

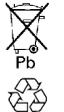
GS Yuasa Battery Germany GmbH

Operating Instructions for Valve-Regulated Lead Acid Batteries

Battery Ranges: EN-ENL-UXF-UXH-UXL



Battery type:	
Number of battery blocks:	
Number of cells:	
Nominal Voltage:	
Installation by Co.:	
Date:	

	<ul style="list-style-type: none"> Observe these instructions and keep them located nearby the battery for future reference! Work on the battery should only be carried out by qualified personnel!
	<ul style="list-style-type: none"> Do not smoke! Do not use any naked flame or other sources of ignition. Explosion and fire hazards are present!
	<ul style="list-style-type: none"> While working on batteries, wear protective eye-glasses and clothing! Observe the accident prevention rules as well as DIN EN IEC 62485-2!
	<ul style="list-style-type: none"> Any acid splashes on the skin or in the eyes must be flushed with plenty of water immediately. Then seek medical assistance. Acid splashes on clothing should be rinsed out with water!
	<ul style="list-style-type: none"> Explosion and fire hazard! Avoid short circuits! Risk of burns! Do not disassemble, heat above 50°C, or incinerate batteries!
	<ul style="list-style-type: none"> Caution! Metal parts of the battery are always alive, therefore do not place items or tools on the battery!
	<ul style="list-style-type: none"> Electrolyte is strongly corrosive and acidic. In normal working conditions the contact with electrolyte is nearly impossible; electrolyte may leak from the vent valves in case of over charging the battery or in case of mechanical damage to the container. In case of any contact with electrolyte please flush with water abundantly and get in touch with a physician.
	<ul style="list-style-type: none"> Batteries/cells are heavy! Ensure adequate mounting security and always use suitable handling equipment for transportation!
<p>Non-compliance with operation instructions, repairs made with other than original parts, or repairs made without authorisation (e.g. opening of valves) render the warranty void.</p>	
	<p>Disposal of Batteries Batteries marked with the recycling symbol should be processed via an authorised recycling agency. By agreement, they might be returned to the manufacturer. Batteries must not be mixed with domestic or industrial waste.</p>

Valve-regulated lead acid batteries consist of cells that are fitted with pressure relief valves which

It is mandatory to ensure sufficient ventilation of the

1. Installation and Initial Operation

Check all batteries for mechanical damage, correct polarity and firmly seated connectors. Ensure the charger is switched off before being connected to the battery (please check the polarity – pos. pole to pos. terminal). Switch the charger on and start charging according to chapter 2.3.

2. Operation

For the installation and operation of these batteries, DIN EN IEC 62485-2 is mandatory. Battery installation should be made such that a temperature difference between individual units does not exceed 3K. Please note that the minimum distance between the battery blocks must be 5-10 mm in order to allow for sufficient air circulation.

2.1 Ventilation

Hydrogen gas can be released via pressure relief valves. It will form an explosive mixture in air when the concentration exceeds 4 % volume.

2.2 Discharge

The cut-off voltage applied in accordance with the discharge current must not be below the specified value. The depth of discharge must not be greater than the nominal capacity. Recharge has to be applied immediately after complete or partial discharge. Leaving the battery in a discharged condition for a long period of time can be damaging to performance and life.

2.3 Charging

All charging methods with limited values according to DIN EN IEC 62485-2 are applicable. Alternating currents from the output of the charger/rectifier and feedbacks from the consumer load lead to an additional temperature increase in the battery with possible damages (see chapter 2.6).

2.3.1 Standby Parallel Operation and Buffer Operation

In this case, the load, direct current source and battery are connected in parallel permanently.

In float charge operation, the source of the direct current is able to supply the maximum load current and the battery charging current. The battery only supplies current if the direct current source fails. During buffer operation, the load current temporarily exceeds the nominal current of the direct current source. During this period, the battery serves as power supply. The battery is not fully charged at all times. However, the float-charge voltage provides sufficient recharge current.

2.4 Float Charging

Charging devices complying with regulations according to DIN EN IEC 62485-2 must be used.

The charge voltage setting is as follows:

- For UXF, UXH batteries: 2,275 VPC ±1% (20°C)
- For UXL batteries: 2,23 VPC ±1% (20°C)
- For EN, ENL batteries: 2,26 VPC ±1% (20°C)

2.5 Supplementary and Equalising Charge

In order to achieve the maximum service life of the batteries, supplementary charge is recommended before initial operation if

- the batteries have been stored for more than 9 months (UXF, UXH, UXL) or more than 6 months (EN, ENL)

- after 12 months from date of production,
- if the open circuit voltage (OCV) is < 2,1 VPC for UXF, UXH, EN, ENL batteries / < 2,07 VPC for UXL batteries.

Batteries with an OCV < 2,0 VPC must not be charged anymore and must be disposed.

For the battery ranges **UXF and UXH**, supplementary charge is to be applied according to the following values:

Storage period from date of production	Charge Voltage at 20°C	Charge time
Less than 12 months	2,275 VPC	More than 72 hours
	2,33 VPC	48 – 72 hours
	2,39 VPC	48 hours
12 – 24 months	2,33 VPC	120 hours
	2,39 VPC	96 hours

For the battery range **UXL**, supplementary charge is to be applied according to the following values:

Storage period from date of production	Charge voltage at 20°C	Charge Time
Less than 12 months	2,23 VPC	More than 72 hours
	2,28 VPC	48 - 72 hours
	2,35 VPC	48 hours
12 - 24 months	2,23 VPC	More than 144 hours
	2,28 VPC	120 hours
	2,35 VPC	96 hours

For the battery ranges **EN and ENL**, supplementary charge is to be applied according to the following values:

Storage period from date of production	Charge voltage at 20°C	Charge time
Less than 9 months	2,26 VPC	More than 72 hours
Up to 1 year	2,31 VPC	48 - 144 hours
1 – 2 years	2,31 VPC	72 – 144 hours

Batteries which are installed into a battery system later, as replacement, and are kept at normal float charge, do not require equalising charge.

2.6 Alternating Currents

During recharge up to 2,4 VPC according to chapters 2.3 and 2.5, the effective value of the alternating current is, for a short time, permitted to reach 0,2 C(A). After recharge and standby / float charging during standby parallel operation or buffer operation, the effective value of the alternating current must be less than 0,05 C(A).

2.7 Charging Currents

During float charge or buffer operation without recharging state, the charging current is not limited. The charging current should range at approx. 0,1 C (A).

2.8 Temperature

The recommended operation temperature range for VRLA batteries is 10–30°C (best 20°C ±5K). Higher temperatures reduce the battery service life. All technical data published by GS Yuasa refer to an ambient temperature of 20°C. Lower temperatures reduce the available capacity. A maximum operational temperature of 50°C must not be exceeded; the average operational temperature must not exceed 40°C.

2.9 Temperature-Related Charging

The float charge voltages as per chapter 2.4 refer to a temperature of 20°C ±5°C. Temperature compensated charging is necessary in order to avoid overcharge at higher temperatures and undercharge at lower temperatures. The recommended temperature compensation factor is –3 mV/cell/°C.

Temperature °C	Float charge voltage [VPC] for the battery ranges UXF, UXH	Float charge voltage [VPC] for the battery range UXL	Float charge voltage [VPC] for the battery ranges EN, ENL
-10	2,36	2,32	2,35
0	2,33	2,29	2,32
10	2,30	2,26	2,29
20	2,275	2,23	2,26
30	2,24	2,20	2,23
40	2,21	2,17	2,20

Do not undertake boost-charge at temperatures higher than 20°C.

2.10 Electrolyte

The electrolyte is diluted sulphuric acid and is absorbed in a glass-matt separator.

3. Battery Maintenance and Control

Keep the battery clean and dry in order to avoid leakage currents. The plastic parts of the battery should be cleaned with water only without any detergent. GS Yuasa forbids the use of any organic cleaning agents.

The following values have to be recorded every 12 months:

- Temperature: ambient and battery
 - Voltage of battery system and all blocks
 - (Visual) checking of connections for tightness
- Besides a general visual checking, the following values have to be recorded every 6 months:*
- Temperature: ambient and battery
 - Standby / float charge voltage

4. Tests

Tests are to be carried out according to DIN EN IEC 62485-2. In order to ensure to have a reliable power supply, the entire battery should be exchanged at the end of the expected service life.

5. Operational Faults

If any operational faults occur at the battery or at the charging device, please call your after-sales service immediately. The recorded data according to chapter 3 will facilitate finding the cause of failure. Regular maintenance checks agreed in a service contract simplify trouble shooting.

6. Decommissioning and Storage

To store or decommission batteries for a longer period, they should be fully charged and stored in a dry and frost-free place. In order to avoid damage to the batteries, supplementary charges as described in chapter 2.5 should be carried out regularly.

7. Transport

Yuasa VRLA batteries are classified as non-dangerous goods for transport via road, rail or plane (according to the currently valid ADR, ADR/RID, GGVE, GGVS and IATA)

if they are protected against short-circuit, slipping, dropping or physical damage during transportation. For damaged / leaking battery containers of VRLA batteries, the respective exception clauses are valid.

8. Warranty

Warranty claims require maintenance according to our instructions. In case of warranty claims, GS Yuasa has to be supplied with the following data:

- All maintenance records
 - GS Yuasa claim report containing the following data: production code of the battery, number of batteries that are damaged, explanatory statements for the claim, order acknowledgement or invoice ref. no. from GS Yuasa.
- Please ask the GS Yuasa team for the form sheet "claim report".

GS Yuasa may ask for the return of defective batteries for analysis of the claim and for professional disposal. However, return of defective batteries shall only be effected after clearance with GS Yuasa.

Battery Type	C ₂₀ [Ah] to 1,8 V/Z	C ₁₀ [Ah] to 1,8 V/Z	Terminal	Torque
UXF100-12	107	100	Front Access M8	9,4-14,1 Nm
UXF150-12	161	150	Front Access M8	9,4-14,1 Nm
UXH38-12	38	35	M6	3,9-5,4 Nm
UXH50-12	50	46	M6	3,9-5,4 Nm
UXH63-12	63	58	M6	3,9-5,4 Nm
UXH75-6	75	69	M6	3,9-5,4 Nm
UXH100-6	100	93	M6	3,9-5,4 Nm
UXH125-6	125	116	M6	3,9-5,4 Nm
UXH100-12N	100	93	M10	14,7-19,6 Nm
UXH200-6	200	186	M10	14,7-19,6 Nm
UXL33-12	32	30	M7	3,9-5,4 Nm
UXL44-12	43	40	M7	3,9-5,4 Nm
UXL55-12	54	50	M7	3,9-5,4 Nm
UXL66-6	64	60	M7	3,9-5,4 Nm
UXL88-6	86	80	M7	3,9-5,4 Nm
UXL110-4 / UXL110-6	107	100	M7	3,9-5,4 Nm
UXL165-2	161	150	M11	14,7-19,6 Nm
UXL220-2	215	200	M11	14,7-19,6 Nm
UXL330-2	322	300	M11	14,7-19,6 Nm
UXL550-2	538	500	M11	14,7-19,6 Nm
UXL1100-2	1.075	1.000	M11	14,7-19,6 Nm
UXL1550-2	1.613	1.500	M11	14,7-19,6 Nm
UXL2200-2	2.150	2.000	M11	14,7-19,6 Nm
UXL3300-2	3.226	3.000	M11	14,7-19,6 Nm
EN80-6	86	81,6	Stud M8	6 Nm
EN100-4 / EN(L)100-6	108	102	Stud M8	6 Nm
EN(L)160-4 / EN(L)160-6	172	163	M8	6 Nm
EN180-6	193	180	M8	6 Nm
EN320-2 / ENL320-2	344	326	M8	6 Nm
EN480-2 / ENL480-2	516	490	M8	6 Nm
EN540-2	579	540	M8	6 Nm
ENL100-12FT	108	100	M6	6 Nm

If the a.m. torques are exceeded seriously, the battery terminals may be damaged.

Batteries are to be lifted by at least two people or by means of a mechanical lifting aid! Batteries must not be installed permanently suspended by their handles!

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