



Industrial Battery Range

VRLA, Li-ion, NiCd, NiMH & Accessories Range Overview



The world's leading battery manufacturer

A  **YUASA** Group Company

A **GS YUASA** Group Company

From the deep sea to outer space




The GS Yuasa Group consists of 65 subsidiaries and 33 affiliates in countries throughout the world.

Since its founding in 1895, the GS Yuasa Group has continually contributed to economic development and the improvement of living standards through the development and manufacture of batteries, power supply systems and lighting equipment. We are a major force in the market as one of the world's leading manufacturers of industrial, automotive and motorcycle batteries. As a supplier of high-performance power supply systems, we help ensure the reliability of social infrastructure.

Responding to today's increasingly sophisticated needs our extensive range of next generation energy system lithium-ion batteries encompasses not only vehicle use but also products in a wide range of fields, from deep sea to aerospace, to meet the ever more sophisticated needs of the times.

Throughout its long history, the GS Yuasa Group has worked to create innovative technology. This commitment serves as the foundation for our continuing efforts to explore new possibilities in the field of electrical energy under a corporate vision expressed in the words "Innovation and Growth".

GS Yuasa Europe

- 1 GS Yuasa Battery Europe Ltd.
Ebbw Vale
- 2 GS Yuasa Battery Sales UK Ltd.
Swindon
- 3 GS Yuasa Battery Germany GmbH.
Düsseldorf
- 4 GS Yuasa Battery France S.A.
Lyon
- 5 GS Yuasa Battery Italy Srl.
Milan
- 6 GS Yuasa Battery Iberia S.A.
Madrid
-  GS Yuasa Battery Manufacturing UK Ltd.
Ebbw Vale



For over 30 years, GS Yuasa Battery Europe Ltd have been Europe's leading battery supplier.

From sales and distribution centres in Swindon, Milan, Lyon, Madrid and Düsseldorf, GS Yuasa supply European markets with an extensive range of high-quality energy storage and network stabilisation solutions.

Supported by experienced Quality Assurance, Technical Support, Marketing and Customer Service teams, our industry leading service and distribution network continues to set new standards in customer care, choice and year-round availability.

Furthermore, GS Yuasa are able to design and project manage custom battery systems.

Whatever the application, GS Yuasa have a solution to suit any requirements.

UK Manufacturing

GS Yuasa Battery Manufacturing UK Ltd is a large state of the art manufacturing facility in Ebbw Vale, Wales, UK. Production began at the site in 1982 and since then well over 80 million batteries have been produced ranging in capacity from 0.8 to 540 ampere hours.

Over 60% of products are exported, mainly within Europe. The facility produces four main product ranges - NPL, EN, ENL and SWL.



Common applications

Uninterruptible Power Supply (UPS)



Ranging in size from desk top units to large plant room installations, UPS's are a no-break backup power supply for essential equipment. Yuasa batteries can be sized to give the autonomy and load required for any project.

Batteries typically used:

NP	NPW	SW	ENL	SLR
NPL	RE	SWL	ENL FT	
NPH	REW	EN	Lithium	

Telecoms



Broadband, land line and mobile providers have equipment that needs battery backup power in the event of a mains failure. Whether in central systems or remote cabinets Yuasa batteries are trusted by providers worldwide.

Batteries typically used:

NP	REW	EN	FXH
NPL	SW	ENL	SLR
RE	SWL	ENL FT	

Renewable Energy



Solar, wind and wave energy is not always produced at times of maximum requirement. Yuasa batteries allow energy to be stored at times of low demand and then released into the grid when demand is high.

Batteries typically used:

NP	REC	ENL FT	SLE	Lithium
NPC	ENL	FXH	SLR	

Fire & Security



Even the most advanced security systems are only as good as the backup batteries supporting them. When an emergency arises, Yuasa standby batteries can protect homes and businesses against crime and fire.

Batteries typically used:

NP	NPL	RE
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Golf & Mobility



Golf and mobility equipment requires batteries to be charged and then used to power the equipment. Yuasa produce specialised cyclic battery types to give maximum performance for hundreds of charge/discharge cycles.

Batteries typically used:

NPC REC

Emergency Lighting



Emergency lighting is required in commercial buildings. In the event of a mains failure, standby batteries provide light for safe evacuation. Yuasa NiCd, NiMH and VRLA batteries exceed common 3 hour run-time requirements.

Batteries typically used:

NiMH NPL REC
NiCd NPC ENL
NP RE ENL FT

Energy Storage



Businesses are usually charged on peak power demand. Load-shedding allows large cost savings by charging batteries during low demand and injecting this stored energy back into business load at times of high demand.

Batteries typically used:

NPL REC ENL FT SLE Lithium
NPC ENL FXH SLR

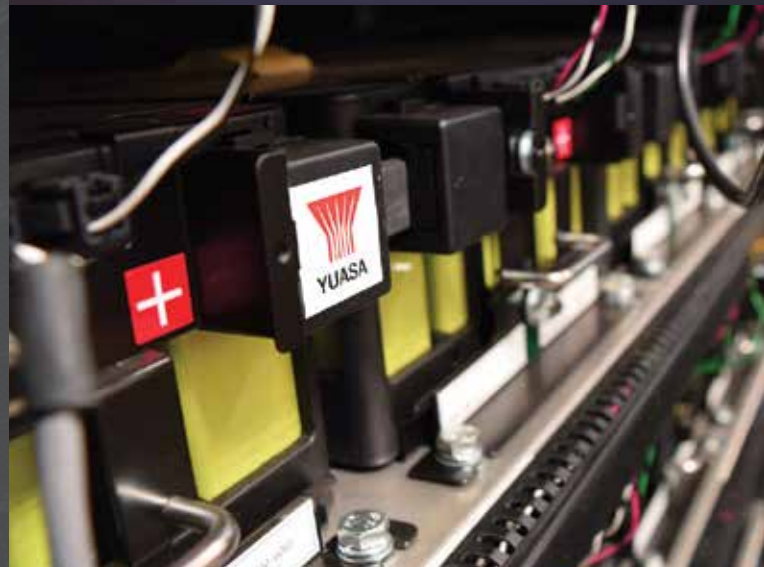
Floor Cleaning & Aerial Access



Applications where deep discharges and harsh operating conditions are common, need a specialist battery solution. The Yuasa Pro-Spec range have excellent resilience against plate corrosion and deep discharge.

Batteries typically used:

Pro-Spec



Yuasa Industrial Batteries

To help with battery selection, and due to different application and operational requirements, every Yuasa industrial battery has been designated with a Eurobat classification or Yuasa cyclic life tag.

Eurobat is a European organisation that has produced a guide to VRLA batteries. Within this guide there are 4 design life categories. Yuasa has used the test methods as set out in an official standard, BS EN60896-21/21 to designate each battery range into one of the categories.



NP Series page 8

- Guaranteed capacity
- Yuasa quality assurance
- VDS approved
- 12 Volt
- 0.8Ah to 65Ah
- Standby & light cyclic use

RE Series page 9

- Guaranteed capacity
- Yuasa quality assurance
- VDS approved
- Flame retardant case
- 12 Volt
- 5Ah to 12Ah
- Standby & light cyclic use

NPL Series page 10

- 6 & 12 Volt types
- 24Ah to 200Ah
- Standby use



SWL Series page 11

- 6 & 12 Volt types
- 24Ah to 180Ah
- Standby use



EN Series page 12

- 2, 4 & 6 Volt types
- 80Ah to 540Ah
- Standby use



ENL Series page 13

- 2, 4 & 6 Volt types
- 80Ah to 540Ah
- Standby use

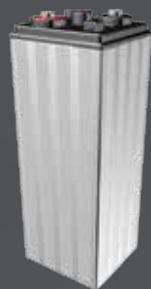




FXH Series

page 14

- 12 Volt
- 45Ah to 200Ah
- Standby use



SLE & SLR Series

page 15

- 2 Volt
- 500Ah to 1000Ah
- Heavy duty cyclic use



REC Series

page 16

- 12 Volt
- 10Ah to 80Ah
- Cyclic use



NPC Series

page 17

- 12 Volt
- 24Ah to 100Ah
- Cyclic use



Lithium Series

page 19

- 3.7 to 50.4 Volt
- 5Ah to 47.5Ah
- Standby & cyclic use



NiCd & NiMH

page 20

- 1.2 Volt
- 50mAh to 13Ah
- General use



Pro-Spec

page 21

- 6, 8 & 12 Volt types
- 150Ah to 260Ah
- Deep cyclic use



Accessories

page

- Racking & Site Services 22
- Yu-Power Chargers 23
- Temperature Monitoring 23
- YSP-117 & Hioki BT3554 Testers 24

Eurobat classification or Yuasa cyclic design life assumes that the battery is operated in normal conditions at 20°C and in accordance with Yuasa recommended operating guidelines.

Yuasa cyclic design life assuming 50% depth of discharge.



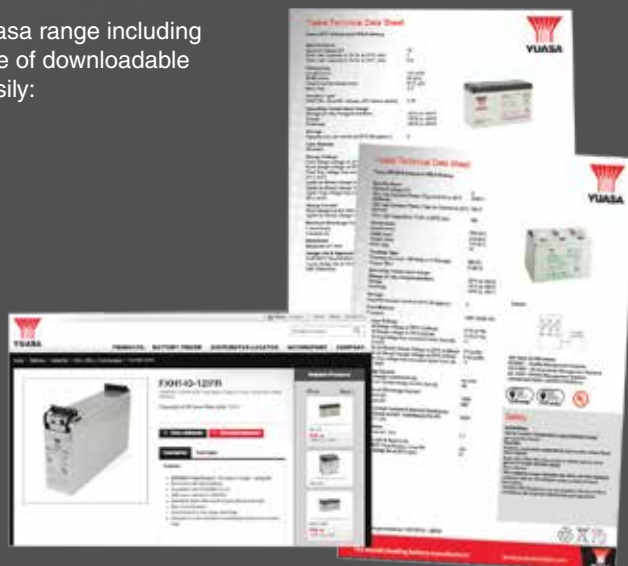
www.yuasa.com



Yuasa's innovative website is mobile-ready and features the entire Yuasa range including specifications, part numbers and photographs. It also includes a range of downloadable brochures, resources, data sheets and guides and allows users to easily:

- Find the right battery and compare products
- Search for local distributors
- Access detailed technical information and guides
- Download dynamic technical data sheets
- Calculate UPS system size requirements
- Keep up to date with the latest from Yuasa

Features every Yuasa industrial, automotive and motorcycle product with full specifications and pictures.



NP Series

Valve Regulated Lead-Acid Batteries



Features

- Lead calcium grids for extended life
- Superb recovery from deep discharge
- Low discharge rate for long shelf life
- Absorbed glass mat (AGM) technology assures no free electrolyte
- High gas recombination efficiency
- Multipurpose: Float or light cyclic use
- Can be used in any orientation excluding continuous inverted use
- Application specific designs

Applications

Ideal for standby and light cyclic applications including:

- Fire and security systems
- Emergency lighting
- Solar and wind
- UPS
- Toys



Model Name	Nominal Voltage (Volts)	Capacity		Watts per cell 10 min to 1.6VPC at 20°C (watts)	Dimensions (mm)			Weight - typical (kg)	Impedance at 1kHz mOhms	1 Second rate (Amps)	Terminal Type	Layout (see page 18)
		20-hr rate to 10.5V at 20°C (Ah)	10-hr rate to 10.8V at 20°C (Ah)		Length (±1)	Width (±1)	Height (over terminals) (±2)					
NP1-6	6	1.0	0.9		51	42.5	54.5	0.25	75	30	A	5
NP1.2-6	6	1.2	1.1		97	25	54.5	0.31	60	36	A	1
NP2.8-6	6	2.8	2.5		134	34	64	0.57	30	84	A	1
NP4-6	6	4.0	3.7		70	47	105.5	0.87	20	120	A	5
NP7-6	6	7.0	6.5		151	34	97.5	1.32	12	210	A	1
NP10-6	6	10.0	9.2		151	50	97.5	1.93	8	300	A/C	1
NP12-6	6	12.0	11.1		151	50	97.5	2.05	7	360	C	1
NP0.8-12	12	0.8	0.7		96	25	61.5	0.35	180	24	H	6
NP1.2-12	12	1.2	1.1		97	48	54.5	0.58	110	36	A	3
NP2-12	12	2.0	1.9		150	20	89	0.7	68	60	B	7
NP2.1-12	12	2.1	1.9		178	34	64	0.82	65	63	A	1
NP2.3-12	12	2.3	2.1		178	34	64	0.95	65	69	A	1
NP2.8-12	12	2.8	2.5		134	67	64	1.12	60	84	A	3
NP3.2-12	12	3.2	2.9		134	67	64	1.2	50	96	A	3
NP4-12	12	4.0	3.7		90	70	106	1.75	40	120	A/C	1
NP7-12	12	7.0	6.4		151	65	97.5	2.65	23	210	A/C	4
NP12-12	12	12.0	11.1		151	98	97.5	4.05	16	360	C	4
NP17-12I	12	17.0	15.7		181	76	167	6.1	15	510	D	2
NP18-12	12	17.2	6.0		180	76	167	6.2	15	540	G	2
NP24-12I	12	24.0	2.3		166	175	125	9	11	720	D	2
NP38-12I	12	38.0	5.3		197	165	170	14.2	9	1140	D	2
NP65-12I	12	65.0	0.5		350	166	174	23	7	1950	E	2



NPH & NPW Series

High Rate NP Batteries

NPH2-12FR	12	2.1	2.0		68	51	88	0.84	66	60	A	2
NPH3.2-12	12	3.3	3.2		134	67	64	1.4	35	96	A	3
NPH5-12	12	5.2	5.0	34	90	70	106	2	24	150	C	1
NPH12-12	12	12.6	2.0	70	151	98	97.5	4.2	16	360	C	4
NPH18-12B	12	17.4	15.9	115.2	181	76	167	6.3	7.9	540	G	2
NPW45-12	12	8.5	7.4	40	151	65	97.5	2.7		105	C	4



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For more information
and technical data

RE Series

Valve Regulated Lead-Acid Batteries



Features

- Lead calcium grids for extended life
- Superb recovery from deep discharge
- Low discharge rate for long shelf life
- Absorbed glass mat (AGM) technology assures no free electrolyte
- High gas recombination efficiency
- Multipurpose: Float or light cyclic use
- Can be used in any orientation excluding continuous inverted use
- Application specific designs

Applications

Ideal for standby and light cyclic applications including:

- Fire and security systems
- Emergency lighting
- Solar and wind
- UPS
- Toys



Model Name	Nominal Voltage (Volts)	Capacity		Dimensions (mm)			Weight - typical (kg)	Impedance at 1kHz mOhms	1 Second rate (Amps)	Terminal Type	Layout (see page 18)
		20-hr rate to 10.5V at 20°C (Ah)	10-hr rate to 10.8V at 20°C (Ah)	Length (±3)	Width (±3)	Height (over terminals) (±3)					
RE5-12	12	5	4.6	90	70	106	1.96	42	120	A	1
RE7-12	12	7	6.2	151	65	97.5	2.75	35	105	A/C	4
RE12-12	12	12	10.56	151	98	97.5	4.15	15	180	C	4
REW45-12	12	8	6.96	151	64	97.5	2.7	24	105	C	4



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For more information and technical data

Yuasa NP Series

Europe's leading standby batteries



- ✓ European market leader for over 30 years
- ✓ Proven track record of long-life performance
- ✓ The original and most reliable NP VRLA battery
- ✓ Dependable standby & light cyclic power
- ✓ Yuasa quality, reliability & performance

NPL Series

Valve Regulated Lead-Acid Batteries



Features

- Low discharge rate for long shelf life
- Absorbed glass mat (AGM) technology assures no free electrolyte
- High gas recombination efficiency
- Maintenance free
- Flame retardant to (UL94) HBØ
- FR option flame retardant to UL94:VØ (oxygen index 30)
- Manufactured in factories that comply with ISO 9001

- Complies with BS EN60896-21+22

Applications

- Security and Fire
- Emergency Lighting
- Telecoms
- UPS



Model Name	Nominal Voltage (Volts)	Capacity			Dimensions (mm)			Weight - typical (kg)	Impedance at 1kHz mOhms	1 Second rate (Amps)	Terminal Type	Layout (see page 18)	Torque (Nm)
		20-hr rate to 10.5V at 20°C (Ah)	10-hr rate to 10.8V at 20°C (Ah)	Watts per cell 10 min to 1.6VPC at 20°C (watts)	Length (±1)	Width (±1)	Height (over terminals) (±1)						
NPL24-12I	12	24.0	21.1	93.2	166	175	125	9.0	9.5	500	D	2	2.5
NPL38-12I	12	38.0	33.4	147.5	197	165	170	14.0	7.5	500	D	2	2.5
NPL65-12I	12	65.0	57.2	252.4	350	166	174	23.0	5.0	800	E	2	4.8
NPL78-12IFR	12	78.0	68.6	302.9	380	166	174	27.5	4.5	800	F	2	6
NPL100-12	12	100.0	88.0	388.4	407	172	240	39.0	4.0	1000	I	1	16.5
NPL130-6IFR	6	130.0	114.4	504.9	350	166	174	23.0	2.5	500	E	5	6
NPL200-6	6	200.0	176.0	776.8	398	176	250	39.0	1.3	1500	I	5	16.5



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and technical data



SWL Series

Valve Regulated Lead-Acid Batteries



Features

- Excellent high rate discharge efficiency, typically 40% higher than equivalent standard product
- Low discharge rate for long shelf life
- Absorbed glass mat (AGM) technology assures no free electrolyte
- High gas recombination efficiency
- Maintenance free
- Standard case material is flame retardant to (UL94) HBØ

- FR option flame retardant to UL94:VØ (oxygen index 30)
- Manufactured in factories that comply with ISO9001
- Complies with BS EN60896-21+22

Applications

- UPS
- All other high rate discharge applications



Long Life

Model Name	Nominal Voltage (Volts)	Capacity		Watts per cell 10 min to 1.6VPC at 20°C (watts)	Dimensions (mm)			Weight - typical (kg)	Impedance at 1kHz mOhms	1 Second rate (Amps)	Terminal Type	Layout (see page 18)	Torque (Nm)
		20-hr rate to 10.5V at 20°C (Ah)	10-hr rate to 10.8V at 20°C (Ah)		Length (±2)	Width (±2)	Height (over terminals) (±2)						
SW 200-12	12	6.2	5.8	33	151	51	97.5	2.5	18.0	100	C	4	
SW 280-12	12	7.9	7.0	47	151	65	97.5	2.6	14.0	150	C	4	
SWL 750(FR)	12	25.0	22.9	128	166	175	125	9.8	8.5	500	D	2	2.45
SWL 780V(FR)	12	28.8	24.5	130	166	125	175	10.1	8.5	500	D	2	2.45
SWL 1100 (FR)	12	40.6	39.6	200	197	165	170	14.5	7.5	500	D	2	2.45
SWL 1800 (FR)	12	57.6	55.0	329	216	168	223	23.0	6.0	800	E	1	4.76
SWL 1850 (FR)	12	74.0	66.0	319	350	166	174	23.8	4.4	800	E	2	4.76
SWL 1850-6 (FR)	6	148.0	132.0	-	350	166	174	23.8	1.8	500	E	5	4.76
SWL 2250(FR)	12	86.0	76.0	375	380	166	174	28.0	3.6	800	F	2	6.1
SWL 2300E (FR)	12	80.0	78.0	400	261	168	225	28.0	5.0	800	E	1	4.8
SWL 2500E (FR)	12	93.6	91.4	417	305	168	225	32.0	4.0	1000	E	1	4.8
SWL 2500TFR	12	93.6	91.4	417	305	173	223	32.0	4.0	1000	E	1	4.8
SWL 2500-6 (FR)	6	184.0	180.0	867	297	168	231.5	32.5	1.7	1500	E	5	6
SWL 3300 (FR)	12	110.2	102.0	550	350	168	225	37.5	3.5	1100	F	1	6
SWL 3800 (FR)	12	135.0	124.0	701	350	173	272	48.0	3.0	1200	F	1	6
SWL 4250FR	12	150.0	140.0	708	341	173	281	49.0	2.7	1200	F	1	6



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For more information
and technical data



EN Series

Valve Regulated Lead-Acid Batteries



Features

- Unique mix and match parallel assembly allows extensive variations to network capacity
- Low discharge rate for long shelf life
- Absorbed glass mat (AGM) technology assures no free electrolyte
- High gas recombination efficiency

- Maintenance free
- Fully compliant with BS EN60896-21+22

Applications

- UPS
- Telecoms
- Emergency lighting



Model Name	Nominal Voltage (Volts)	Capacity			Dimensions (mm)			Weight - typical (kg)	Impedance at 1kHz mOhms	1 Second rate (Amps)	Terminal Type	Layout (see page 18)	Torque (Nm)
		20-hr rate to 10.5V at 20°C (Ah)	10-hr rate to 10.8V at 20°C (Ah)	Watts per cell 10 min to 1.6VPC at 20°C (watts)	Length (±2)	Width (±2)	Height (over terminals) (±2)						
EN80-6	6	86.4	81.6	336.1	200	208	238	23.0	2.0	1000	F	8	6.1
EN100-4	4	108.0	102	420.1	200	208	238	17.5	1.6	1000	F	8	6.1
EN100-6	6	108.0	102	420.1	200	208	238	23.0	2.0	1000	F	8	6.1
EN160-4	4	172.8	163.2	672.2	206	210	240	24.0	1.0	1500	F	10	6.1
EN160-6	6	172.8	163.2	672.2	305	210	240	35.0	1.5	1500	F	9	6.1
EN180-6	6	193.0	181.4	767.7	305	210	240	38.0	0.5 (single cell)	1500	F	9	6.1
EN320-2	2	345.6	326.4	1344.4	206	210	240	24.0	0.5 (single cell)	3000	F	10	6.1
EN480-2	2	518.4	489.6	2016.7	305	210	240	35.0	0.5 (single cell)	4500	F	11	6.1
EN540-2	2	579.0	544.2	2303.1	305	210	240	38.0	0.5 (single cell)	4500	F	11	6.1



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and technical data



ENL Series

Valve Regulated Lead-Acid Batteries



Features

- 15 year design life version of the EN series
- Unique mix and match parallel assembly allows extensive variations to network capacity
- Low discharge rate for long shelf life
- Absorbed glass mat (AGM) technology assures no free electrolyte
- High gas recombination efficiency

- Maintenance free
- Fully compliant with BS EN60896-21+22

Applications

- UPS
- Telecoms
- Emergency lighting
- Solar and wind
- Renewable energy storage



Model Name	Nominal Voltage (Volts)	Capacity			Dimensions (mm)			Weight - typical (kg)	Impedance at 1kHz mOhms	1 Second rate (Amps)	Terminal Type	Layout (see page 18)	Torque (Nm)
		20-hr rate to 10.5V at 20°C (Ah)	10-hr rate to 10.8V at 20°C (Ah)	Watts per cell 10 min to 1.6VPC at 20°C (watts)	Length (±1)	Width (±1)	Height (over terminals) (±1)						
ENL100-6	6	108.0	102.0	399.1	200	208	238	23.0	2.0	1000	F	8	6.1
ENL160-6	6	172.8	163.2	638.6	305	210	240	35.0	1.5	1500	F	9	6.1
ENL320-2	2	345.6	326.4	1277.2	206	210	240	24.0	0.5 (single cell)	3000	F	10	6.1
ENL480-2	2	518.4	489.6	1915.8	305	210	240	35.0	0.5 (single cell)	4500	F	11	6.1
ENL100-12FT	12	108.0	102.0	N/A	558	125	235	41.0	7.5	500	F	3	6.1



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FXH Series

Valve Regulated Lead-Acid Batteries



Features

- Front terminal connection for ease of installation and maintenance
- Low discharge rate for long shelf life
- Absorbed glass mat (AGM) technology assures no free electrolyte
- High gas recombination efficiency
- Maintenance free

- Case material ABS flame retardant UL94:V0
- BS EN60896-2 compliant

Applications

- UPS
- Telecoms
- Emergency lighting



Model Name	Nominal Voltage (Volts)	Capacity			Dimensions (mm)			Weight - typical (kg)	Impedance at 1kHz mOhms	1 Second rate (Amps)	Terminal Type	Layout (see page 18)	Torque (Nm)
		20-hr rate to 10.5V at 20°C (Ah)	10-hr rate to 10.8V at 20°C (Ah)	Watts per cell 10 min to 1.6VPC at 20°C (watts)	Length (±3)	Width (±3)	Height (over terminals) (±3)						
FXH45-12IFR	12	46.4	44.6	184.3	278	103	197	15.0	4.7	400	E/D	3	5.4/3.0
FXH90-12IFR	12	96.8	89.8	335	395	105	255	30.0	3.4	540	F/E	3	11.9/5.4
FXH100-12IFR	12	101.2	98.4	396	508	106	236	34.9	3.5	540	E/E	3	5.4/5.4
FXH100S-12IFR	12	110.4	100.0	396	395	106	290	34.0	3.5	600	F/E	3	11.9/5.4
FXH140-12IFR	12	164.6	154.0	595.4	556	123	295	51.0	2.7	540	F/E	3	11.9/5.4
FXH155-12IFR	12	165.6	155.0	509	415	174	258	50.5	2.8	930	E	3	5.4/N/A
FXH165-12IFR	12	197.0	177.0	591	556	125	317	56.0	2.8	990	F/E	3	11.9/5.4
FXH185-12IFR	12	196.0	187.0	632.6	556	125	317	60.7	2.5	1000	F/E	3	11.9/5.4
FXH190-12IFR	12	210.0	200.0	782	604	123	320	67.0	2.5	1000	F/E	3	11.9/5.4
FXH200-12IFR	12	234.8	229.0	847	520	243	203	70.6	2.1	1000	F	3	11.9/N/A

90° FXH Terminal Adaptors

for telecoms use

	Battery Terminal	90° Adaptor
FXH45-12IFR	M6	M5
FXH90-12IFR	M8	M6
FXH100-12IFR	M6	M6
FXH100S-12IFR	M8	M6
FXH140-12IFR	M8	M6
FXH155-12IFR	M6	N/A
FXH165-12IFR	M8	M6
FXH185-12IFR	M8	M6
FXH190-12IFR	M8	M6
FXH200-12IFR	M8	N/A

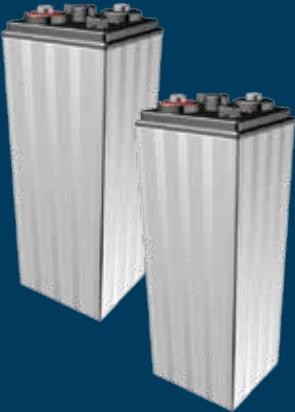


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For more information
and technical data



SLE & SLR Series

Larger Cyclic Batteries



Features

Easy installation and smaller footprint due to modular unit design





- Horizontal orientation
- Higher gas recombination facility as a result of silica gel/AGM construction
- Nano-Carbon negative plate for more efficient charging and less sulphation risk
- Higher capacity retention throughout service life

SLE Applications

- Large scale utility and commercial
- Renewable energy storage
- Load shedding
- Off grid

SLR Applications

- As SLE plus
- UPS
- Telecoms
- Emergency lighting

Model Name	Nominal Capacity	Nominal Voltage	Cycle Life at Depth of Discharge (DoD)	
			50%	70%
SLE-500	500Ah/10HR	2V	3000	2000
SLE-1000	1000Ah/10HR	2V	3000	2000
SLR-1000	1000Ah/10HR	2V	5500	5000

Model Name	Length (mm)	Width (mm)	Total Height (mm)	Weight (kg)
SLE-500	156	171	492	34
SLE-1000	287	165	493	64
SLR-1000	287	165	493	67



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For more information and technical data



REC Series

Premium VRLA Cyclic Batteries



Features

- Double cycle life when compared to standard VRLA
- Durability for deep discharge
- Modern construction to considerably prolong service life
- Low discharge rate for long shelf life
- Maintenance free
- Absorbed glass mat (AGM) technology assures no free electrolyte
- High gas recombination efficiency

Applications

- Golf and Mobility
- Solar and wind
- Renewable energy
- Professional tools
- Automatic guided vehicles
- Emergency lighting
- Measuring instruments



Model Name	Nominal Voltage (Volts)	Capacity			Dimensions (mm)			Weight - typical (kg)	Impedance at 1kHz mOhms	1 Second rate (Amps)	Terminal Type	Layout (see page 18)	Torque (Nm)
		20-hr rate to 10.5V at 20°C (Ah)	10-hr rate to 10.8V at 20°C (Ah)	Watts per cell 10 min to 1.6VPC at 20°C (watts)	Length (±3)	Width (±3)	Height (over terminals) (±3)						
REC10-12	12	10.0	9.3	51.8	151	65	115.5	3.2	17.6	150	C	4	N/A
REC12-12	12	12.0	11.2	68	151	98	97.5	4.2	11.8	180	C	4	N/A
REC14-12	12	13.0	11.9	78.3	151	98	115.5	4.2	10.1	195	C	4	N/A
REC22-12B / I	12	22.0	19.7	120.8	181	76.2	167	6.2	8.2	330	G / D	2	2.0-3.0
REC26-12I	12	26.0	23.5	145	166	175	125	9.0	8.8	330	D	2	2.0-3.0
REC36-12I	12	36.0	32.0	166.7	196	130	169	11.2	8.7	360	D	1	2.0-3.0
REC50-12I	12	50.0	40.0	233	197	165	175	15.3	5.7	400	D	2	2.0-3.0
REC80-12I	12	80.0	74.0	404	259	168	212.5	27.0	4.7	480	E	1	3.9-5.4

REC & NPC Carrying Cases

Model	Description
GB 12210	Carrying case for REC22-12B / I
GB 12260	Carrying case for REC26-12 & NPC24-12I
GB 12360	Carrying case for REC36



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and technical data



NPC

VRLA Cyclic Batteries



Features

- Double cycle life when compared to standard VRLA
- Durability for deep discharge
- Modern construction to considerably prolong service life
- Low discharge rate for long shelf life
- Maintenance free
- Absorbed glass mat (AGM) technology assures no free electrolyte
- High gas recombination efficiency

Applications

- Golf and Mobility
- Solar and wind
- Renewable energy
- Professional tools
- Automatic guided vehicles
- Emergency lighting
- Measuring instruments



Model Name	Nominal Voltage (Volts)	Capacity			Dimensions (mm)			Weight - typical (kg)	Impedance at 1kHz mOhms	1 Second rate (Amps)	Terminal Type	Layout (see page 18)
		20-hr rate to 10.5V at 20°C (Ah)	10-hr rate to 10.8V at 20°C (Ah)	Watts per cell 10 min to 1.6VPC at 20°C (watts)	Length (±3)	Width (±3)	Height (over terminals) (±3)					
NPC24-12I	12	24	21.1	166	175	125	9	11	500	D	2	4
NPC38-12I	12	38	33.4	197	165	170	14.2	9	500	D	2	4
NPC65-12I	12	65	57.2	350	166	174	23	7	800	E	2	4
NPC100-12	12	100	92.3	350	168	225	38.8	4	1100	F	1	2

REC & NPC Powakaddy Adaptors

Model	Description
PK22	For REC22-12B
PK22I	For REC22-12I
PK26	For REC26-12 & NPC24-12I
PK36	For REC36

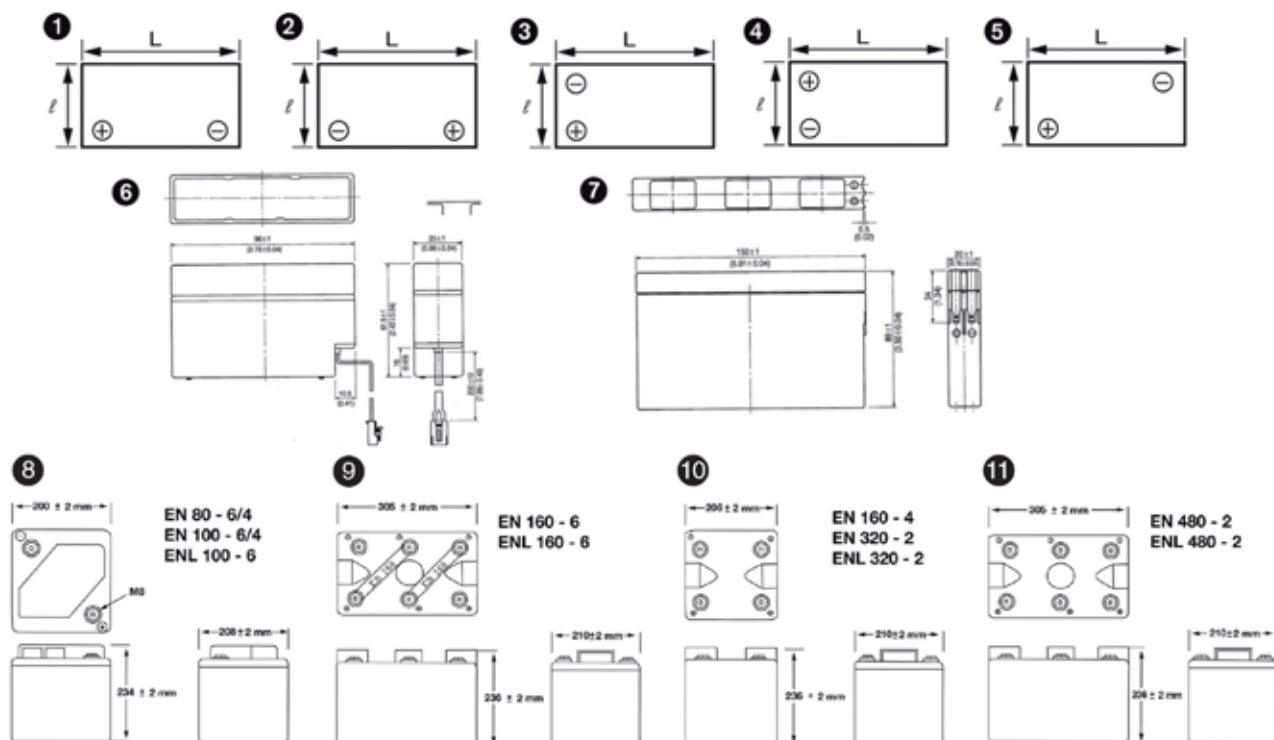


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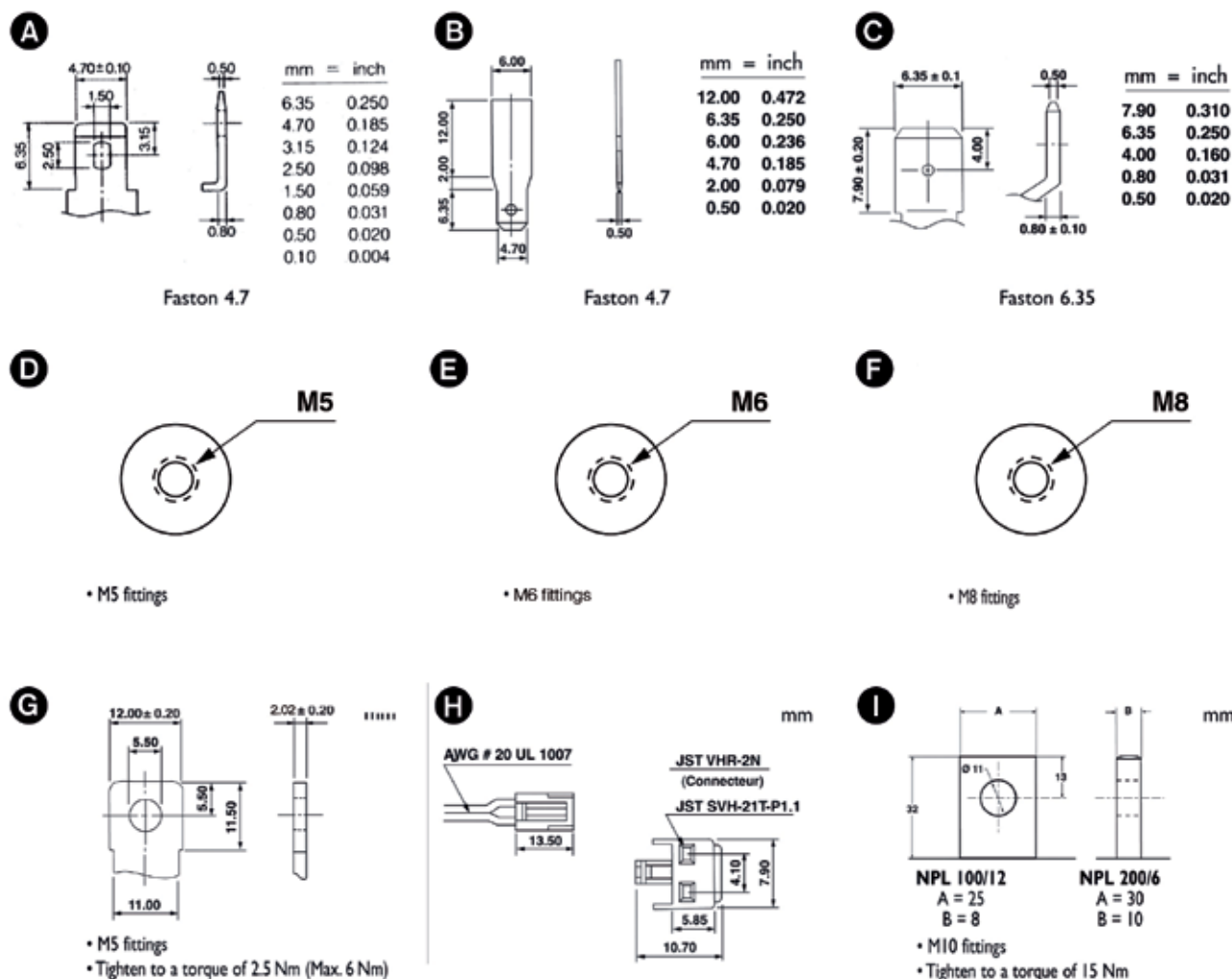


Layout & Terminal Diagrams

Layout



Terminals



Lithium Series

GS Yuasa LIM Li-ion Batteries



Features

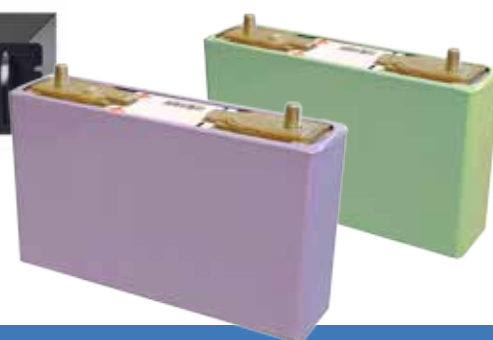
- Advanced maximum reliability system design
- Built in battery monitoring unit (ACS) constantly monitors the condition of each cell
- Outstanding cycle life of up to 3,000 cycles at 100% discharge
- High Charge-Discharge density capable of currents up to 600A
- Maintenance free
- Safe materials used in design and production

Applications

- High energy industrial systems
- UPS
- Energy storage
- Smart Grid
- AGV traction power



Model Name	Nominal Voltage (Volts)	Operating Voltage Range (Volts)	Capacity 1-hr rate to 22.0V @ 25° C (Ah)	Charge Current Continuous (Amps)	Maximum Current Continuous (Amps)	Discharge Current Continuous (Amps)	Maximum Discharge Current (Amps)	Dimensions (mm)			Weight (kg)	Cycles
								Length (±3)	Width (±3)	Height (±3)		
LIM25H-8S1-F1	28.8	22.0 - 33.6	25	100	600 (14s)	100	600 (14s)	440	219	128	17.5	20000
LIM25H-8S2-F2	28.8	22.0 - 33.6	25	100	600 (14s)	100	600 (14s)	440	219	128	17.5	20000
LIM25H-12S1-F1	43.2	33.0 - 50.4	25	100	600 (14s)	100	600 (14s)	620	219	128	28	20000
LIM25H-12S1-F2	43.2	33.0 - 50.4	25	100	600 (14s)	100	600 (14s)	617	219	128	27.5	20000
LIM5H-10P1-W1	36	24.0 - 42.0	5	50	200 (3s)	50	200 (3s)	245	131	110	4.5	20000
LIM40E-13T1	38	35.8 - 53.3	38	40	100 (60s)	40	600 (60s)	385	450	130	28	11000
LIM50EN-8S2-F2	29.6	22.0 - 32.8	47.5	50	125 (60s)	200	300 (60s)	440	219	128	17	11000
LIM50EN-12S2-F2	44.4	33.0 - 49.2	47.5	50	125 (60s)	200	300 (60s)	617	219	128	27	11000
LIM50E-7G-C1	25.9	19.3 - 28.7	47.5	50	125 (60s)	200	300 (60s)	412	180	135	15	7500



Li-ion Battery Control Modules (LiBM)

- Monitors and controls the operation of up to 26 lithium ion modules
- Multiple LiBMs can be networked for larger system integration
- Provides full access to all cell data via RS485 and CANbus 2.0b ports
- 16 cell and monitoring system functions are checked continuously
- Status thresholds are configurable for all monitored parameters
- Warning and alarm outputs configurable via relay and opto-isolated NO and NC contacts
- State of Charge measured by voltage and current analysis
- On-board data logging capability
- Low power consumption at 24Vdc

NiCd & NiMH

Battery Packs



Features

- Excellent cyclic performance
- Multiple pack configurations available for all cell types
- High temperature versions tested to ICEL 1010
- Three dimensional mesh structure
- Foamed Nickel technology allows higher capacity in smaller can sizes
- Maintenance free

Applications

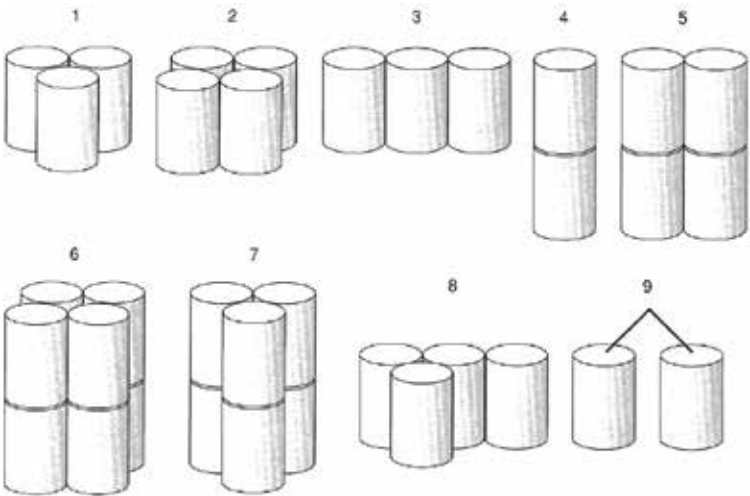
Packs can be tailored to a wide range of smaller power applications, including:

- Emergency lighting
- Toys
- Electronic equipment
- Testing equipment

Available Can Sizes

Model Name	Fraction Code	Diameter (mm)	Height (mm)
AA		14.1	48
7/5AA	R	14.1	64.4
4/5AA	S	14.1	42.6
2/3AA	X	14.1	28
1/2AA	Z	14.1	24
2/5AA	T	14.1	21
1/3AA	Y	14.1	16.5
AAA		10.1	43.6
7/5AAA	R	10.1	66.5
5/ 4AAA	V	10.1	49.5
5/6AAA		10.1	41.6
2/3AAA	X	10.1	27.8
1/2AAA	Z	10.1	25
1/3AAA	Y	10.1	15
1/4AAA	W	10.1	12
AAAA		7.9	41.5
F		32.2	89
18650		18	65
18670		18	67
A		16.8	49
7/5A	R	16.8	65.9
4/5 A	S	16.8	42.1
1/2A	Z	16.8	28
2/5A	T	16.8	21.5
1/3A	Y	16.5	16.5
AF		16.8	49
7/5AF	R	16.8	65.9
C		25.3	49
2/3C	X	25.3	30
1/3C	Y	25.3	19.1
D		32.2	59
2/3D	X	32.2	43
1/2D	Z	32.2	35
1/3D	Y	32.2	29.5
SC		22.1	42
5/4SC	V	22.1	49

Configuration Options



All Yuasa cylindrical cells can be connected together to form higher voltage/capacity packs. Dependant upon quantities required, almost any configuration can be achieved. Pack details are available on request.

Part numbers for packs incorporate all the information required to identify manufacturing details.

For example **3AAZ400LM3** translates as **3** x '**AA** 1/2 size(**Z**)' cells **400mAh** with **L**eads and **M**olex plug and configured using style **3**.



CR123A & CR2

Non-rechargeable Lithium Batteries

Model Name	Nominal Voltage	Capacity	Diameter	Height
CR2 - 1000	3V	1000mAh	15.6mm	27mm
CR123A - 1700	3V	1700mAh	17mm	34.5mm

Pro-Spec

Multiple Purpose Deep Cycle Batteries



Features

- Deep cycle
- Vibration resistant
- Easy maintenance vent caps
- AGM/porous rubber separator construction to resist corrosion and reduce electrical resistance
- Enhanced life cycle compared to competitors
- Two terminal types available
- Extended service life

Applications

- Electric vehicles including:
- Golf carts
- Mobility vehicles
- Warehouse equipment including:
- Fork lifts
- Access platforms
- Floor cleaners



Type	Model Name	Capacity				Dimensions (mm)			Terminal Height	Weight (kg)
		@25A (Mins)	@75A (Mins)	5HR (Ah)	20HR (Ah)	Length	Width	Height		
Deep Cycle 6V	DCB605-6(DT)	383	105	175	210	259	179	245	273	27
	DCB105-6(DT)	447	115	185	225	259	179	245	273	28.6
	DCB125-6(DT)	488	132	195	240	259	179	245	273	30.7
	DCB145-6(DT)	530	145	215	260	259	179	264	292	33
Deep Cycle 8V	DCB875-8(DT)	295	75	145	170	262	181	245	273	29
	DCB890-8(DT)	340	90	155	190	262	181	245	273	31.6
	DCB8125-8(DT)	425	110	190	240	262	181	283	311	37.6
Deep Cycle 12V	DCB1275-12(ET)	290	70	125	150	329	181	245	276	37.5

DT -
Dual Terminal



ET -
Embedded Terminal



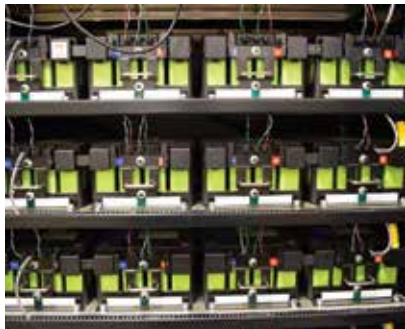
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* Suggested cyclic life based on 0.25C₃ 3 hour discharge - 0.18C₅ hour charge

Racking & Site Services

Yuasa Technical Department



The GS Yuasa Battery Sales UK Ltd Technical Department provides a full battery design and quotation service, including:

- **Battery sizing**
- **Open style or clad racks, cubical design & supply**
- **Gas & heat calculations**
- **AutoCAD drawings**
- **Battery system testing**

To discuss your project or requirements please contact us on **01793 833555** or **enquiries@yuasaeurope.com**



Battery Sizing

Utilising Yuasa's range of VRLA batteries, the latest design software and extensive technical expertise, our engineers will find the best battery solution tailored to your requirements.

Battery Containment

GS Yuasa have a full complement of battery racking solutions available. Our popular open or clad steel flat pack racking can be built to specification. Options including colour, tier heights, leg extensions, seismic strengthening and many more.

Gas & Heat

We can provide full calculations relating to heat output and hydrogen gas emissions of any Yuasa battery system.

Drawings

Using AutoCAD software, our engineers can provide detailed rack and battery layout drawings for your project.

Install

GS Yuasa can quote for and arrange battery installation and commissioning. Our trained engineers and over 30 years of industrial battery experience will ensure your project goes smoothly.

System Testing

We offer a full battery testing service for battery installations of all sizes. Measuring every battery for impedance and voltage, a detailed report with findings and recommendations will be issued once completed.



Yu-Power®

Intelligent Chargers



Yu-Power® intelligent chargers utilise multi-stage proportional timing technology to ensure safe and efficient lead acid battery charging.

Proportional timing during the bulk charging mode ensures the best balance of maximum state of charge, without damaging the battery before switching to the float charging mode.

Once in float charge mode the charger will charge the battery and maintain it at 100% state of charge whilst using an ECO mode to save power.

YPC09A12MC	Yu-Power 900ma 12V Motorcycle Battery Charger, UK Plug
YPC2A6	Yu-Power 2A 6V Charger - UK/Euro Plug c/w YPCCLIPMC
YPC2A12	Yu-Power 2A 12V Charger - UK/Euro Plug c/w YPCCLIPMC
YPC4A12	Yu-Power 4A 12V Charger - UK/Euro Plug c/w YPCCLIP
YPC4A24	Yu-Power 4A 24V Charger - UK/Euro plug c/w YPCCLIP
YPC8A12	Yu-Power 8A 12V charger - UK/Euro Plug c/w YPCCLIP
YPCCLIP	Yu-Power 24" Cordset (Torberry to clips)
YPCCLIPMC	Yu-Power 24" Cordset (std trailer to clips)
YPCMOB	Yu-Power 6" Cordset (male mobility plug to Torberry)
YPCPK	Yu-Power 24" Cordset (Powakaddy to Torberry)
YPCRINGMC	Yu-Power 24" Fused Ring Cordset (std trailer to rings)
YPCTESTMC	Yu-Power LED Battery Tester (trailer plug c/w YPCRINGMC)



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Yu-Power®

Battery Temperature Monitoring System YPCBM1

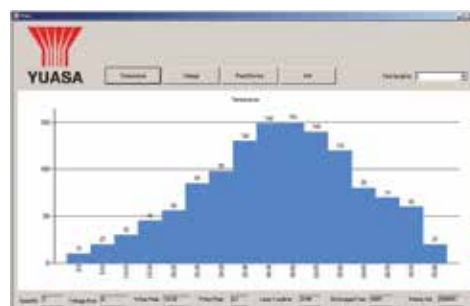


Hardware

- Continual monitoring with hourly logging of temperature and voltage
- 7.5 years of 1 hour rolling data storage
- Readable data set via 2.5mm output socket (lead available separately part code YPCBL1)
- Optional equipment available to allow for live working
- Unit dimensions: 40mm(±1) x 40mm(±1) x 14mm(±0.5)

Software

- Configurable to requirement
- Encoded against corruption
- Exportable to master documentation for further analysis
- Exportable to graphic displays
- Common file formats (Excel, csv, text)



YSP-117

Conductance Tester

The YSP-117 Yuasa conductance tester provides a simple method to screen the state-of-health of 1.2Ah to 55Ah Valve Regulated Lead Acid (VRLA) batteries.

- 6 and 12 volts (nominal) batteries
- Voltage and conductance (Siemens) readings
- Applications include security systems, emergency lighting, mobility vehicles, desktop/compact uninterruptible power supplies (UPS)



Hioki BT3554

Impedance Tester

The Hioki BT3554 impedance tester provides complete diagnosis of VRLA batteries with a single device.

- 2, 4, 6 and 12 volts (nominal) batteries
- Up to 60 volt test range
- Designed for UPS, central lighting systems and other large backup battery installations
- Auto-hold and Auto-data storage functions
- Integral storage for up to 4800 sets of data
- Full range of accessories and spares (available separately)
- Supporting software included
- 10°C to 60°C measurement range
- Supplied with heavy-duty carry case
- Suitable for testing the full range of Yuasa industrial VRLA products



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and technical data



Standby & Cyclic Definitions

Standby

A float STANDBY application is one where a battery is maintained, using a float charge voltage, in a 100% state of charge ready to support an attached load immediately should the mains supply fail. The float charge voltage ensures the correct current flow to compensate for any self-discharge characteristic¹. A typical application for an industrial battery system would be an Uninterruptable Power Supply (UPS).

Yuasa consider a float standby application to be where a battery

- Has no more discharges than is indicated in the table below.

DOD²	Allowable Discharges per Year (average)
0.1 – 10%	16-18
or	
11- 30%	10-12
or	
31- 100%	2-3

- Is expected to have prolonged periods of float charge, > 3 months, between discharges on average and at least 72 hours recharge between planned consecutive discharges (unless the battery you are using has repeat duty sizing for reduced charging times).
- Is expected to spend >99.9% of its life on float charge.
- Is never left in partially discharged condition.

Yuasa VRLA STANDBY Battery types: NP, NPL, SWL and EN

Cyclic

A CYCLIC application is one where a battery is discharged and charged on a regular and/or planned basis. A typical application for a CYCLIC industrial battery system would be an electrical power load shedding system. Yuasa consider a CYCLIC application to be where a battery:

- Is regularly³ subjected to charge times of <72 hours between discharges.
- Is regularly³ discharged to any depth of discharge.
- Following first use is subjected to periods longer than 1 month without charge in any 6 month period.
- Following first use is left in a partial state of discharge for >1 week.

Yuasa VRLA cyclic battery types: NPC, REC, ENL, SLE

Notes

1. Float charge can include intermittent charging patterns, having periods when fully charged batteries stand at open circuit. However, to ensure battery strings are correctly equalised for state of charge and charge acceptance characteristics, continuous float charge conditions should be applied for at least 6 months after commissioning or alterations to battery configuration.
2. Depth of Discharge (DOD). 100% Discharge in regards to this document should be considered to be end of calculated autonomy period at any given load. A 10% discharge would be a discharge time of 10% of the calculated autonomy at a given load.
3. 'Regularly' could be considered as more than twice per month on average.

Golf, Mobility & Other Cyclic Use

Do:

- Follow the battery fitting instruction supplied by your equipment supplier.
- Charge your new battery for 12 hours before use, a battery can require up to 6 cycles of charge/discharge before it reaches its optimum performance. Always re-charge for a minimum of 12 hours after use.
- Ensure that your charger switches from bulk (usually indicated by a red or blue LED) to float charge (usually indicated by a Green LED) within 12 hours on charge. If this does not occur within 12 hours then disconnect battery from charge, use and then recharge.
- Store your battery in a fully charged state.
- Charge your battery as and when possible, regardless of state of charge.
- Do maintain your equipment, follow lubrication advice and have your device regularly checked for correct running.
- All running gear should be free of grass, mud and other debris. Any extra resistance will exert extra load on the battery and will reduce run time.

Do not:

- Fully or partially discharge the battery and leave in a discharged state. This will cause internal damage to the battery and result in reduced life.
- Exceed the operational loading weight set by the product manufacture.
- Store the battery for long periods above an ambient temperature of 20 degrees centigrade.
- Drop or bump the battery – you will damage it.

Useful information:

- A battery is deemed to have reached end of life when it reaches 60% of original capacity.
- The life of the battery will depend on the depth of discharge and number of cycles performed.
- 1 cycle = 1 x discharge + 1 x charge.

Factors which can also affect life and run time are:

- Weight of the load carried.
- Number of times used per week (number of cycles).
- Length of time used per occasion (depth of discharge).
- Charging regime.
- Age and condition of your equipment, wheel bearing wear and motor condition can put extra load on the battery and reduce any autonomy time. New batteries fitted to new equipment will last longer than new batteries fitted to older equipment.
- Ambient temperature over 20°C.

Note: Yuasa REC & NPC batteries used in golf caddy applications are not designed to support a specific number of holes played during a round of golf. The guarantee of the product is solely based on the product premature failing due to a manufacturing or materials defect only. Yuasa do not manufacture an 18, 24, or 36 hole golf battery.



YUASA BATTERY

THE INDUSTRIAL SUPER POWER



Reliability, quality & performance

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