

FOR LIGHT VEHICLES & START STOP VEHICLES



AGM

Start Stop plus with
AGM Tech.



EFB

Start Stop with
EFB Tech.



UHPB

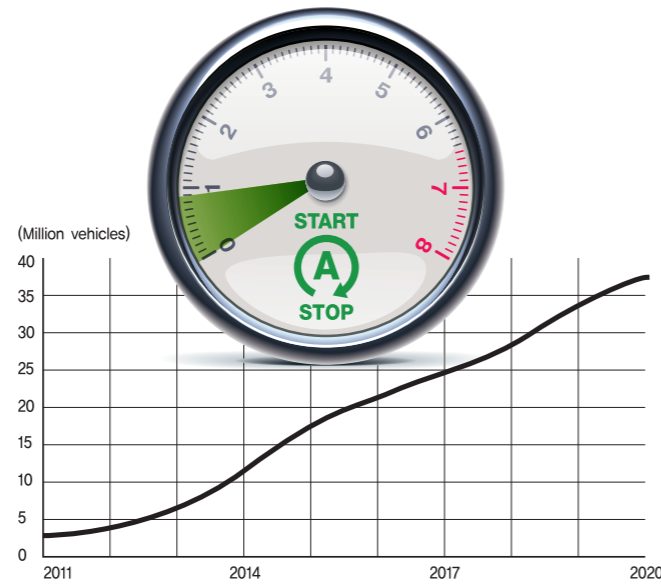
Ultra High Performance
Battery



SMF

Sealed Maintenance
Free Battery

KOBA[®]



Fuel economy trend by Automotive Technologies

From 2012, international environmental regulations against global car makers have come to the fore. Major countries of vehicle production and sales such as the United States, China, Japan and European Union have been reinforcing the regulations on CO₂ emission and the fuel economy to cope with global climate change and excessive energy consumption.

Start-stop technology is one of the fuel economy car technologies to help reduce the CO₂ emission, playing a key role in a way to achieve stringent emission norms for vehicle manufacturer. On the other hand it reduces fuel consumption, which is what a vehicle owner mostly looks for in a vehicle, with ever increasing fuel prices.

What is Start Stop System?

Start Stop system controls engine to stop when the vehicle is not in movement and restart the engine when vehicles begin its acceleration. This technology can help to avoid unnecessary energy loss caused by engine idling and has in fact been proved to cut fuel consumption by 5~15%, also Start Stop system improves engine silence for the consumer's driving comfort.

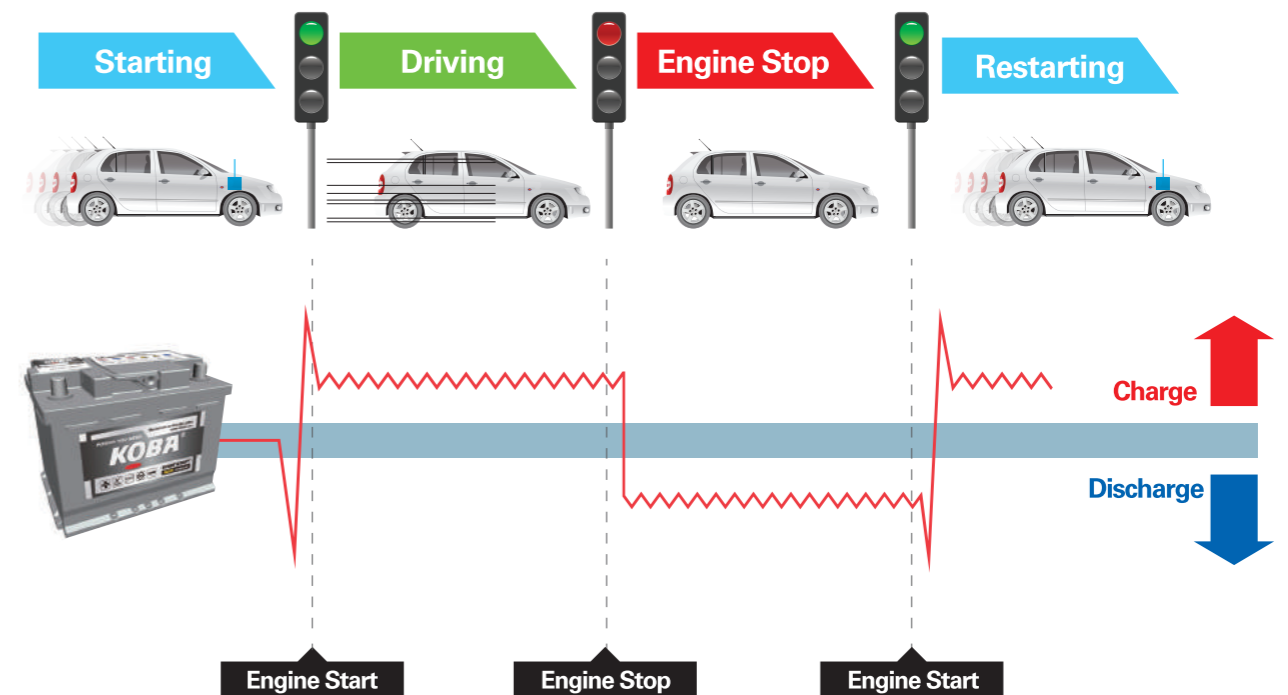
Next Icon to drive your business forward

In 2013, 8 million vehicles were equipped with Start Stop system and it is forecasted to grow up to 23 million vehicles by 2017. Particularly in Europe, around 70% of total vehicle sales in 2015 will include Start Stop system

The Role of Start Stop Battery

Start Stop vehicles require enhanced battery due to the frequent start and stop events at traffic light. Therefore, battery with enhanced durability and charge acceptance is required to withstand the severe driving environments for the Start Stop vehicles. KOBA Start Stop series have enhanced the durability and battery life to perfectly optimize for the Start Stop vehicles. Also it is not only optimized for Start Stop vehicles but it could perform higher stability and longer life for the previous Internal Combustion Engine(ICE) equipped vehicles as well.

Start Stop System





Start Stop Plus with AGM Technology

Start Stop plus with AGM Series, the primary choice of vehicle manufacturers, is specially designed to meet and even go beyond all requirements of advanced start stop vehicles heavily equipped with electronic devices, the most prestigious vehicles.

Group No	Type No	Capacity (20HR)	CCA (EN)	Dimension(mm)				Layout	Terminal	Hold-down
				L	W	H	TH			
L2	SA 56020	60	680	242	174	190	190	0	A	B13
L3	SA 57020	70	760	277	174	190	190	0	A	B13
L4	SA 58020	80	800	314	174	190	190	0	A	B13
L5	SA 59520	95	850	352	174	190	190	0	A	B13

Key Features

- Absorbent Glass Mat separator
- VRLA sealed construction
- X-Frame Technology
- Reinforced case design
- Meets OE quality, performance & specification

Benefits

- x4 time longer idling stop life cycle
- Charge acceptance 150% up
- Starting power 130% up
- Optimal safety for passenger compartment installation

Application



▶ Start Stop system



▶ Regenerative Braking System



▶ Urban intensive use



▶ Heavily equipped electronic devices



Start Stop with EFB Technology

Start Stop with EFB Series, the primary choice of vehicle manufacturers, is specially designed to meet and even go beyond all requirements of entry start stop vehicles heavily equipped with electronic devices.

Group No	Type No	Capacity (20HR)	CCA (DIN:EN / JIS:SAE)	Dimension(mm)				Layout	Terminal	Hold-down
				L	W	H	TH			
L2	SE 56010	60	560	242	174	190	190	0	A	B13
L3	SE 57010	70	650	277	174	190	190	0	A	B13
L4	SE 58010	80	730	315	174	190	190	0	A	B13
L5	SE59510	95	900	354	174	190	190	0	A	B13
L6	SE 61010	110	950	398	174	190	190	0	A	B13
LB3	SE 56510	65	650	277	174	175	175	0	A	B13
LB4	SE 57510	75	730	315	174	175	175	0	A	B13
B20	SE M42(55B20L)	40	420	196	127	200	220	0	A(B)	B0
	SE M42R(55B20R)	40	420	196	127	200	220	1	A(B)	B0
B24	SE N55(70B24L)	45	460	234	127	200	220	0	A(B)	B0(B1)
D23	SE Q85(90D23L)	65	670	230	172	200	220	0	A	B0(B1)
	SE Q85R(90D23R)	65	670	230	172	200	220	1	A	B0(B1)
D26	SE S95(100D26L)	68	730	257	172	200	220	0	A	B0(B1)
D31	SE T110(115D31L)	80	800	302	172	200	220	0	A	B0(B1)

Key Features

- Sealed Maintenance Free with double lid
- Grid Protect System with special tissue
- X-Frame Technology
- Carbon additives
- Meets VDA standard

Benefits

- x3 time longer idling stop life cycle
- Charge acceptance 130% up
- Starting power 115% up
- Optimal fit for engine compartment

Application



▶ Start Stop System



▶ Urban intensive use



▶ Heavily equipped electronic devices



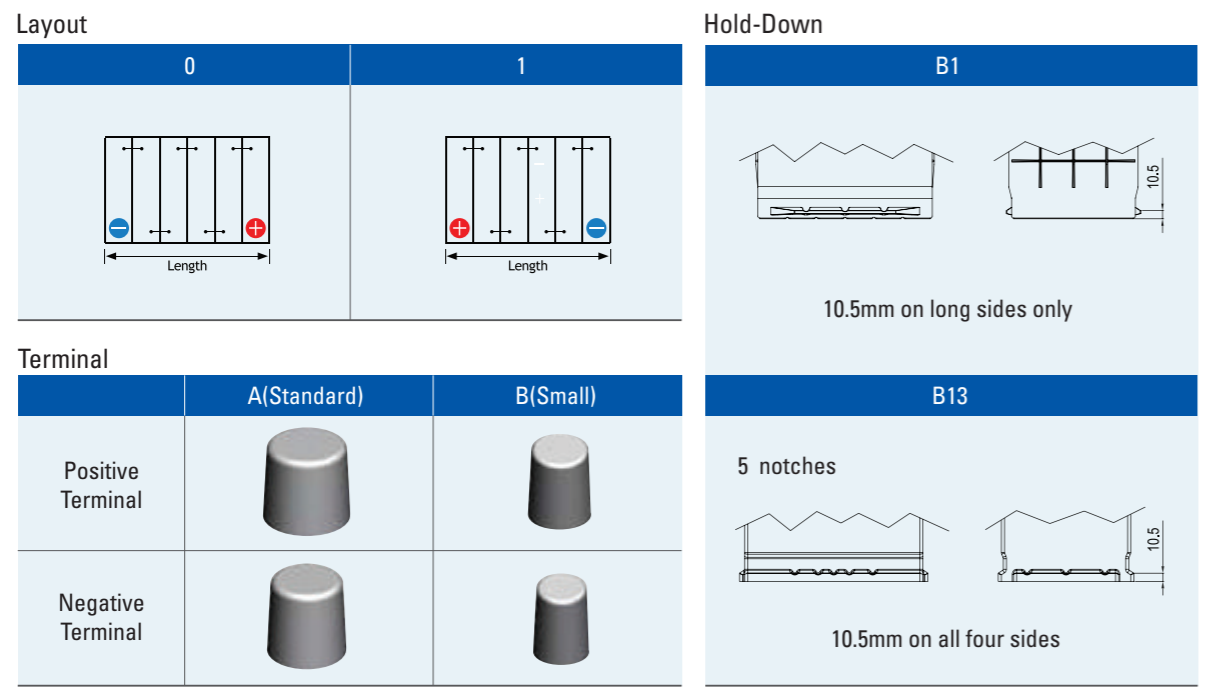


Performance Rating Comparison

	SMF	Start Stop(EFB)	Start Stop Plus (AGM)
Starting Power	★	★★	★★★
Charge Acceptance	★	★★	★★★
Vibration Resistance	★	★	★★★
ISS Life Cycle	—	★★	★★★
Safety	★	★★	★★★
Application	Standard diesel & petrol engine	Start Stop System	Advanced Start Stop System

★ Good ★★ Very Good ★★★ Excellent

Technical Information



• B0 : There is no Hold-Down

HEV Auxiliary Battery with AGM Technology

Hybrid cars are equipped with high voltage main battery(Ni-MH, Li-Ion) and Auxiliary Battery for electronic devices as well as cranking internal combustion engine.

Group No	Type No	Capacity	CCA	Dimension(mm)				Layout	Terminal	Hold-down	Remark
		(20HR)	(SAE)	L	W	H	TH				
B24	AX S46B24R	45	370	236	125	200	220	1	B	B0	Toyota Prius
D23	AX S55D23R	50	550	220	170	200	220	1	A	B0(B1)	Toyota Camry HV
D26	AX S65D26R	75	750	260	172	200	220	1	A	B1	

Key Features

- Absorbent Glass Mat separator
- VRLA sealed construction
- X-Frame technology
- Reinforced case design

Benefits

- X2 times higher cycling durability compared to Flooded batteries
- Perfectly meets Original equipment specification
- Starting power 130% up

Application

- Hybrid Electric Vehicle
- Back up utility
- Heavily equipped electronic devices

KOBA AGM & EFB Technology



THE KOBA TECHNOLOGY

Product Features & Benefits

Trust KOBA's Innovative Technology

Take a powerful ride with KOBA starter batteries. Whether it's for an entry level vehicle or a high-end performance car, KOBA batteries provide reliable starting power that goes all the way through to the end of your journey.

As always, KOBA's outstanding product quality is the result of our innovative technology.

KOBA BATTERIES

Delivering outstanding product quality through innovative technology:



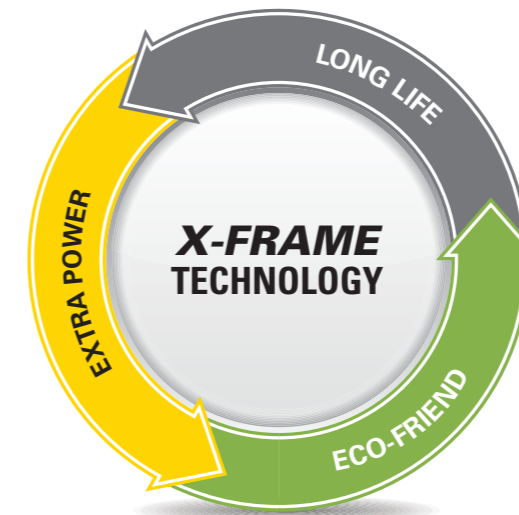
- Long Life
- Enhanced Power
- Reliable Performance
- Improved Safety and Usability

BATTERY STRUCTURE

- 1 X-Frame Technology and High Durability Technology
- 2 Enveloped separator for low electric resistance
- 3 Advanced center lug technology and cast on strap
- 4 Sealed double lid with frame arrestor
- 5 Integrated computer design and reinforced container
- 6 Magic eye indicator

X-FRAME TECHNOLOGY : MAXIMIZED POWER & ENHANCED STABILITY

KOBA's produces patterned and fully framed grids through a manufacturing process called "stamping". Compared to conventional batteries with expanded metal grid, KOBA batteries deliver longer life and stable power flow.



Long Life

- Rolling & Stamping Process
 - Excellent corrosion resistance
 - Outstanding mechanical performance
- Full Framed Grid Design
 - Prevents grid growth & short circuits

Extra Power

- Radial Grid Design
 - Ensures low electrical resistance
- Advanced Center Lug
 - Better power flow

Eco-Friendly

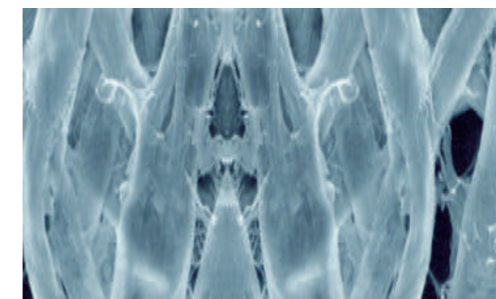
- Production process is more eco-friendly

High Durability Technology : EXTENDED BATTERY LIFE

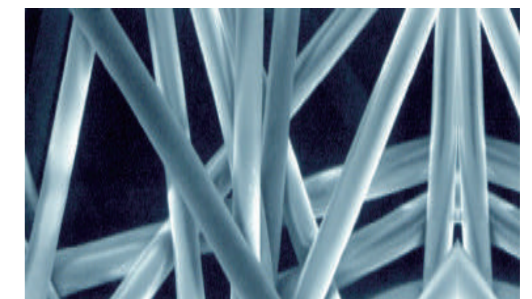
KOBA batteries provide extended life cycle through the High Durability Technology. Using cutting-edge materials, the High Durability Technology protects the grid until the end of the battery life and improves the battery performance.

Ultra Micro-Fiber & Special Tissue

- Increases plate durability by reducing the aging- rate of active materials.



Conventional
Common Pulp Tissue



KOBA
Special Tissue

* These images of electron microscope show the surface of a tissue after a life cycle test.

**GET ALL
THE POWER
YOU NEED**

UHPB BATTERIES Ultra High Performance Batteries

KOBA UHPB Battery is designed to provide ultimate performance for a wide range of premium vehicles that require higher power support.



MAIN BENEFITS:

- 30% enhanced starting power for top level performance
- Fast and powerful start with X-Frame Technology
- Enduring and consistent power performance with High Durability Technology
- Reinforced case to resist exterior damage and deformation
- Rapid charging through latest carbon plus technology

UHPB SPECIFICATIONS:

Gr.No	Type No.	Capacity (20HR)	CCA (JIS:SAE/DIN:EN)	Dimension (mm)				Layout	Terminal	Hold-Down
				L	W	H	TH			
B19	UMF55B19R	45	400	187	127	200	220	1	B	B0(B1)
B19	UMF55B19L	45	400	187	127	200	220	0	B	B0(B1)
B19	UMF55B19RS	45	400	187	127	200	220	1	A	B0(B1)
B19	UMF55B19LS	45	400	187	127	200	220	0	A	B0(B1)
B24	UMF75B24R	55	500	234	127	200	220	1	B	B0(B1)
B24	UMF75B24L	55	500	234	127	200	220	0	B	B0(B1)
B24	UMF75B24RS	55	500	234	127	200	220	1	A	B0(B1)
B24	UMF75B24LS	55	500	234	127	200	220	0	A	B0(B1)
D23	UMF95D23R	75	700	230	172	200	220	1	A	B0(B1)
D23	UMF95D23L	75	700	230	172	200	220	0	A	B0(B1)
D26	UMF115D26R	85	750	257	172	200	220	1	A	B0(B1)
D26	UMF115D26L	85	750	257	172	200	220	0	A	B0(B1)
D31	UMF135D31R	100	850	302	172	200	220	1	A	B0(B1)
D31	UMF135D31L	100	850	302	172	200	220	0	A	B0(B1)
LB2	UMF56000	60	600	242	174	175	175	0	A	B13
L2	UMF56800	68	600	242	174	190	190	0	A	B13
L2	UMF56801	68	600	242	174	190	190	1	A	B13
LB3	UMF57400	74	750	277	174	175	175	0	A	B13
LB3	UMF57401	74	750	277	174	175	175	1	A	B13
L3	UMF57800	78	780	277	174	190	190	0	A	B13
LB4	UMF58000	80	800	315	174	175	175	0	A	B13
L4	UMF59000	90	800	315	174	190	190	0	A	B13
L4	UMF59001	90	800	315	174	190	190	1	A	B13
L5	UMF60500	105	850	354	174	190	190	0	A	B13
L6	UMF61000	110	950	398	174	190	190	0	A	B13

SMF BATTERIES

Sealed Maintenance Free Batteries

KOBA SMF Battery is the ideal choice for standard vehicles with usual power demands. It's maintenance free and it provides reliable power support for all applications.

KOBA offers a complete range of SMF Batteries for all of European, Asian and American vehicles.



MAIN BENEFITS:

- Reliable starting power with X-Frame Technology
- High Durability Technology delivers longer service life
- A complete range offered for 99% of vehicles on the market

SMF SPECIFICATIONS: FOR JAPANESE VEHICLES

Gr.No	Type No.	Capacity (20HR)	CCA (SAE)	Dimension (mm)				Layout	Terminal	Hold-Down
				L	W	H	TH			
B19	MF40B19L	35	330	187	127	200	220	0	B	B0
B19	MF40B19R	35	330	187	127	200	220	1	B	B0
B19	MF40B19LS	35	330	187	127	200	220	0	A	B0
B19	MF40B19RS	35	330	187	127	200	220	1	A	B0
B19	MF40B19FL	35	330	187	127	200	220	0	B	B1
B19	MF42B19L	38	350	187	127	200	220	0	B	B0
B19	MF42B19R	38	350	187	127	200	220	1	B	B0
B19	MF42B19LS	38	350	187	127	200	220	0	A	B0
B19	MF42B19RS	38	350	187	127	200	220	1	A	B0
B19	MF42B19FL	38	350	187	127	200	220	0	B	B1
B19	MF44B19L	40	370	187	127	200	220	0	B	B0
B19	MF44B19R	40	370	187	127	200	220	1	B	B0
B19	MF44B19FL	40	370	187	127	200	220	0	B	B1
B19	MF50B19R	42	380	187	127	200	220	1	B	B0
B19	MF50B19L	42	380	187	127	200	220	0	B	B0
B19	MF50B19RS	42	380	187	127	200	220	1	A	B0
B19	MF50B19LS	42	380	187	127	200	220	0	A	B0
B24	MF50B24L	45	400	234	127	200	220	0	B	B0
B24	MF50B24R	45	400	234	127	200	220	1	B	B0
B24	MF50B24LS	45	400	234	127	200	220	0	A	B0
B24	MF50B24RS	45	400	234	127	200	220	1	A	B0
B24	MF55B24L	45	430	234	127	200	220	0	B	B0
B24	MF55B24R	45	430	234	127	200	220	1	B	B0
B24	MF55B24LS	45	430	234	127	200	220	0	A	B0
B24	MF55B24RS	45	430	234	127	200	220	1	A	B0
B24	MF60B24L	48	460	234	127	200	220	0	B	B0
B24	MF60B24R	48	460	234	127	200	220	1	B	B0
B24	MF60B24LS	48	460	234	127	200	220	0	A	B0

SMF BATTERIES

Sealed Maintenance Free Batteries

SMF SPECIFICATIONS: FOR JAPANESE VEHICLES

Gr.No	Type No.	Capacity (20HR)	CCA (SAE)	Dimension (mm)				Layout	Terminal	Hold-Down
				L	W	H	TH			
B24	MF60B24RS	48	460	234	127	200	220	1	A	B0
B24	MF65B24R	48	470	234	127	200	220	1	B	B0
B24	MF65B24L	48	470	234	127	200	220	0	B	B0
B24	MF65B24RS	48	470	234	127	200	220	1	A	B0
B24	MF65B24LS	48	470	234	127	200	220	0	A	B0
D20	MF50D20L	50	450	200	172	200	220	0	A	B1
D20	MF50D20R	50	450	200	172	200	220	1	A	B1
D23	MF55D23L	60	550	230	172	200	220	0	A	B0
D23	MF55D23R	60	550	230	172	200	220	1	A	B0
D23	MF55D23FL	60	550	230	172	200	220	0	A	B1
D23	MF55D23FR	60	550	230	172	200	220	1	A	B1
D23	MF75D23L	65	580	230	172	200	220	0	A	B0
D23	MF75D23R	65	580	230	172	200	220	1	A	B0
D23	MF75D23FL	65	580	230	172	200	220	0	A	B1
D23	MF75D23FR	65	580	230	172	200	220	1	A	B1
D23	MF85D23L	68	600	230	172	200	220	0	A	B0
D23	MF85D23R	68	600	230	172	200	220	1	A	B0
D23	MF85D23FL	68	600	230	172	200	220	0	A	B1
D23	MF90D23R	68	630	230	172	200	220	1	A	B0
D23	MF90D23L	68	630	230	172	200	220	0	A	B0
D23	MF90D23FR	68	630	230	172	200	220	1	A	B1
D23	MF90D23FL	68	630	230	172	200	220	0	A	B1
D26	MF48D26L	50	450	257	172	200	220	0	A	B0
D26	MF48D26R	50	450	257	172	200	220	1	A	B0
D26	MF48D26FL	50	450	257	172	200	220	0	A	B1
D26	MF48D26FR	50	450	257	172	200	220	1	A	B1
D26	MF55D26L	60	550	257	172	200	220	0	A	B0
D26	MF55D26R	60	550	257	172	200	220	1	A	B0
D26	MF55D26FL	60	550	257	172	200	220	0	A	B1
D26	MF55D26FR	60	550	257	172	200	220	1	A	B1
D26	MF75D26L	65	580	257	172	200	220	0	A	B0
D26	MF75D26R	65	580	257	172	200	220	1	A	B0
D26	MF75D26FL	65	580	257	172	200	220	0	A	B1
D26	MF75D26FR	65	580	257	172	200	220	1	A	B1
D26	MF80D26L	70	600	257	172	200	220	0	A	B0
D26	MF80D26R	70	600	257	172	200	220	1	A	B0
D26	MF80D26FL	70	600	257	172	200	220	0	A	B1
D26	MF80D26FR	70	600	257	172	200	220	1	A	B1
D26	MF90D26L	72	630	257	172	200	220	0	A	B0
D26	MF90D26R	72	630	257	172	200	220	1	A	B0

SMF BATTERIES Sealed Maintenance Free Batteries

SMF SPECIFICATIONS: FOR JAPANESE VEHICLES

Gr.No	Type No.	Capacity (20HR)	CCA (SAE)	Dimension (mm)				Layout	Terminal	Hold-Down
				L	W	H	TH			
D26	MF90D26FL	72	630	257	172	200	220	0	A	B1
D26	MF90D26FR	72	630	257	172	200	220	1	A	B1
D26	MF100D26R	70	680	257	172	200	220	1	A	B0
D26	MF100D26L	70	680	257	172	200	220	0	A	B0
D26	MF100D26FR	70	680	257	172	200	220	1	A	B1
D26	MF100D26FL	70	680	257	172	200	220	0	A	B1
D31	MF65D31L	70	600	302	172	200	220	0	A	B0
D31	MF65D31R	70	600	302	172	200	220	1	A	B0
D31	MF65D31FL	70	600	302	172	200	220	0	A	B1
D31	MF65D31FR	70	600	302	172	200	220	1	A	B1
D31	MF75D31L	75	660	302	172	200	220	0	A	B0
D31	MF75D31R	75	660	302	172	200	220	1	A	B0
D31	MF75D31FL	75	660	302	172	200	220	0	A	B1
D31	MF75D31FR	75	660	302	172	200	220	1	A	B1
D31	MF95D31L	80	670	302	172	200	220	0	A	B0
D31	MF95D31R	80	670	302	172	200	220	1	A	B0
D31	MF95D31FL	80	670	302	172	200	220	0	A	B1
D31	MF95D31FR	80	670	302	172	200	220	1	A	B1
D31	MF105D31L	90	750	302	172	200	220	0	A	B0
D31	MF105D31R	90	750	302	172	200	220	1	A	B0
D31	MF105D31FL	90	750	302	172	200	220	0	A	B1
D31	MF105D31FR	90	750	302	172	200	220	1	A	B1
D31	MF115D31L	95	830	302	172	200	220	0	A	B0
D31	MF115D31R	95	830	302	172	200	220	1	A	B0
D31	MF115D31FL	95	830	302	172	200	220	0	A	B1
D31	MF115D31FR	95	830	302	172	200	220	1	A	B1
D31	MF120D31R	90	880	302	172	200	220	1	A	B0
D31	MF120D31L	90	880	302	172	200	220	0	A	B0
D31	MF120D31FR	90	880	302	172	200	220	1	A	B1
D31	MF120D31FL	90	880	302	172	200	220	0	A	B1
CARNIVAL	MF100L	100	830	325	172	200	220	0	A	B1
E41	MF95E41L	100	830	402	171	205	226	0	A	B0
E41	MF95E41R	100	830	402	171	205	226	1	A	B0
E41	MF115E41L	110	900	402	171	205	226	0	A	B0
E41	MF115E41R	110	900	402	171	205	226	1	A	B0



SMF SPECIFICATIONS: FOR EUROPEAN VEHICLES

Gr.No	Type No.	Capacity (20HR)	CCA (EN)	Dimension (mm)				Layout	Terminal	Hold-Down
				L	W	H	TH			
L0	MF54080	40	340	174	174	190	190	0	A	B13
LB1	MF53646	36	330	208	174	175	175	0	A	B13
LB1	MF54321	45	450	208	174	175	175	0	A	B13
LB1	MF54322	45	450	208	174	175	175	1	A	B13
L1	MF54459	44	390	208	174	190	190	0	A	B13
L1	MF54464	44	390	208	174	190	190	1	A	B13
L1	MF55054	50	420	208	174	190	190	0	A	B13
L1	MF55090	50	470	208	174	190	190	0	A	B13
L1	MF55091	50	470	208	174	190	190	1	A	B13
LB2	MF54519	45	390	242	174	175	175	0	A	B13
LB2	MF55046	50	450	242	174	175	175	0	A	B13
LB2	MF55457	54	480	242	174	175	175	0	A	B13
LB2	MF55459	54	480	242	174	175	175	1	A	B13
LB2	MF55427	54	480	242	174	175	175	0	4F	B13
LB2	MF56077	60	510	242	174	175	175	0	A	B13
L2	MF55559	55	480	242	174	190	190	0	A	B13
L2	MF55565	55	480	242	174	190	190	1	A	B13
L2	MF55531	55	480	242	174	190	190	0	4F	B13
L2	MF56219	62	540	242	174	190	190	0	A	B13
L2	MF56220	62	540	242	174	190	190	1	A	B13
L2	MF56290	62	570	242	174	190	190	0	A	B13
L2	MF56291	62	570	242	174	190	190	1	A	B13
LB3	MF55415	54	480	277	174	175	175	0	A	B13
LB3	MF56318	63	540	277	174	175	175	0	A	B13
LB3	MF56828	68	570	277	174	175	175	0	A	B13
LB3	MF56821	68	570	277	174	175	175	1	A	B13
LB3	MF56818	68	570	277	174	175	175	0	4F	B13
LB3	MF57113	72	640	277	174	175	175	0	A	B13
L3	MF56638	66	540	277	174	190	190	0	A	B13
L3	MF56633	66	540	277	174	190	190	1	A	B13
L3	MF57220	72	610	277	174	190	190	0	A	B13
L3	MF57219	72	610	277	174	190	190	1	A	B13
L3	MF57290	72	720	277	174	190	190	0	A	B13
L3	MF57291	72	720	277	174	190	190	1	A	B13
L3	MF57412	74	680	277	174	190	190	0	A	B13
L3	MF57413	74	680	277	174	190	190	1	A	B13

SMF BATTERIES Sealed Maintenance Free Batteries

SMF SPECIFICATIONS: FOR EUROPEAN VEHICLES

Gr.No	Type No.	Capacity (20HR)	CCA (EN)	Dimension (mm)				Layout	Terminal	Hold-Down
				L	W	H	TH			
LB4	MF57539	75	640	315	174	175	175	0	A	B13
L4	MF58043	80	640	315	174	190	190	0	A	B13
L4	MF58590	85	750	315	174	190	190	0	A	B13
L4	MF58591	85	750	315	174	190	190	1	A	B13
LB5	MF58515	85	720	354	174	175	175	0	A	B13
L5	MF58827	88	680	354	174	190	190	0	A	B13
L5	MF58821	88	680	354	174	190	190	1	A	B13
L5	MF59218	92	720	354	174	190	190	0	A	B13
L5	MF60038	100	850	354	174	190	190	0	A	B13
L5	MF60090	100	880	354	174	190	190	0	A	B13
B19	MF53520	35	330	187	127	200	220	0	B	B0
B19	MF53522	35	330	187	127	200	220	1	B	B0
B19	MF53504	35	330	187	136	200	220	0	B	B1
B19	MF54026	40	360	187	127	200	220	0	B	B0
B19	MF54027	40	360	187	127	200	220	1	B	B0
B24	MF54523	45	360	234	127	200	220	0	A	B0
B24	MF54524	45	360	234	127	200	220	1	A	B0
B24	MF54584	45	360	234	127	200	220	0	B	B0
B24	MF54551	45	360	234	127	200	220	1	B	B0
D20	MF55041	50	390	200	172	200	220	0	A	B1
D20	MF55042	50	390	200	172	200	220	1	A	B1
D23	MF56068	60	480	230	172	200	220	0	A	B1
D23	MF56069	60	480	230	172	200	220	1	A	B1
D26	MF56048	60	480	257	172	200	220	0	A	B1
D26	MF56049	60	480	257	172	200	220	1	A	B1
D26	MF57024	70	540	257	172	200	220	1	A	B1
D26	MF57029	70	540	257	172	200	220	0	A	B1
D31	MF57512	75	600	302	172	200	220	0	A	B1
D31	MF57513	75	600	302	172	200	220	1	A	B1
D31	MF58513	85	680	302	172	200	220	0	A	B1
D31	MF58514	85	680	302	172	200	220	1	A	B1
D31	MF59518	95	720	302	172	200	220	0	A	B1
D31	MF59519	95	720	302	172	200	220	1	A	B1
D31	MF60045	100	800	302	172	200	220	0	A	B1
D31	MF60046	100	800	302	172	200	220	1	A	B1



SMF SPECIFICATIONS: FOR AMERICAN VEHICLES

Gr.No	Type No.	RC (Min)	CCA (SAE)	Dimension (mm)				Layout	Terminal	Hold-Down	BCI Assembly Figure No
				L	W	H	TH				
51	MF51-430	71	430	234	136	200	220	1	A	B1	10
51	MF51-460	78	460	234	136	200	220	1	A	B1	10
51R	MF51R-430	71	430	234	136	200	220	0	A	B1	11
51R	MF51R-460	78	460	234	136	200	220	0	A	B1	11
21	MF21-450	80	450	200	172	200	220	1	A	B1	10
21R	MF21R-450	80	450	200	172	200	220	0	A	B1	11
26	MF26-450	80	450	208	172	180	200	1	A	B1	10
26	MF26-550	100	550	208	172	180	200	1	A	B1	10
26R	MF26R-450	80	450	208	172	180	200	0	A	B1	11
26R	MF26R-550	100	550	208	172	180	200	0	A	B1	11
85	MF85-500	85	500	230	172	180	200	0	A	B1	11
85	MF85-550	90	550	230	172	180	200	0	A	B1	11
86(85R)	MF85R-500	85	500	230	172	180	200	1	A	B1	10
86(85R)	MF85R-550	90	550	230	172	180	200	1	A	B1	10
34	MF34-550	100	550	260	172	180	200	1	A	B1	10
34	MF34-630	125	630	260	172	180	200	1	A	B1	10
34	MF34-670	130	670	260	172	180	200	1	A	B1	10
34	MF34-710	140	710	260	172	180	200	1	A	B1	10
34	MF34-750	155	750	260	172	180	200	1	A	B1	10
34R	MF34R-550	100	550	260	172	180	200	0	A	B1	11
34R	MF34R-630	125	630	260	172	180	200	0	A	B1	11
34R	MF34R-710	140	710	260	172	180	200	0	A	B1	11
34R	MF34R-750	155	750	260	172	180	200	0	A	B1	11
25	MF25-550	100	550	230	172	200	220	1	A	B1	10
35	MF35-550	100	550	230	172	200	220	0	A	B1	11
35	MF35-580	110	580	230	172	200	220	0	A	B1	11
24	MF24-500	90	500	257	172	200	220	1	A	B1	10
24	MF24-550	100	550	257	172	200	220	1	A	B1	10
24	MF24-600	113	600	257	172	200	220	1	A	B1	10
24	MF24-630	130	630	257	172	200	220	1	A	B1	10
24	MF24-750	155	750	257	172	200	220	1	A	B1	10
24R	MF24R-500	90	500	257	172	200	220	0	A	B1	11
24R	MF24R-550	100	550	257	172	200	220	0	A	B1	11
24R	MF24R-600	113	600	257	172	200	220	0	A	B1	11
24R	MF24R-630	130	630	257	172	200	220	0	A	B1	11
24R	MF24R-750	155	750	257	172	200	220	0	A	B1	11

SMF BATTERIES Sealed Maintenance Free Batteries

SMF SPECIFICATIONS: FOR AMERICAN VEHICLES

Gr.No	Type No.	RC (Min)	CCA (SAE)	Dimension (mm)				Layout	Terminal	Hold-Down	BCI Assembly Figure No
				L	W	H	TH				
24F	MF24F-500	90	500	266	172	200	220	0	A	B5	11F
24F	MF24F-550	100	550	266	172	200	220	0	A	B5	11F
24F	MF24F-600	113	600	266	172	200	220	0	A	B5	11F
24F	MF24F-630	130	630	266	172	200	220	0	A	B5	11F
24F	MF24F-680	140	680	266	172	200	220	0	A	B5	11F
24F	MF24F-750	155	750	266	172	200	220	0	A	B5	11F
27	MF27-630	130	630	302	172	200	220	1	A	B1	10
27	MF27-670	140	670	302	172	200	220	1	A	B1	10
27	MF27-750	155	750	302	172	200	220	1	A	B1	10
27	MF27-840	190	840	302	172	200	220	1	A	B1	10
27R	MF27R-630	130	630	302	172	200	220	0	A	B1	11
27R	MF27R-670	140	670	302	172	200	220	0	A	B1	11
27R	MF27R-750	155	750	302	172	200	220	0	A	B1	11
27F	MF27F-630	130	630	311	172	200	220	0	A	B5	11F
27F	MF27F-670	140	670	311	172	200	220	0	A	B5	11F
27F	MF27F-750	155	750	311	172	200	220	0	A	B5	11F
27F	MF27F-810	180	810	311	172	200	220	0	A	B5	11F
27F	MF27F-840	190	840	311	172	200	220	0	A	B5	11F
30H	MF30H-900	182	830	325	172	200	220	1	A	B1	10
31	MF31-630	130	630	330	172	218	242	1	TOP	B0	18
31	MF31-700	150	700	330	172	218	242	1	TOP	B0	18
31	MF31-750	160	750	330	172	218	242	1	TOP	B0	18
31	MF31-800	170	800	330	172	218	242	1	TOP	B0	18
31	MF31-850	180	850	330	172	218	242	1	TOP	B0	18
31	MF31-1000	190	1000	330	172	218	242	1	TOP	B0	18
31S	MF31S-630	130	630	330	172	218	242	1	STUD	B0	18
31S	MF31S-700	150	700	330	172	218	242	1	STUD	B0	18
31S	MF31S-750	160	750	330	172	218	242	1	STUD	B0	18
31S	MF31S-800	170	800	330	172	218	242	1	STUD	B0	18
31S	MF31S-850	180	850	330	172	218	242	1	STUD	B0	18
31S	MF31S-1000	190	1000	330	172	218	242	1	STUD	B0	18
90	MF90-450	80	450	242	174	175	175	0	A	B13	24
90	MF90-500	90	500	242	174	175	175	0	A	B13	24
90	MF90-550	100	550	242	174	175	175	0	A	B13	24
47	MF47-500	90	500	242	174	190	190	0	A	B13	24
47	MF47-600	110	600	242	174	190	190	0	A	B13	24
91	MF91-580	100	580	277	174	175	175	0	A	B13	24
91	MF91-630	110	630	277	174	175	175	0	A	B13	24
91	MF91-690	130	690	277	174	175	175	0	A	B13	24
48	MF48-580	100	580	277	174	190	190	0	A	B13	24

SMF SPECIFICATIONS: FOR AMERICAN VEHICLES

Gr.No	Type No.	RC (Min)	CCA (SAE)	Dimension (mm)				Layout	Terminal	Hold-Down	BCI Assembly Figure No
				L	W	H	TH				
48	MF48-630	110	630	277	174	190	190	0	A	B13	24
48	MF48-690	130	690	277	174	190	190	0	A	B13	24
49	MF49-750	160	750	354	174	190	190	0	A	B13	24
49	MF49-850	180	850	354	174	190	190	0	A	B13	24
58	MF58-460	75	460	254	182	157	178	1	A	B8	26
58	MF58-500	90	500	254	182	157	178	1	A	B8	26
58	MF58-560	100	560	254	182	157	178	1	A	B8	26
58R	MF58R-460	75	460	254	182	157	178	0	A	B8	19
58R	MF58R-500	90	500	254	182	157	178	0	A	B8	19
58R	MF58R-560	100	560	254	182	157	178	0	A	B8	19
65	MF65-650	130	650	296	187	171	191	1	A	B8	10
65	MF65-750	140	750	296	187	171	191	1	A	B8	10
65R	MF65R-650	130	650	296	187	171	191	0	A	B8	11
65R	MF65R-750	140	750	296	187	171	191	0	A	B8	11
70	MF70-450	80	450	208	179	180	180	1	SIDE	B1	17
70	MF70-500	90	500	208	179	180	180	1	SIDE	B1	17
70	MF70-550	100	550	208	179	180	180	1	SIDE	B1	17
70DT	MF70DT-400	71	400	208	179	180	200	1	DT	B1	17
70DT	MF70DT-550	100	550	208	179	180	200	1	DT	B1	17
75	MF75-500	90	500	230	179	180	180	1	SIDE	B1	17
75	MF75-550	100	550	230	179	180	180	1	SIDE	B1	17
75	MF75-600	113	600	230	179	180	180	1	SIDE	B1	17
75	MF75-630	125	630	230	179	180	180	1	SIDE	B1	17
75	MF75-650	130	650	230	179	180	180	1	SIDE	B1	17
75DT	MF75DT-550	100	550	230	179	180	200	1	DT	B1	17
75DT	MF75DT-600	113	600	230	179	180	200	1	DT	B1	17
75DT	MF75DT-630	125	630	230	179	180	200	1	DT	B1	17
75DT	MF75DT-650	130	650	230	179	180	200	1	DT	B1	17
78	MF78-550	100	550	260	179	180	180	1	SIDE	B1	17
78	MF78-600	113	600	260	179	180	180	1	SIDE	B1	17
78	MF78-630	125	630	260	179	180	180	1	SIDE	B1	17
78	MF78-670	130	670	260	179	180	180	1	SIDE	B1	17
78	MF78-710	140	710	260	179	180	180	1	SIDE	B1	17
78	MF78-750	155	750	260	179	180	180	1	SIDE	B1	17
78DT	MF78DT-600	113	600	260	179	180	200	1	DT	B1	17
78DT	MF78DT-670	130	670	260	179	180	200	1	DT	B1	17
78DT	MF78DT-710	140	710	260	179	180	200	1	DT	B1	17
78DT	MF78DT-750	155	750	260	179	180	200	1	DT	B1	17
MINI	MF MINIFIT R	65	400	243	127	180	200	1	A	B6	
MINI	MF MINIFIT L	65	400	243	127	180	200	0	A	B6	

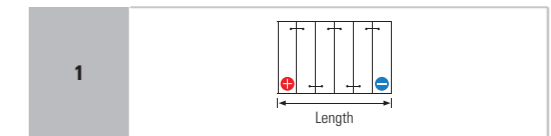
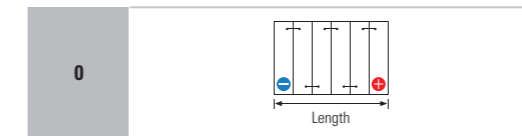
TECHNICAL INFORMATION

Layout, Terminals & Hold-down

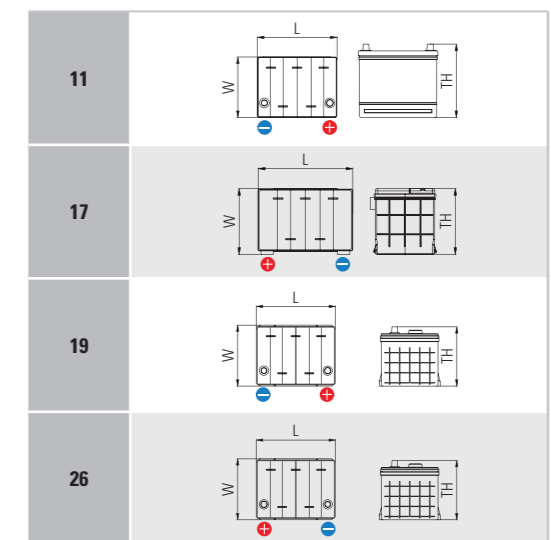
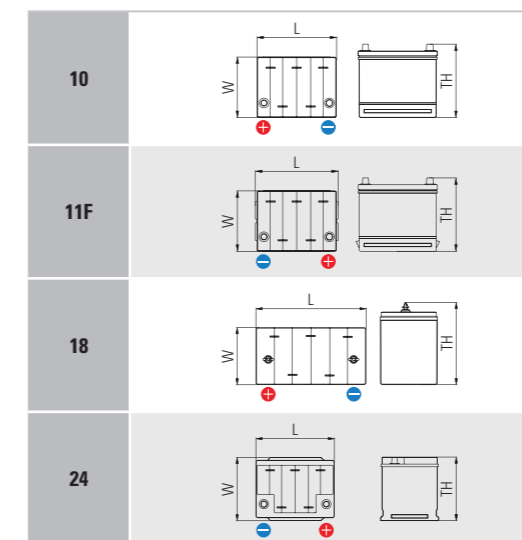
SMF SPECIFICATIONS: FOR AMERICAN VEHICLES

Gr.No	Type No.	RC (Min)	CCA (SAE)	Dimension (mm)				Layout	Terminal	Hold-Down	BCI Assembly Figure No
				L	W	H	TH				
22F	MF22F-450	75	450	240	172	180	205	0	DUAL FIT	B9	11F
22F	MF22F-500	90	500	240	172	180	205	0	DUAL FIT	B9	11F
22F	MF22F-550	95	550	240	172	180	205	0	DUAL FIT	B9	11F
94R	MF94R-680	140	680	315	174	190	190	0	A	B13	24
92	MF92-650	125	650	315	174	175	175	0	A	B13	24
93	MF93-800	140	800	354	174	175	175	0	A	B13	24

LAYOUT FOR JIS & DIN



LAYOUT FOR BCI



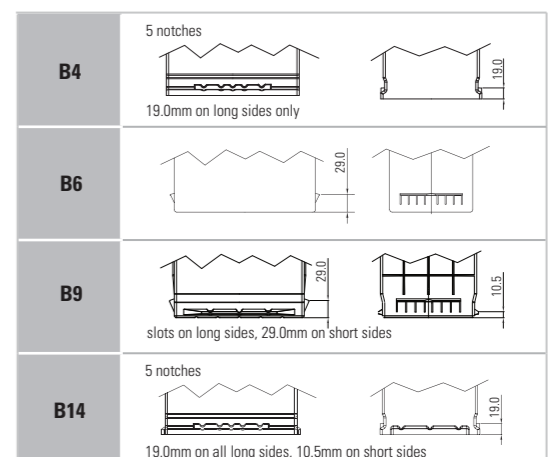
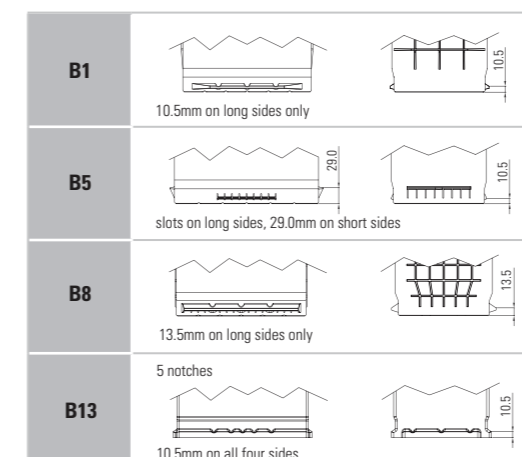
TERMINALS

* DT: Dual Terminal (Standard + Side)

Terminal	A (Standard)	B (Small)	Top Post	Dual Fit	4F	Stud	Side
Positive						 3/8"-16 Threads	
Negative						 3/8"-16 Threads	

HOLD-DOWN

* For B0 there is no Hold-Down



TECHNICAL INFORMATION

How to Handle Battery

PRECAUTION

If treated with care and taking the proper precautions, lead acid batteries can be handled safely with minimum risk. However, lead acid batteries contain sulfuric acid which is both poisonous and corrosive. This makes them potentially hazardous and it can cause serious injury when standard handling procedures and safety measures are not followed.

Safety

- Always wear acid resistant clothing, protective goggles, PVC gloves and rubber boots.
- Avoid smoking, sparks and flames near operating or charging lead acid batteries.
- Keep metal objects away from terminals.
- Batteries are heavy. Lift carefully and do not place on unstable surfaces.
- Keep away from children.

Emergency Action

- Splashes in eyes : Wash out eyes with plenty of water for at least 15 minutes.
- Splashes on skin : Remove contaminated clothing carefully and wash the affected skin areas with plenty of water.
- Swallowed : Drink copious amounts of milk of magnesia, water or milk. Do not induce vomiting.

Storage

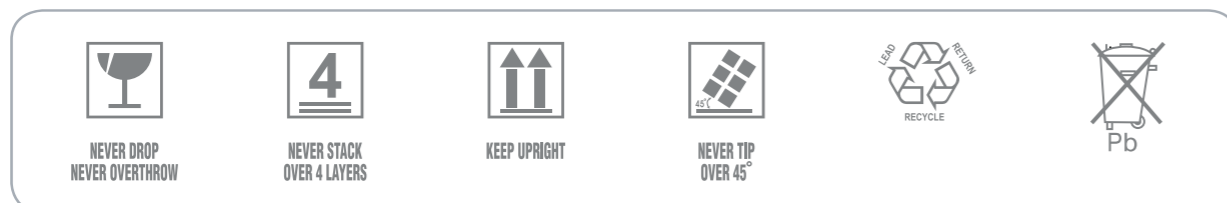
- Keep batteries upright.
- Batteries should not be directly exposed to the sun.
- Keep batteries clean and always store in a cool, dry place.
- Never stack over 4 layers.
- Never drop, never overthrow.
- In all cases, (First In, First Out) storage procedure should be applied.

Installation

- Check the vehicle's engine is turned off.
- Remove the negative terminal connection of the old battery.
- Remove the positive terminal connection, and then remove the hole-down bracket or clamp.
- Replace the old battery with the new battery and fix the new one in the tray.
- Prior to replacing the new one, inspect the tray for corrosion. Clean battery holder and battery terminals using a wire brush, if necessary.
- Connect the positive terminal first.
- Connect the negative terminal. The negative terminal should always be replaced last.

Disposal

- Batteries must NEVER be disposed of in household waste.
- Batteries are recyclable material.
- Do not throw away.



BATTERY TESTING PROCEDURES

A. Visual Check

- Check the Container, Cover and Terminals. Where physical damage is present, replace the battery.
- Check the Indicator (If the battery has the Indicator). Always look right down when viewing the Indicator and lightly tap the Indicator on the battery to dislodge any air bubbles.



TABLE 1. State of Charge

Approx. State of Charge	OCV
100%	12.75V
75%	12.40V
50%	12.20V
25%	12.00V
Discharged	11.90V

* For Reference Only

B. Voltage Check

- If OCV is below 12.4V, recharge the battery immediately.

C. Discharge Test (Load Test)

- Connect the battery tester to battery terminals.
- Measure the temperature of the battery around.
- Set the battery tester ampere values for ½ of the CCA rating.
- Apply the load for 15 seconds and then read the voltage.
- Compare measured values with values in TABLE 2.
- If the values are outside of the table values, recharge the battery and test again.
- If the battery fails the load test twice, replace it.
- Sometimes, electronic testers such as MIDTRONICS, SNAP-ON and etc are used instead of load tester.
- Electronic testers are only suitable for batteries that have been in use for a certain time.
- They cannot rate the performance of new or unused batteries.
- For this reason, ATLASBX recommends the test defined in global standards to confirm rated specifications.

TABLE 2. Load Test

Minimum Voltage	Temperature
9.6V	21°C & Above
9.4V	10°C
9.1V	-1°C
8.9V	-7°C
8.5V	-18°C

BATTERY CHARGE

If the battery is below 12.4V or fails to pass the load test, battery must be recharged as soon as possible to prevent lead sulfation. During charge, if the battery sprays electrolyte through the vent holes or gets hot (over 52°C), the charge must be stopped for a time to allow the battery to be cool down.

Constant Current Charge

General guidelines for constant-current-charge are given in TABLE 3. The table summarizes approximate amperes and hours in need of charge according to 20Hr-rate capacity and OCV.

Constant Voltage Charge

Another method is to charge a battery at a specified voltage(14.4-16V). When charging starts, a high rate current flows into the battery. As the battery is being charged, the current is reduced. Generally this method needs more time than the constant-current-charge, but overcharge risk is lower.

End of Charge

If a battery has been properly charged, voltage output across battery terminals on charge will be maintained for 2 hours.

TABLE 3. Constant Current Charge Condition

OCV	31-40AH	41-50AH	51-60AH	61-70AH	71-80AH	81-90AH	91-100AH	101-110AH
12.4-12.49V	4X3	5X3	6X3	7X3	8X3	9X3	10X3	11X3
12.3-12.39V	4X5	5X5	6X5	7X5	8X5	9X5	10X5	11X5
12.2-12.29V	4X7	5X7	6X7	7X7	8X7	9X7	10X7	11X7
12.1-12.19V	4X8	5X8	6X8	7X8	8X8	9X8	10X8	11X8
12.0-12.09V	4X10	5X10	6X10	7X10	8X10	9X10	10X10	11X10
Below 11.99V	4X13	5X13	6X13	7X13	8X13	9X13	10X13	11X13

* 4X3 means 4 ampere and 3 hours.



COMPANY INFORMATION

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The information provided in this brochure contains only general descriptions or performance characteristics, which do not always apply as described in the specific case or which may change as a result of further development of the product. This information is merely a technical description of the product. This information is not meant or intended to be a special guarantee for a particular quality or particular durability. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract. We reserve the right to make changes in availability as well as technical changes without prior notice.