avoid short circuits.
- Avoid electrostatic charges and discharges/sparks!

- Electolyte is strongly corrosive!

- Blocks/cells are very heavy! Make sure they are installed securely! Only use suitable means of transport!
- Block/cell containers are sensitive to mechanical damage.
- Handle with care!
- Do not lift or pull up blocks/cells on the poles.

- Caution! Dangerous voltage.
- Metal parts of the battery are always alive, therefore do not place items or tools on the battery!

Non-compliance with operating instructions and installations or repairs made with other than original accessories and spare parts or with accessories and spare parts not recommended by the battery manufacturer or repairs made without authorization and use of additives for the electrolytes (alleged enhancing agents) render the warranty void.

Spent batteries have to be collected and recycled separately from normal household wastes (EWC 160601). The handling of spent batteries is described in the EU Battery Directive (2006/66/EC) and their national transitions (UK: HS Regulation 1994 No. 232, Ireland: Statory Instrument No. 73/2000). Contact your supplier to agree upon the recollection and recycling of your spent batteries or contact a local and authorized Waste Management Company.

1. Start Up

Check all cells/blocks for mechanical damage, correct polarity and firmly seated connectors. The following torques apply to the cell types:

GroE, OCSM-LA, OPzS-LA Cells	Energy Bloc OPzS Block	OGi-LA Cells ≤ 250 Ah	OGi-LA Cells ≥ 260 Ah
20 Nm	12 Nm	8 Nm	20 Nm

Table 1: Torques with a tolerance of ± 1 Nm

Put covers on the terminals if necessary. Check the electrolyte level in all cells and if necessary top up to maximum level with purified water as acc. to DIN 43530 Part 4. Connect the battery with the correct polarity to the charger (pos. pole to pos. terminal). The charger must not be switched on during this process, and the load must not be connected. Switch on charger and start charging following item 2.2.

The insulation resistance measured at the disconnected loads and charger should be ≥ 100 Ω per volt nominal voltage.

2. Operation

For the installation and operation of stationary batteries EN 50 272-2 is mandatory.

The battery must be installed in a way which prevents ambiance-dependent temperature differences of >3 K arising. The spacing between the cells or blocks should be 10 mm and at least 5 mm in rack mounting.

2.1 Discharge

Discharge must not be continued below the voltage recommended for the discharge time. Deeper discharges must not be carried out unless specifically agreed with the manufacturer. Recharge immediately following complete or partial discharge.

2.2 Charging

All charging characteristics with their specific data, described in
DIN 41773 (IU-characteristic, I-const.: ± 2%, U-const.: ± 1%)
DIN 41774 (W-characteristic, ± 0.05 Vpc)
DIN 41776 (I-characteristic, I-const.: ± 2%)
may be used. According to the charging equipment, specification and characteristics alternating currents flow through the battery superimposing onto the direct current during charge operation.
Alternating currents and the reaction of the loads may lead to an additional temperature increase of the battery, and strain the electrodes with possible damage (see point 2.5), which can shorten the battery life. Depending on the installation, charging (acc. to EN 50272-2) may be carried out in following operations:

a) Standby Parallel Operation

Here the load, battery and battery charger are continuously in parallel. Thereby, the charge voltage is the operation voltage and at the same time the battery installation voltage.

With the standby parallel operation, the battery charger is capable, at any time, of supplying the maximum load current and the battery charging current. The battery only supplies current when the battery charger fails. The float charge voltage measured at the end terminals of the battery should be set at the values in table 2. To reduce the charging time, a boost-charging stage can be applied in which the charge voltage of 2.33 V - 2.40 V x number of cells can be adjusted (standby parallel operation with boost recharging stage). Automatic changeover to float charging voltage acc. to table 2.
With **buffer operation**, the battery charger is not able to supply the maximum load current at all times. The load current intermittently exceeds the nominal current of the battery charger. During this period the battery supplies power. This results in the battery not being fully charged at all times. Therefore, depending on the load the charge voltage must be set at 2.25 V - 2.30 V x number of cells. This has to be carried out in accordance with the manufacturers instructions.

Range	Float charge voltage per cell
GroE, OPzS-LA, Energy Bloc, OGi-LA block / cell	2.23 V
OCSM-LA	2.25 V

Table 2: Float charge voltage

b) Switch mode operation
When charging, the battery is separated from the load. Towards the end of the charging process the charge voltage of the battery is 2.6 V - 2.75 V times the number of cells. The charging process must be monitored (see points 2.4, 2.5 and 2.6)! On reaching a fully charged state, the charging process must be stopped or switched to float charge as in point 2.3.

c) Battery Operation
(charge-/discharge operation)
The load is supplied by the battery only, whereby the charge voltage of the battery towards the end of the charging process can be 2.6 V - 2.75 V times the number of cells. The charging process must be monitored (see points 2.4, 2.5 and 2.6)! On reaching a fully charged state, the charging process must be switched off. The battery can be switched to the load as required.

2.3 Maintaining full charge
(float charging)
The devices used must comply with the stipulations under DIN 41773. They are to be set so that the average cell voltage is see table 2 and the electrolyte density should not decrease over a lengthy period.

2.4 Equalizing charge
Because it is possible to exceed the permitted load voltages, appropriate measures must be taken, e.g. switch off the load.
Equalizing charges are required after deep discharges and/or inadequate charges. They can be carried out as follows:
– at constant voltage of max. 2.4 Vpc up to 72 hours
– with I- or W-characteristic as in point 2.6.

The electrolyte temperature must never exceed 55° C. If it does, stop charging or revert to float charge to allow the temperature to drop.
The end of the equalizing charge is reached when the electrolyte density and the cell voltages no longer increase over a period of 2 hours.
(2 h -criterion only applies to I- and W-characteristics).

2.5 Alternating currents
When recharging up to 2.4 Vpc under operation modes 2.2 the value of the alternating current is occasionally permitted to reach 10 A (RMS) per 100 Ah nominal capacity.
In a fully charged state during float charge or standby parallel operation the actual value of the alternating current must not exceed 5 A (RMS) per 100 Ah nominal capacity.

2.6 Charging currents
The charging currents are not limited during standby parallel operation or buffer operation (IU-charge characteristic) with voltages up to 2.4 Vpc (reference values 5 A up to 35 A per 100 Ah nominal capacity).
Charging by I- or W-characteristic results in voltages higher than 2.4 Vpc and therefore increased decomposition of water. The charging currents per 100 Ah nominal capacity shown in the following table most not be exceeded.

Charging procedure	Range		Cell voltage
	GroE	OGi-LA, OPzS-LA, OCSM-LA, Energy Bloc (OGi-LA Block)	
IU-characteristic*)	10 A to 35 A		up to 2.40 V
I-characteristic	6.5 A	5.0 A	2.60 V-2.75 V
W-characteristic	9.0 A 4.5 A	7.0 A 3.5 A	at 2.40 V at 2.65 V

*Table 3: Permissible charging currents per 100 Ah nominal capacity, *) = recommended values*

2.7 Temperature
The recommended operating temperature range for lead acid batteries is 10° C to 30° C. All technical data apply to the nominal temperature 20° C.

The ideal operating temperature is 20° C ± 5 K. Higher temperatures will seriously reduce service life. Lower temperatures reduce the available capacity. The absolute maximum temperature is 55° C.

2.8 Temperature-related charge voltage
A temperature related adjustment of the charge voltage within the operating temperature of 10° C to 30° C is not necessary. If the operating temperature is constantly outside this range, the charge voltage has to be adjusted.
The temperature correction factor is -0.004 Vpc per K. If the temperature is constantly in excess of 40° C, the factor is -0.003 Vpc per K.

2.9 Electrolyte
The electrolyte density is diluted sulphuric acid. The nominal electrolyte density ± 0.01 kg/l (acc. to technical data) is based on 20 °C when fully charged and with the maximum electrolyte level. Higher temperatures reduce electrolyte density, lower temperatures increase electrolyte density. The appropriate correction factor is -0.0007 kg/l per K.
Example: electrolyte density of 1.23 kg/l at 35° C corresponds to a density of 1.24 kg/l at 20° C or an electrolyte density of 1.25 kg/l at 5° C corresponds to a density of 1.24 kg/l at 20° C.

3. Battery maintenance and control
The electrolyte level must be checked regularly. If it drops to the lower electrolyte level mark, purified water must be added in accordance with DIN 43530 Part 4 (maximum conductivity 30 µS/cm). Keep the battery clean and dry to avoid leakage currents. Plastic parts of the battery, especially containers, must be cleaned with pure water without additives.

At least every 6 months measure and record:
- Battery voltage
- Voltage of some cells/block batteries
- Electrolyte temperature of some cells
- Battery-room temperature
- Electrolyte density of some cells

If the cell voltages deviate by more than + 0.1 V or - 0.05 V (for blocks see table 4) from the average charge retention voltage (see table 2), and/or if the electrolyte density of the cells of a battery string deviates from the average-value more than ± 0.01 kg/l, call customer service.

Tolerance	4 V-Block	6 V-Block	10 V-Block	12 V-Block
+	0.14 V	0.17 V	0.22 V	0.24 V
-	0.07 V	0.09 V	0.11 V	0.12 V

Table 4: Permissible deviation from the average charge retention for block batteries

Annual measurement and recording:
- Voltage of all cells/block batteries
- Electrolyte temperature of all cells
- Electrolyte density of all cells

Annual visual check:
- Screw connections
- Screw connections without locking devices have to be checked for tightness
- Battery installation and arrangement
- Ventilation

4. Tests
Tests have to be carried out according to IEC 60896-11. Special instructions like
DIN VDE 0107 and DIN VDE 0108 have to be observed.

Capacity test, for instance, acceptance test on site: In order to make sure the battery is fully charged the following IU-charge methods must be applied: Option 1: float charge (see table 2), ≥ 72 hours. Option 2: 2.40 Vpc, ≥ 16 hours (max. 48 hours) followed by float charge (see item 2.3), ≥ 8 hours. The current available to the battery must be between 10 A / 100 Ah and 35 A / 100 Ah of the C_{10}-capacity.

5. Faults
Call the services agents immediately if faults in the battery or charging unit are found. Recorded data as described in point 3. simplify the troubleshooting and fault clearance. A service contract for example with Exide Technologies facilitates detecting faults in time.

6. Storage and taking out of operation
To store or decommission cells/blocks for a longer period of time they should be fully charged and stored in a dry and cold but frost-free room, away from direct sunlight. To avoid damage the following charging methods can be chosen:
To prevent damage, choose the following charging methods:
1. Refreshing charges every three months as described under point 2.4.
   At average ambient temperatures of more than the nominal temperature shorter intervals can be necessary.
2. Float charging as under point 2.3.

7. Transport
To prevent any leakage of electrolyte, the cells/block batteries must be transported in an upright position. Cells/block batteries without any visible damage are not defined as hazardous goods under the regulations for transport of hazardous goods by road (ADR) or by railway (RID). They must be protected against short circuits, slipping, upsetting or damaging. Block batteries may be suitably stacked and secured on pallets (ADR and RID, special provision 598). It is prohibited to stack pallets. No dangerous traces of acid may be found on the exteriors of the packing units. Cells/block batteries whose cases leak or are damaged must be packed and transported as class 8 hazardous goods under UN no. 2794.
In case of air transport, batteries which are part of any equipment must be disconnected at their terminals, and the terminals must be protected against short-circuits. This is in order to avoid the risk of any incidents like fire etc.

8. Technical data
The nominal voltage, the number of cells, the nominal capacity ($C_{10} = C_N$) and the battery type are described on the type plate. Other capacities (C_n) at different discharge currents (I_n) with the corresponding discharge times (t_n) see table 8.1.1 - 8.1.5.

8.1 Measurements, weights and capacities at different discharge times and final discharge voltage

8.1.1 Stationary lead acid batteries type OPzS-LA acc. to DIN 40736 and DIN 40737

with positive tubular plates and negative grid plates, Nominal electrolyte density 1.24 kg/l

Blocks

	Discharge data								Measurements and weights				
	Capacity [Ah]				discharge current [A]				Length max.	Width max.	Height [1] max.	Weight with acid approx.	Weight acid approx.
Discharge time [h]	10	5	3	1	10	5	3	1					
Final discharge voltage [Vpc]	1.80	1.80	1.75	1.65	1.80	1.80	1.75	1.65	[mm]	[mm]	[mm]	[kg]	[kg]
12V 1 OPzS 50 LA	59.0	47.5	42.0	27.9	5.90	9.50	14.0	27.9	273	204	358	35	15
12V 2 OPzS 100 LA	101	85.5	77.7	55.5	10.1	17.1	25.9	55.5	273	204	358	45	14
12V 3 OPzS 150 LA	150	128	112	83.0	15.0	25.7	37.5	83.0	381	204	358	64	19
6V 4 OPzS 200 LA	203	174	150	113	20.3	34.9	50.0	113	273	204	358	41	13
6V 5 OPzS 250 LA	255	214	186	135	25.5	42.8	62.0	135	381	204	358	56	20
6V 6 OPzS 300 LA	303	255	223	165	30.3	51.0	74.5	165	381	204	358	63	20

Cells

2 OPzS 100 LA	128	113	102	71.8	12.8	22.6	34.3	71.8	105	208	395	13.7	5.2
3 OPzS 150 LA	168	147	134	91.7	16.8	29.5	44.9	91.7	105	208	395	15.2	5.0
4 OPzS 200 LA	214	188	171	118	21.4	37.6	57.1	118	105	208	395	16.6	4.6
5 OPzS 250 LA	265	231	210	145	26.5	46.3	70.0	145	126	208	395	20.0	5.8
6 OPzS 300 LA	316	274	247	171	31.6	54.9	82.6	171	147	208	395	23.3	6.9
5 OPzS 350 LA	380	325	291	211	38.0	65.0	97.3	211	126	208	511	26.7	8.1
6 OPzS 420 LA	455	389	348	246	45.5	77.8	116	246	147	208	511	31.0	9.3
7 OPzS 490 LA	530	453	408	280	53.0	90.6	136	280	168	208	511	35.4	10.8
6 OPzS 600 LA	680	560	501	364	68.0	112	167	364	147	208	686	43.9	13.0
7 OPzS 700 LA	750	615	552	401	75.0	123	184	401	147	208	686	47.2	12.8
8 OPzS 800 LA	910	760	678	502	91.0	152	226	502	212	193	686	59.9	17.1
9 OPzS 900 LA	980	820	729	541	98.0	164	243	541	212	193	686	63.4	16.8
10 OPzS 1000 LA	1140	945	843	620	114	189	281	620	212	235	686	73.2	21.7
12 OPzS 1200 LA	1370	1125	1008	733	137	225	336	733	212	277	686	86.4	26.1
12 OPzS 1500 LA	1700	1385	1239	853	170	277	413	853	212	277	836	108.0	33.7
14 OPzS 1750 LA	1800	1465	1311	904	180	293	437	904	212	277	836	114.0	32.7
16 OPzS 2000 LA	2250	1835	1641	1180	225	367	547	1180	215	400	812	151.0	50.0
18 OPzS 2250 LA	2450	1995	1785	1250	245	399	595	1250	215	400	812	158.0	48.0
20 OPzS 2500 LA	2800	2280	2040	1465	280	456	680	1465	215	490	812	184.0	60.0
22 OPzS 2750 LA	3000	2445	2187	1570	300	489	729	1570	215	490	812	191.0	58.0
24 OPzS 3000 LA	3350	2730	2442	1710	335	546	814	1710	215	580	812	217.0	71.0

[1] Includes installed connector, the above mentioned height can differ depending on the used vent(s)

8.1.2 Stationary lead acid cells type OCSM-LA

with positive tubular plates and negative copper stretch metal grid plates, Nominal electrolyte density 1.26 kg/l

	Discharge data								Measurements and weights				
	Capacity [Ah]				discharge current [A]				Length max.	Width max.	Height [1] max.	Weight with acid approx.	Weight acid approx.
Discharge time [h]	10	5	3	1	10	5	3	1					
Final discharge voltage [Vpc]	1.80	1.80	1.75	1.70	1.80	1.80	1.75	1.70	[mm]	[mm]	[mm]	[kg]	[kg]
2 OCSM 160	160	140	127	91.0	16.0	28.0	42.6	91.0	126	208	522	19.8	8.4
3 OCSM 240	240	210	191	136	24.0	42.0	63.9	136	126	208	522	22.6	8.2
4 OCSM 320	320	280	255	182	32.0	56.0	85.2	182	126	208	522	25.1	7.9
5 OCSM 400	400	350	318	227	40.0	70.0	106	227	126	208	522	28.3	8.2
6 OCSM 480	480	420	381	273	48.0	84.0	127	273	147	208	522	33.1	9.7
7 OCSM 560	560	490	447	318	56.0	98.0	149	318	168	208	522	37.9	11.1
5 OCSM 575	575	500	453	325	57.5	100	151	325	147	208	698	41.8	13.4
6 OCSM 690	690	600	543	399	69.0	120	181	399	147	208	698	45.4	13.3
7 OCSM 805	805	700	636	455	80.5	140	212	455	215	193	698	58.3	17.3
8 OCSM 920	920	800	726	520	92.0	160	242	520	215	193	698	61.9	17.7
9 OCSM 1035	1030	900	816	585	103	180	272	585	215	235	698	71.6	21.6
10 OCSM 1150	1150	1005	909	650	115	201	303	650	215	235	698	75.7	21.8
11 OCSM 1265	1260	1105	999	715	126	221	333	715	215	277	698	86.3	26.5
12 OCSM 1380	1380	1205	1089	780	138	241	363	780	215	277	698	88.9	26.4
11 OCSM 1595	1590	1350	1221	858	159	270	407	858	215	277	848	106	33.3
12 OCSM 1740	1740	1475	1332	936	174	295	444	936	215	277	848	110	32.8
14 OCSM 2030	2030	1720	1554	1092	203	344	518	1092	215	400	824	143	47.8
16 OCSM 2320	2320	1965	1776	1248	232	393	592	1248	215	400	824	152	46.9
18 OCSM 2610	2610	2210	1998	1404	261	442	666	1404	215	490	824	178	57.9
20 OCSM 2900	2900	2460	2220	1560	290	492	740	1560	215	490	824	186	55.6
22 OCSM 3190	3190	2705	2442	1716	319	541	814	1716	215	580	824	224	68.0
24 OCSM 3480	3480	2950	2664	1872	348	590	888	1872	215	580	824	222	67.1

[1] The above mentioned height can differ depending on the used vents

8.1.3 Stationary lead acid block batteries Energy Bloc (OGi-Block battery)

with positive and negative grid plates, Nominal electrolyte density 1,24 kg/l

	Discharge data								Measurements and weights				
	Capacity [Ah]				discharge current [A]				Length max.	Width max.	Height [1] max.	Weight including acid approx.	Weight of acid approx.
Discharge time [h]	10	5	3	1	10	5	3	1					
Final discharge voltage [Vpc]	1.80	1.80	1.80	1.75	1.80	1.80	1.80	1.75	[mm]	[mm]	[mm]	ca. [kg]	ca. [kg]
EB 1230	30.0	26.5	23.1	17.3	3.00	5.30	7.70	17.3	273	204	358	28.7	12.7
EB 1260	61.0	52.5	46.2	34.7	6.10	10.5	15.4	34.7	273	204	358	33.9	11.8
EB 1285	85.0	75.5	66.6	50.3	8.50	15.1	22.2	50.3	273	204	358	39.1	10.7
EB 12110	105	96.0	84.9	64.7	10.5	19.2	28.3	64.7	273	204	358	44.2	10.6
EB 12145	141	126	111	83.8	14.1	25.2	37.0	83.8	381	204	358	57.8	15.2
EB 12160	158	144	127	97.1	15.8	28.8	42.5	97.1	381	204	358	64.2	15.1
EB 6215	211	184	162	121	21.1	36.9	54.0	121	273	204	358	41.2	11.6
EB 6230	226	201	177	134	22.6	40.3	59.2	134	273	204	358	43.4	11.1
EB 6240	237	216	191	145	23.7	43.2	63.7	145	273	204	358	46.0	11.0
EB 6310	302	263	231	173	30.2	52.7	77.2	173	381	204	358	56.9	16.80
EB 6335	332	290	255	190	33.2	58.0	85.0	190	381	204	358	59.6	16.40
EB 6350	339	302	266	201	33.9	60.5	88.,8	201	381	204	358	62.3	15.80

[1] Includes installed connector, the above mentioned height can differ depending on the used vent(s)

8.1.4 Stationary lead acid batteries type GroE acc. to DIN 40 738

with positive plates and negative grid plates, Nominal electrolyte density 1.22 kg/l

	Discharge data								Measurements and weights				
	Capacity [Ah]				discharge current [A]				Length max.	Width max.	Height [1] max.	Weight with acid approx.	Weight acid approx.
Discharge time [h]	10	5	3	1	10	5	3	1					
Final discharge voltage [Vpc]	1.80	1.80	1.775	1.75	1.80	1.80	1.775	1.75	[mm]	[mm]	[mm]	[kg]	[kg]
3 GroE 75	75	76.5	68.4	50.7	7.50	15.3	22.8	50.7	182	153	411	17.5	6.6
4 GroE 100	100	102	91.2	67.6	10.0	20.4	30.4	67.6	182	153	411	19.7	6.4
5 GroE 125	125	127	114	84.5	12.5	25.5	38.0	84.5	182	153	411	21.9	6.2
6 GroE 150	150	153	136	101	15.0	30.6	45.6	101	182	153	411	24.1	6.0
7 GroE 175	175	178	159	118	17.5	35.7	53.2	118	182	153	411	26.3	5.8
8 GroE 200	200	204	182	135	20.0	40.8	60.8	135	182	228	411	33.2	9.4
9 GroE 225	225	229	205	152	22.5	45.9	68.4	152	182	228	411	35.4	9.2
10 GroE 250	250	255	228	169	25.0	51.0	76.0	169	182	228	411	37.6	9.0
11 GroE 275	275	280	250	185	27.5	56.1	83.6	185	182	228	411	39.8	8.8
12 GroE 300	300	306	273	202	30.0	61.2	91.2	202	182	228	411	42.0	8.6
13 GroE 325	325	331	296	219	32.5	66.3	98.8	219	182	338	411	52.5	14.1
14 GroE 350	350	357	318	236	35.0	71.4	106	236	182	338	411	54.7	13.8
15 GroE 375	375	382	342	253	37.5	76.5	114	253	182	338	411	56.9	13.6
16 GroE 400	400	408	363	270	40.0	81.6	121	270	182	338	411	59.1	13.3
17 GroE 425	425	433	387	287	42.5	86.7	129	287	182	338	411	61.3	13.0
18 GroE 450	450	459	408	304	45.0	91.8	136	304	182	338	411	63.5	12.7
5 GroE 500	500	462	438	307	50.0	92.5	146	307	328	268	590	95	34
6 GroE 600	600	555	525	369	60.0	111	175	369	328	268	590	104	33
7 GroE 700	700	645	612	430	70.0	129	204	430	328	268	590	113	32
8 GroE 800	800	740	699	492	80.0	148	233	492	328	268	590	122	31
9 GroE 900	900	830	786	553	90.0	166	262	553	328	268	590	131	30
10 GroE 1000	1000	925	876	615	100	185	292	615	328	268	590	140	29
11 GroE 1100	1100	1015	963	676	110	203	321	676	328	268	590	149	28
12 GroE 1200	1200	1110	1050	738	120	222	350	738	328	348	590	170	39
13 GroE 1300	1300	1200	1137	799	130	240	379	799	328	348	590	179	38
14 GroE 1400	1400	1295	1224	861	140	259	408	861	328	348	590	188	37
15 GroE 1500	1500	1385	1314	922	150	277	438	922	328	348	590	197	36
16 GroE 1600	1600	1480	1401	984	160	296	467	984	328	438	590	222	49
17 GroE 1700	1700	1570	1488	1045	170	314	496	1045	328	438	590	231	48
18 GroE 1800	1800	1665	1575	1107	180	333	525	1107	328	438	590	240	47
19 GroE 1900	1900	1755	1662	1168	190	351	554	1168	328	438	590	249	46
20 GroE 2000	2000	1850	1752	1230	200	370	584	1230	328	438	590	258	45
21 GroE 2100	2100	1940	1839	1291	210	388	613	1291	328	528	590	285	58
22 GroE 2200	2200	2035	1926	1353	220	407	642	1353	328	528	590	294	57
23 GroE 2300	2300	2125	2013	1414	230	425	671	1414	328	528	590	303	56
24 GroE 2400	2400	2220	2100	1476	240	444	700	1476	328	528	590	312	55
25 GroE 2500	2500	2310	2190	1537	250	462	730	1537	328	573	590	325	60
26 GroE 2600	2600	2405	2277	1599	260	481	759	1599	328	573	590	334	59

[1] Includes installed connector, the above mentioned height can differ depending on the used vent(s)

8.1.5 Stationary lead acid batteries type OGi (LA)

with positive and negative grid plates, Nominal electrolyte density 1.26 kg/l,
* Nominal electrolyte density 1.24 kg/l

Single cell

	Discharge data								Measurements and weights				
	Capacity [Ah]				discharge current [A]				Length max.	Width max.	Height [1] max.	Weight with acid approx.	Weight acid approx.
Discharge time [h]	10	5	3	1	10	5	3	1					
Final discharge voltage [Vpc]	1.80	1.77	1.75	1.67	1.80	1.77	1.75	1.67	[mm]	[mm]	[mm]	[kg]	[kg]
2 OGi 50 LA*	50	45.0	36.6	26	5.0	9.0	12.2	26	69	160	351	6.30	2.30
3 OGi 75 LA*	75	67.5	54.6	39	7.5	13.5	18.2	39	69	160	351	7.00	2.10
4 OGi 100 LA*	100	90.0	71.4	51	10.0	18.0	23.8	51	125	160	384	11.5	4.90
6 OGi 150 LA*	150	135.0	107.4	75	15.0	27.0	35.8	75	125	160	384	13.3	4.60
8 OGi 200 LA*	200	177.5	143.1	98	20.0	35.5	47.7	98	155	160	384	16.8	5.80
10 OGi 250 LA*	250	222.5	178.8	120	25.0	44.5	59.6	120	194	160	384	20.9	7.30
4 OGi 260 LA	260	224.5	186.3	129	26.0	44.9	62.1	129	124	206	528	20.8	8.20
5 OGi 325 LA	325	280.0	233.1	161	32.5	56.0	77.7	161	124	206	528	22.9	7.90
6 OGi 370 LA	370	312.5	268.2	192	37.0	62.5	89.4	192	124	206	528	24.7	7.50
7 OGi 410 LA	410	347.5	303.0	224	41.0	69.5	101.0	224	124	206	528	26.6	7.30
8 OGi 440 LA	440	382.5	339.0	255	44.0	76.5	113.0	255	124	206	528	28.5	7.10
9 OGi 470 LA	470	417.5	375.0	287	47.0	83.5	125.0	287	124	206	528	30.6	6.90
10 OGi 530 LA	530	465.0	420.0	316	53.0	93.0	140.0	316	145	206	528	34.0	8.10
11 OGi 580 LA	580	515.0	465.0	346	58.0	103.0	155.0	346	166	206	528	38.3	9.80
12 OGi 620 LA	620	562.5	513.0	375	62.0	112.5	171.0	375	166	206	528	40.0	9.40
12 OGi 730 LA	730	585.0	579.0	383	73.0	117.0	193.0	383	254	210	528	50.3	17.5
14 OGi 800 LA	800	715.0	636.0	482	80.0	143.0	212.0	482	254	210	528	52.6	15.9
16 OGi 880 LA	880	770.0	687.0	520	88.0	154.0	229.0	520	254	210	528	56.6	15.5
19 OGi 1000 LA	1000	857.5	762.0	578	100.0	171.5	254.0	578	254	210	528	62.5	14.9
16 OGi 1260 LA	1260	1117.5	1002.0	718	126.0	223.5	334.0	718	233	210	699	78.2	18.3
18 OGi 1340 LA	1340	1187.5	1065.0	763	134.0	237.5	355.0	763	233	210	699	85.2	19.7
20 OGi 1520 LA	1520	1347.5	1209.0	869	152.0	269.5	403.0	869	275	210	699	95.2	22.3
22 OGi 1600 LA	1600	1420.0	1272.0	915	160.0	284.0	424.0	915	275	210	699	103	23.3

[1] The above mentioned height can differ depending on the used vent(s)

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