



## automobile batteries



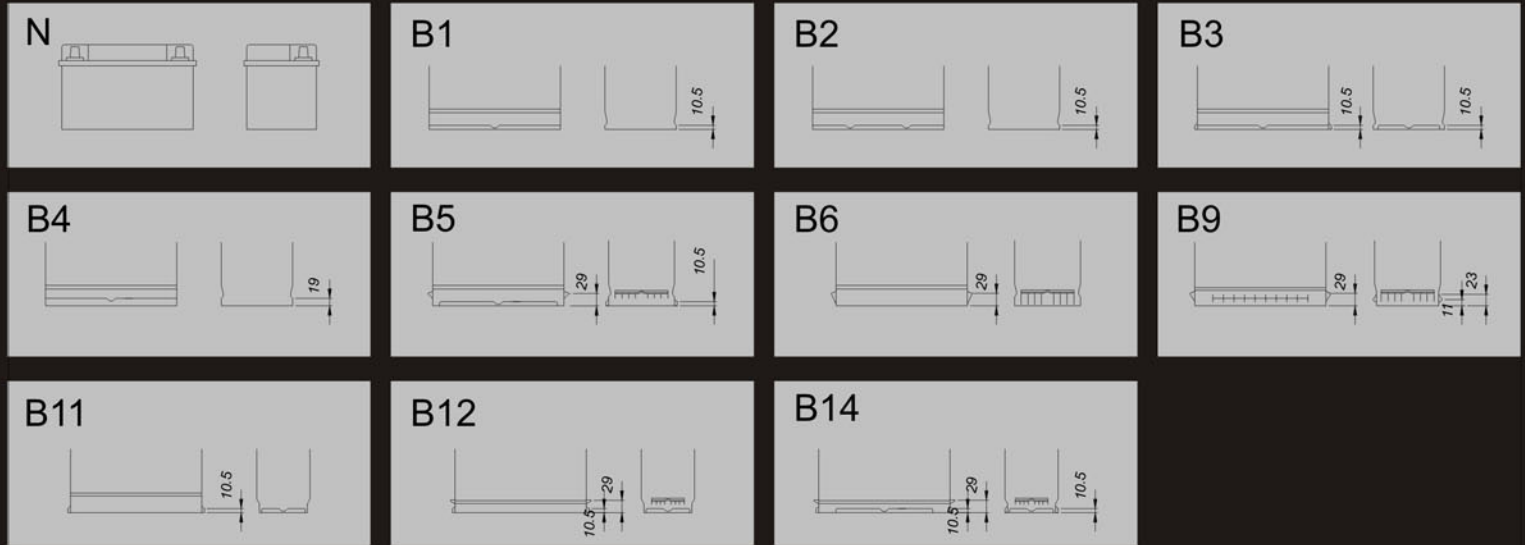
## maintenance-free

**Maintenance Free**  
Dual technology positive PbCa-PbCa negative.

**No leakage**  
With double sealed system for guarantee anti spill.



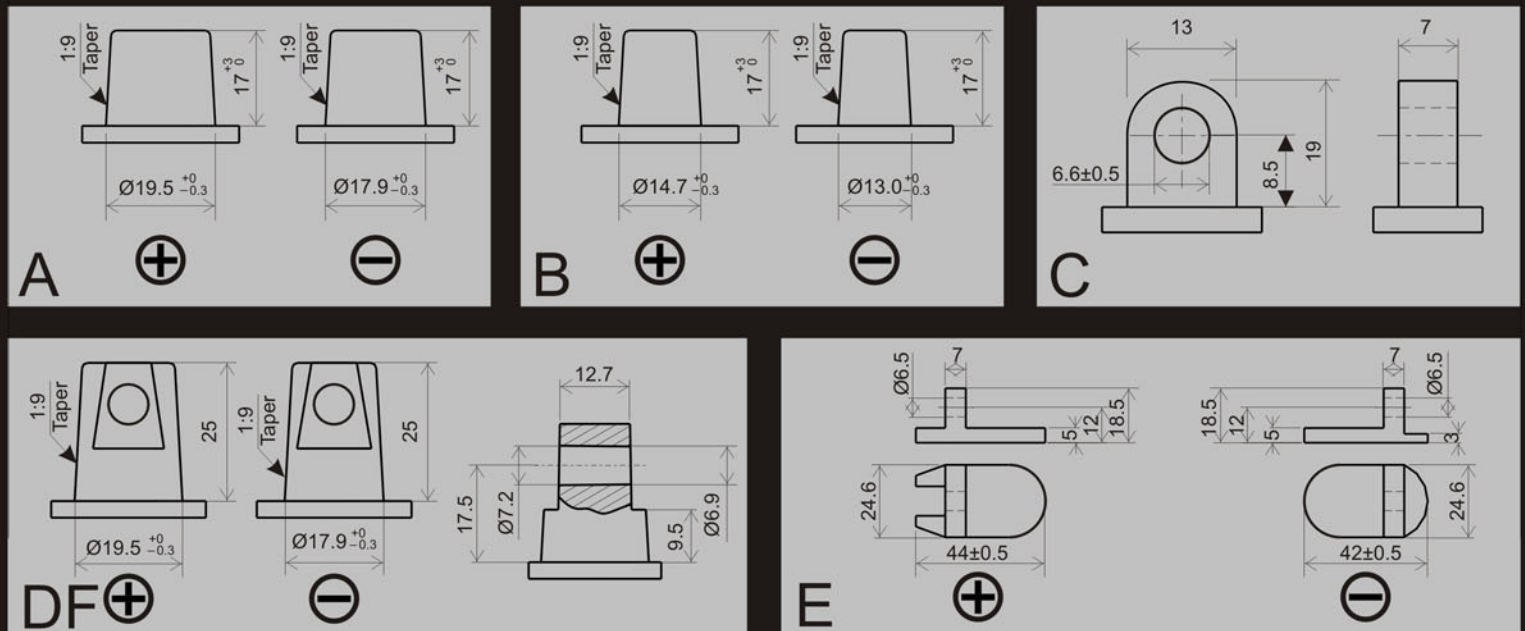
## BASE HOLD DOWN



## CELL LAYOUT



## TERMINALS DESIGN





# JIS SPECIFICATION

JIS GROUP NO.	OLD JIS NO.	CATALOGUE NO.	CAPACITY		RC	CCA (18°C)	DIMENSION (mm)				LAYOUT	TERMINAL
			20HR	5HR			Length	Width	Height	T.Height		
B20	NS40ZL	SMF38B20L	35	28	52	340	197	128	200	220	0	B
	NS40Z	SMF38B20R	35	28	52	340	197	128	200	220	1	B
	NS40ZLS	SMF38B20LS	35	28	52	340	197	128	200	220	0	A
	NS40ZS	SMF38B20RS	35	28	52	340	197	128	200	220	1	A
	-	SMF44B20L	45	36	71	410	197	128	200	220	0	B
	-	SMF44B20R	45	36	71	410	197	128	200	220	1	B
	-	SMF44B20LS	45	36	71	410	197	128	200	220	0	A
	-	SMF44B20RS	45	36	71	410	197	128	200	220	1	A
C24	N40L	SMF32C24L	40	32	52	340	234	128	200	220	0	A
	N40	SMF32C24R	40	32	52	340	234	128	200	220	1	A
B24	NS60L	SMF55B24L	45	36	71	410	234	128	200	220	0	B
	NS60	SMF55B24R	45	36	71	410	234	128	200	220	1	B
	NS60LS	SMF55B24LS	45	36	71	410	234	128	200	220	0	A
	NS60S	SMF55B24RS	45	36	71	410	234	128	200	220	1	A
	-	SMF60B24L	54	43	88	475	234	128	200	220	0	B
	-	SMF60B24R	54	43	88	475	234	128	200	220	1	B
	-	SMF60B24LS	54	43	88	475	234	128	200	220	0	A
	-	SMF60B24RS	54	43	88	475	234	128	200	220	1	A
D26	N50L	SMF48D26L	50	40	80	430	257	172	200	220	0	A
	N50	SMF48D26R	50	40	80	430	257	172	200	220	1	A
	N50ZL	SMF55D26L	60	48	100	525	257	172	200	220	0	A
	N50Z	SMF55D26R	60	48	100	525	257	172	200	220	1	A
	NS70L	SMF75D26L	65	52	113	550	257	172	200	220	0	A
	NS70	SMF75D26R	65	52	113	550	257	172	200	220	1	A
	NX110-5L	SMF80D26L	70	56	120	570	257	172	200	220	0	A
	NX110-5	SMF80D26R	70	56	120	570	257	172	200	220	1	A
	-	SMF90D26L	75	60	130	610	257	172	200	220	0	A
	-	SMF90D26R	75	60	130	610	257	172	200	220	1	A
D31	N70L	SMF65D31L	70	56	120	550	302	172	200	220	0	A
	N70	SMF65D31R	70	56	120	550	302	172	200	220	1	A
	N70ZL	SMF75D31L	75	60	130	610	302	172	200	220	0	A
	N70Z	SMF75D31R	75	60	130	610	302	172	200	220	1	A
	NX120-7L	SMF95D31L	80	64	140	630	302	172	200	220	0	A
	NX120-7	SMF95D31R	80	64	140	630	302	172	200	220	1	A
	-	SMF105D31L	90	72	155	670	302	172	200	220	0	A
	-	SMF105D31R	90	72	155	670	302	172	200	220	1	A

# DIN SPECIFICATION

DIN GROUP NO.	CATALOGUE NO.	CAPACITY 20HR	RC	CCA (18°C)			DIMENSION (mm)				LAYOUT	TERMINAL	HOLD DOWN
				SAE	DIN	EN	Length	Width	Height	T.Height			
	SMF53520	35	52	340	175	240	197	128	200	220	0	B	-
	SMF53522	35	52	340	175	240	197	128	200	220	1	B	-
	SMF53521	35	52	340	175	240	197	128	200	220	0	A	-
	SMF54523	45	71	410	220	300	234	128	200	220	0	A	-
	SMF54524	45	71	410	220	300	234	128	200	220	1	A	-
	SMF54551	45	71	410	220	300	234	128	200	220	1	B	-
	SMF54584	45	71	410	220	300	234	128	200	220	0	B	-
	SMF55046	50	80	430	265	360	242	174	175	175	0	A	B3
	SMF55457	54	88	470	265	450	242	174	175	175	0	A	B3
	SMF55427	54	88	470	265	450	242	174	175	175	0	4F	B3
L2	SMF55530 / SMF55559	55	90	475	255	420	242	174	190	190	0	A	B3
	SMF55565	55	90	475	255	420	242	174	190	190	1	A	B3
	SMF55531	55	90	475	255	420	242	174	190	190	0	4F	B3
	SMF536219	62	100	525	280	450	242	174	190	190	0	A	B3
LB3	SMF56828	68	113	550	320	510	277	174	175	175	0	A	B3
	SMF56818	68	113	550	320	510	277	174	175	175	0	4F	B3
L3	SMF56618 / SMF56638	66	113	540	300	510	277	174	190	190	0	A	B3
	SMF56633	66	113	540	300	510	277	174	190	190	1	A	B3
	SMF56619	66	113	540	300	510	277	174	190	190	0	4F	B3
	SMF57219	72	130	640	380	640	277	174	190	190	1	A	B3
	SMF57220	72	130	640	380	640	277	174	190	190	0	A	B3
	SMF56068	60	100	525	250	450	230	172	200	220	0	A	-
	SMF56069	60	100	525	250	450	230	172	200	220	1	A	-
	SMF56048	60	100	525	250	450	266	172	200	220	0	A	B9
	SMF56049	60	100	525	250	450	266	172	200	220	1	A	B9
	SMF57024	70	113	535	310	510	266	172	200	220	1	A	B9
	SMF57029	70	113	535	310	510	266	172	200	220	0	A	B9
	SMF57512	75	130	610	330	540	302	172	200	220	0	A	-
	SMF57513	75	130	610	330	540	302	172	200	220	1	A	-
	SMF58513	85	140	650	360	600	302	172	200	220	0	A	-
	SMF58514	85	140	650	360	600	302	172	200	220	1	A	-
	SMF59518	95	155	675	395	640	302	172	200	220	0	A	B1
	SMF59519	95	155	675	395	640	302	172	200	220	1	A	B1
LB5	SMF58515	85	140	760	450	720	354	174	175	175	0	A	B3
L5	SMF58815 / SMF58827	88	155	675	395	640	354	174	190	190	0	A	B3
	SMF58821	88	155	675	395	640	354	174	190	190	1	A	B3
	SMF59218	92	155	675	395	640	354	174	190	190	0	A	B3
	SMF60038	100	180	760	450	720	354	174	190	190	0	A	B3



# BATTERY APPLICATIONS

	SMF TYPE	STANDARD		SMF TYPE	STANDARD
<b>TOYOTA</b>			<b>MAZDA</b>		
Hi-Ace Diesel, Land Cruiser/HT, Fork lift	SMF65D31R	N70	323 Series, Interplay, Lantis	SMF55B24LS	NS60LS
Land Cruiser VX/VR Turbo	SMF75D31L	N70ZL	Familia, Bongo E-2000	SMF55B24LS	NS60LS
New Kijang Standard, Soluna, Vios, Corola Altis, Previa	SMF55B24RS	NS60S	MR90, VanTrend	SMF42B20R	NS40Z
Camry, Camry 2.4	SMF70D23L	65D23L	Capella 626, 323	SMF42B20L	NS40ZL
Kijang KF 20, KF 50, STD, Starlet 1000/1300, Corola Mark II, Avanza	SMF42B20R	NS40Z	Capella 626, Cronos 2.0, Astina, Interplay (taxi), 323 Familia	SMF55D26L	N50ZL
Corola DX/GL/SE, Corola Twin Cam, Hi-Ace	SMF42B20L	NS40ZL	Capella 626 (new)	SMF55D24L	NS60L
Kijang, Corona	SMF55B24R	NS60	E 2000 (Diesel), T 4000	SMF80D26R	NS70
New Kijang Grand (Gasoline)/ Krista (LGX1,8/2.0), Land Cruiser (Bensin)	SMF55D26R	N50Z	<b>NISSAN</b>		
Kijang Grand Extra, Crown, Cressida	SMF55D26L	N50ZL	Sentra SGX, Genesis, Supreme GS, Coupe, Sunny	SMF55B24LS	NS60LS
New Kijang Diesel (LGX-D), Lexus, New Harrier, Alphard, Voxy	SMF80D26R	NS70	Terrano, Serena, Laurel, TV Set, X-Trail	SMF48B26L	N50
Fork Lift, RAV4 Cruiser	SMF75D31R	N70Z	X-Trail	SMF70D23L	65D23L
Kijang KF-40, KF-50std, New Starlet 1600, Corona Twin Cam Absolute	SMF42B20L	NS40ZL	Sentra, Coupe, Genesis, New Sunny	SMF42B20L	NS40ZL
Land Cruiser	SMF95D31R	NX120-7	Cfiro, Patrol	SMF55D26R	N50Z
<b>HONDA</b>			Sunny, Infinity	SMF55D26L	N50ZL
Civic (Old 1500, Excelent, Wonder, Grand, Genio, Ferio, Nouva, Estilo)	SMF55B24RS	NS60S	Sentra, Coupe, Genesis, Sunny 1300/1600, Sena	SMF55B24L	NS60L
Accord (Elegant, Executive, Prestige, Maric Cielo), CRV (Old), Stream	SMF55B24RS	NS60S	TruckCK/CDA/CWA	SMF65D31R	N70
City 1300, City Z, New City, Fit (1.3/1.5)	SMF42B20L	NS40ZL	Truck CK/CDA/CWA, Terano (Diesel), Cendic	SMF75D31R	N70Z
Accord Maestro, Cielo SV 4AT	SMF55D26L	N50ZL	Fork Lift	SMF75D31L	N70ZL
Odyssey (2.3/3.0)	SMF80D26R	NS70	<b>FORD</b>		
CRV (New), Accord	SMF55B24LS	NS60LS	Laser 1300 (Taxi)	SMF48D26R	N50
<b>MITSUBISHI</b>			Laser Sonic, Gala < Champ	SMF55559L	55559L
T-120SS, Jet Star, Mini Bus L300 Bsn, Pick Up L300, Lancer	SMF42B20R	NS40Z	Telstar, laser	SMF42B20L	NS40ZL
Gallant 1600 GL/GLS, 2000 GLX/Touring	SMF42B20R	NS40Z	Escape 2.0	SMF55B26R	NS60
Kuda Gasoline, Gallant V6/VR, Eterna SOHC/DOHC, Lancer	SMF55B24RS	NS60S	Gala, Laser CT 1.8, Telstar TX-5, Challenger / Brilliant	SMF55F26L	N50ZL
Galant Old, Galant II, Eterna SOHC/DOHC	SMF48D26R	N50	Laser 1600, 1800	SMF55B24L	NS60L
Cold Diesel, Pajero, Fuso, Truck FE, FM, FN, Bus RM/BM/Old, Chariot	SMF55D26R	N50Z	<b>MERCEDES BENZ</b>		
Pajero Jeep V6, L300 Diesel, Kuda Diesel	SMF65D31R	N70	240 (Diesel/280)	SMF65D31R	N70
L300 Diesel, Kuda Diesel	SMF75D31R	N70Z	(200, 230, 280), Mercy Jeep Boxer (Korea), A-Series	SMF58024L	58024L
<b>SUZUKI</b>			240 (Diesel/280)	SMF75D31R	N70Z
Jimny, Katana, Super Carry ST-100, Forsa, Futura 1.3/1.6, Vitara, Escudo	SMF42B20R	NS40Z	Diesel 24 SD, S-Series, C-Series, E-Series	SMF60038L	60038L
Side Kick, Esteem, Amenity	SMF42B20R	NS40Z	New Truck MB-8000	SMF75D31L	N70ZL
Escudo 2.0	SMF70D23R	65D23R	<b>TIMOR</b>		
Karimun, Baleno	SMF42B20L	NS40ZL	515 / 515 i	SMF55B24RS	NS60S
<b>ISUZU</b>			<b>HINO</b>		
Truck TXD, TLD	SMF42B20L	NS40ZL	Truck EF Series, S6 Series, FM	SMF55D26R	N50Z
Truck Elf NKR58, Chevrolet (Luv Diesel), Bison	SMF55D26R	N50Z	FF / FL 172 NA / Ranger	SMF80D26R	NS70
Truck TXD/TLD	SMF55B24L	NS60L	<b>PERKASA</b>		
Chevrolet Trooper, Panther, Elf NKR 66, F series, KAD 51, Elf	SMF80D26R	NS70	Truck Series	SMF55D26R	N50Z
Truck JCR	SMF65D31R	N70	<b>RENAULT</b>		
Truck Etc, NHR 55, Farm Tracktor	SMF75D31R	N70Z	Scenic, Clio, Kangoi	SMF55559L	55559L
<b>DAIHATSU</b>			R21, R18	SMF55559L	55559L
Hi-Jet 1000, Zebra 1000/1300, Espass, Feroza, Taruna,	SMF42B20R	NS40Z	R12TL, Nr18New	SMF42B20L	NS40ZL
Charade Series, Xenia			<b>DAEWOO</b>		
Classy, Charmant, Jeep RV-10V (bensin), Feroza Std, Ceria	SMF42B20L	N40ZL	Matis	SMF42B20L	NS40ZL
<b>BMW</b>			Nexia, Espero	SMF55559L	55559L
318 i	SMF55559L	55559L			
Series (318, 320, 323, 325, 330) New, (520, 525, 528, 530) New, X5	SMF58024L	58024L			

# BATTERY APPLICATIONS

	SMF TYPE	STANDARD		SMF TYPE	STANDARD
<b>PEUGEOT</b>					
504 /505	SMF48D26R	N50			
604	SMF55D26L	N50ZL			
Peugeot Series P605, 405 Nem, 306, 307, 406, 206, Partner	SMF55559L	55559L			
<b>VW</b>					
Combi, Safari, Golf	SMF42B20R	NS40Z			
Caravelle	SMF58024L	58024L			
Polo	SMF55559L	55559L			
Beetle 1202, 1303	SMF48D26R	N50			
<b>OPEL</b>					
Kadet 1200 cc, Montera, Optima, Vectra	SMF55559I	55559L			
Blazer	SMF55D26R	N50Z			
<b>VOLVO</b>					
244 / 246	SMF55D26R	N50Z			
740, 960, 240, 340, 850	SMF58024L	58024L			
V70XC, S40, S80	SMF55559L	55559L			
<b>CITROEN</b>					
GS 1220	SMF42B20R	NS40Z			
CX	SMF55559L	55559L			
<b>FIAT</b>					
Fiat 1300, UNO 1300 / 1400	SMF55559L	55559L			
<b>AUDI</b>					
A3, A4	SMF58024L	58024L			
A6	SMF60038L	60038L			
<b>HOLDEN</b>					
Holden	SMF42B20R	NS40Z			
Gemini Diesel	SMF75D31R	N70Z			
<b>JEEP /CHRYSLER</b>					
CJ 7 Bensin	SMF55D26R	N50Z			
Cherokee Limited, Grand Cherokee	SMF56221R	56221R			
CJ 7 Diesel	SMF75D31R	N70Z			
Neo	SMF55565R	55565R			
<b>CHEVROLET</b>					
Zafira GL / CD	SMF58024L	58024L			
Travera, Spark	SMF42B20R	NS40Z			
Aveo	SMF55559L	55559L			
<b>HYUNDAI</b>					
Atoz	SMF42B20L	MF40ENL			
Elantra, Nenggala, Bimantara	SMF55B26R	N50Z/65D23R			
Accent, Cakra, Verna, X6, Sonata, Coupe 200 cc	SMF55543R	55543L			
Getz	SMF55559L	55559L			
Coupe	SMF55565R	55565R			
Grace, Grandeur	SMF75D31R	N70Z			
			<b>KIA</b>		
			Visto	SMF42B20L	NS40ZL
			Spoutage, Shuma, Carens, Carens II	SMF56221R	56221R
			Carnival (Bensin), Sedona (Bensin)	SMF80D26L	NS70L
			Carnival (Diesel), Sedona (Diesel)	SMF90D31L	NX120-7L
			Rio	SMF55559L	65D23L
			<b>SANGYONG</b>		
			Musso (G), Rexton	SMF95D31R	NX120-7
			Musso (D)	SMF95D31L	NX120-7L
			Chairman	SMF60038L	60038L

## BATTERY TESTING

### STEP 1. VISUAL INSPECTION

Check for obvious damage such as cracked or broken case that shows loss of electrolyte, terminal damage. If obvious physical damage is noted, replace battery.

### STEP 2. VOLTAGE CHECK

State-of-charge (SOC) can be determined by measuring the open-circuit-voltage (OCV) of the battery with a voltmeter. If OCV is below 12.4V, recharge the battery, first.

### STEP 3. LOAD TEST

1. Connect a voltmeter and the load tester across the battery terminals. Side terminal batteries may require test adapters. Never use a bolt for testing purposes. Batteries with threaded stud terminal, attach clamp between lead pad and bottom of terminal hex nut.
2. Start load test with setting amperes. Setting value is usually  $\frac{1}{2}$  of the CCA rating. For instance, a 500CCA battery would load test at 250 Amps for 15 seconds. At the end of the 15 seconds, with the load still applied, read the voltage. During the load test, the voltage on a good battery will not drop below the table's indicated voltage at the shown temperature.
3. If voltage at 15 seconds is higher than value indicated table 2, return the battery to service.

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

Table 1. STATE OF CHARGE

Approximate State of Charge	OCV
100%	12.78
75%	12.54
50%	12.30
25%	12.12
Discharged	11.94

For reference only

## BATTERY CHARGING

If the battery is below 12.4V or not to be passed the load test, battery must be recharge as soon as possible to prevent lead sulfation. During charging, if the battery sprays electrolyte through the vent holes or gets hot (Over 52°C), the charging must be slowed or stopped for a time to allow the battery to cool.

### CONSTANT CURRENT CHARGING

General guide lines for constant-current-charging are given Table 3.

The table summarizes approximate amperes and hours need for charging according to 20HR-rate capacity and OCV.

### CONSTANT VOLTAGE CHARGING

It is another method to charge at the specified voltage (14.4 ~ 16V). At the beginning of charge, a high rate current flows into the battery and as battery is charged, the current is getting reduced. Generally this method needs longer time to recharge the battery than the constant-current-charging, but overcharge risk is less.

### END OF CHARGE

If a battery has been properly charged, voltage output across battery terminal on charging can be maintained at constant level for 2 hours.

Table 3. CONSTANT CURRENT CHARGING CONDITION

OCV	31-40 Ah	41-50 Ah	51-60 Ah	61-70 Ah	71-80 Ah	81-90 Ah	91-100 Ah
12.4 - 12.49	4x3	5x3	6x3	7x3	8x3	9x3	10x3
12.3 - 12.39	4x5	5x5	6x5	7x5	8x5	9x5	10x5
12.2 - 12.29	4x7	5x7	6x7	7x7	8x7	9x7	10x7
12.1 - 12.19	4x8	5x8	6x8	7x8	8x8	9x8	10x8
12.0 - 12.09	4x10	5x10	6x10	7x10	8x10	9x10	10x10
Below 11.9	4x13	5x13	6x13	7x13	8x13	9x13	10x13

- 4x3 mean 4 ampere and 3 hours -

## PRECAUTION & EMERGENCY ACTION

Lead acid batteries contain hydrogen gases that is very explosive and sulfuric acid that can cause severe burns. To avoid danger and injury, observe the following precaution when handling or working with batteries

### PRECAUTIONS

- Wear a face shield or safety goggles.
- Wear plastic gloves to prevent acid burns. An apron will protect your clothes.
- Absolutely no smoking, no sparks, no flames around the batteries.
- Keep out of the reach of children.

### EMERGENCY ACTION

- For acid in eyes, flush for several minutes with water and seek immediate medical attention
- For sulfuric acid is splashed on the skin, flush with water immediately.
- If acid is swallowed, drink large quantities of milk or water. Do not induce vomiting.
- Call a poison control center or doctor immediately.

## BATTERY STORAGE

### KEEP UPRIGHT

Although the batteries have sealed cover, it is possible for electrolyte to escape through the vent holes if the batteries are turned on their sides or top

### STORE IN A COOL PLACE

A wet battery is alive. The higher the storage temperature, the higher the self-discharge rate

### UTILIZE FIRST-IN / FIRST-OUT INVENTORY SYSTEM

Date codes on the cover should be observed so that sales and shipment can be made on a first-in/first-out inventory basis. It is not necessary to recharge a battery, if stock rotation is well controlled (three turns or more a year).

## BATTERY FITTING

1. Switch off the engine and keep sparks, flames, cigarettes away from battery at all times, before removing the old battery.
2. Disconnect the negative terminal, first and avoid short-circuit caused by tools, when removing old battery.
3. Clean corroded parts in tray and cable clamps, before installation of new battery.
4. connect the positive terminal, first and check the terminal clamps for tight fit, when installing new battery.

## DISPOSAL

Never dispose of old batteries as domestic waste.



NEVER DROP  
NEVER OVERTHROW



NEVER STACK  
OVER 4 LAYERS



KEEP UPRIGHT



NEVER TIP  
OVER 45°



RECYCLE



Pb



**Office / Factory**

JL. Raya Narogong Km 26 Cileungsi Bogor 16820 Indonesia  
Tel. : (62-21) 823 0968 Fax. : (62-21) 823 0935, 823 0936 P.O. BOX 4011, Jakarta 11040  
[www.nipress.com](http://www.nipress.com)