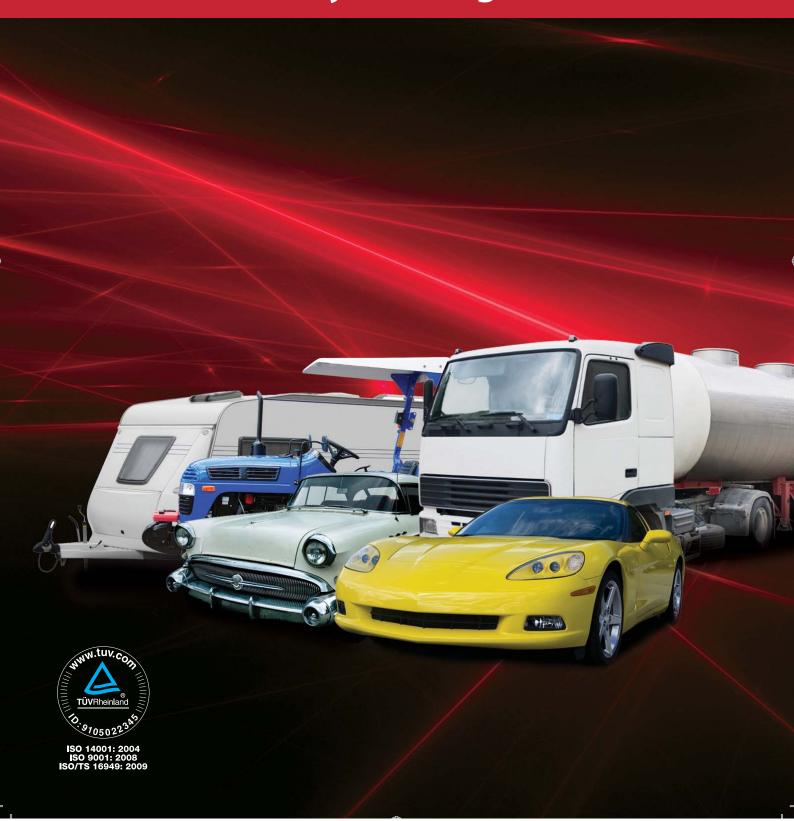


# **Battery Catalogue 2011/2012**





CONTENTS	Page
Passenger Vehicles	1
SUV, 4X4 and Light Delivery Vehicles	10
Commercial Vehicles	16
Forktrucks	19
Battery Specifications	20
Battery diagrams	22
Twin Battery Setups	32
5 Point Testing Plan	33
Warranties	34
Diagnostic Chart	36
Jump-starting, Storage, Charging and Fitting	37
AGM Technology	38
Back to "Battery Basics"	39
Process Flow - Secondary Smelting	41

#### **IMPORTED VEHICLES**

The battery selection information for imported vehicles is incorporated into the main selection listings for each make of vehicle.

Please be aware that the selection and fitment information in this guide may not be complete, due to the arrival of new models on the South African market. Many imported vehicles take the same battery as the equivalent locally assembled vehicle but if you have any doubts, please contact First National Battery Toll Free 0800 112 600.

#### PERFORMANCE RATINGS

Performance ratings as shown are calculated from batteries which are tested according to IEC 60095 – 1: 2006. Actual battery performance may vary under different operating conditions.

#### **DISCLAIMER**

The contents of this guide, and particularly the battery data, are offered only for information. The information contained is based on data considered accurate; however, there are no warranties either expressed or implied for which First National Battery assumes legal responsibility. Since First National Battery cannot anticipate or control the conditions under which this information may be used, each user should review the information in the specific context of the intended use

Batteries recommended in this guide are based on the latest information available, but due to possible battery compartment variations we advise that you check bonnet clearances and hold down heights before fitting the battery.

Specifications shown are subject to change without notice.

#### IMPORTANT SAFETY INFORMATION

- Lead acid batteries generate explosive gases. Keep sparks, flames and lighted cigarettes away from the battery.
- When charging or using the battery in an enclosed space, provide plenty of ventilation.
- Lead acid batteries contain sulphuric acid as an electrolyte. If acid contacts eyes, skin or clothing, flush immediately with large quantities of clean water.

In the event of acid contacting the eyes, immediately flush eyes with cool water for at least 15 minutes then consult a doctor immediately.

Lead acid batteries are by nature very heavy. When lifting, don't use your back like a crane; let your legs do the work by bending your knees. If lifting or manoeuvring a large commercial or marine battery First National Battery recommends a two person approach to the job.



## **DANGER / POISON**

KEEP OUT OF REACH OF CHILDREN.
DO NOT TIP. KEEP VENT CAPS TIGHT AND LEVEL.





Observe the instructions or consult a battery specialist.



When working on batteries, wear safety glasses and protective clothing.



No smoking. Do not allow naked flames, hot objects or sparks near battery due to risk of explosion or fire.



Flush splashes of acid out of the eyes or off the skin with copious amounts of clean water, then seek a doctor without delay. Clothing contaminated by acid should be washed out in water.



Risk of explosion or fire - avoid short circuits.



Electrolyte is highly corrosive.



Recycle scrap batteries.



Pb



MODEL	YEAR	BATTERY	MODEL	YEAR	BATTERY
ALFA ROMEO			AUDI		
Alfa 33, 33 Ti	83-85	639	A1	11>	•
Alfa 6	81-83	639	A3 Turbo, FSI & TDi	95-06	646
Alfetta	64-67	628	A3	07>	652
Alfetta 1591	81-85	639	A4	95-08	
Alfetta Export	81-83	628	A4	09>	668P
Alfetta Sedan	81-83	611	A4 Attraction	08>	668AGM
Brera	08>	646	A5	08-09	
GT Q2	08>	646	A5	10>	658
GTV 3.2 AC PS	04>	646	A6	07>	652
Guilietta	83-85	638	A6 2.8 FSI	08>	•
Guilietta 1.8	79-85	622	A8 Quattro 4.2 Tiptronic	05>	658
Guilietta 2000 Ti	82-83	622	A8 4.2 Quattro Tiptronic AC PS		
Guilietta Gold/Silver	83-85	646	R4 Avant	0700	. 052
Guilietta models	78-83	646	R8 4.2 FSI Quattro	08>	
Guilietta Start / Stop	11>	652AGM	R8 4.2 FSI Quattro R Tronic	08>	
Mito	10>	646	RS4	06>	652
Mito Start / Stop	11>	652AGM	RS6 Quattro & Avant	00>	652
Spider 2.0	05>	651	RS6 Quattro & Avant	05>	658
Spider 2.0 TS AC PS	03>	646	RS6 5.0T Triptonic	05>	668
Spider 3.2 AC PS	04>	646	S3	09>	
-	04>	651	S3	07-00	646
Spider 3.2 V6		611	S4 Quattro & Avant		
Sprint	81-83			04>	646
Sprint MK3	83-85 80-85	639 628	S5 SB 3.0T FSI S-Tronic	10> 08>	668P 652
Veloce 1.5			S5 Quattro		
1.6 T Spark	02>	641	S6 4.2 V8 Quattro Tiptronic	05-06	658
145 Quad 2.0L Twin II	95>	628	S6 Quattro Tiptronic	07>	
146 Sport 155, 155 V6 GTV	95>	647	S8 Quattro Tiptronic	07>	•
147	05>	628	TT Court Court at C	01-04	
147GTA	03>	652	TT Coupé Quattro 1.8	05-06	658
147 T Spark 1.6	01>	647	TT Roadster	07>	050
155	93>	628	TTS	09>	652
156	98>	652	Q7 3.6 Quattro Tiptronic	07>	•
159 all models /GTA	05>	651	3.0 TDI Quattro Tiptronic	<80	668P
159 2.4 JTDM Q Tronic	07>	663	3.2 FSi Multitronic	05>	652
159 3.2 V6 Q4	06>	646	100	82-83	
164 Quad	93>	647	100, 200 and 500	81-82	647
164 TS Super 3.0 V6	93>	643			
166 V6 3.0 Sporttronic, GTV	00>	658	BENTLEY		
2,5 GTV 6	81-83	638	All models	05>	639
2,5 GTV 6, Alfa 6	82-83	647	Turbo	67>	657
2000 GTV, Export models	81-83	622			
3,0 GTV 6	84-87	646	BMW		
3.2 GTV V6	05>	646			
33 all models	93>	628	THE FV RANGE OF BATTERIES AUHORISED BMW DEALERS.	IS ONLY A	VAILABLE FROM
ASIA		_			
Rocsta Diesel	96>	652	All models	<91	622
Rocsta Petrol	96>	639	BMW "Mini"	02>	646
			M3 Convertible	03>	652
ASTON MARTIN			M3 all models	03-04	668D
All models		656	M3 all models except Convertib		•
			M5	01>	658



MODEL	YEAR	BATTERY	MODEL	YEAR	BATTERY
M5 & M6 all models	04>		535	90>	654
X3	04>	•	540	01>	658
Z3 Roadster all models	97>	658	545i & Steptronic - AC PS	04>	668D
Z4 all models - AC PS	03-04	668D	6 Series	07>	•
Z4 all models	04>	•	6 Series E63/E64	06>	658AGM
I16i	07>	•	635 CSI	80>	652
130i	07>	•	7 Series all models	74-02	658
I Series	07>		7 Series E32	74-98	663DS
3 Series	07>	•	7 Series E38	98-02	663DS
3 Series (E36)	91>	651	7 Series E65/E66	04-06	658AGM
3 Series E90	07>		730d AT AC PS	03-04	652
3 Series TDI Roadster (diesel)	96>	654	730 D & 735i	07>	•
3 Series innovations	07>		735i AT AC PS	04-06	652
316	99>	651/652	745i	07>	•
316	83-91	628	750Li	07>	•
316i	83-91	651/652	760Li AT AC PS	03-04	668D
318 (BU87)	83-91	651/652	760i	07>	•
B18 (E30)	83-91	628	8 Series (E31)	91>	651x2
B18 4 cyl (E46)	99>	651/652			
318i Touring SW & AT - AC PS	04>	652	CHANA		
318i (E46)	99>	657	Benni	08>	631/636
318i all models	07>	•	25	002	0017000
320, 323, 325, 333	83-91	651	CHERY		
320d & 320i AT - AC PS	06>	668D	J1	09>	615C
320d all models	07>	•	J5 2.0 TX AT	09>	638
320i, 323i (BU86)	83-91	652	QQ3 0.8 TX AC	09>	630
320i, 325i (BU87)	83-91	652	Tiggo 1.6 TXE AT	09>	638
320i Coupe	07>	032	Tiggo 1.0 TAL AT	09/	030
323, 328 6 cylinder	99>	652	CHEVROLET		
325; 326 6 cyllidei 325i & 325Ci coupé AT - AC PS		668D	Aveo	04>	622
325i & 3250i Coupe Ai - AC PS 325i Touring SW & AT - AC PS	04>	668D	Aveo Auto 1.5 All models	04>	SMF65
		000D			SIVIFOS
325i Coupe M Sport	07>		Corvette C4/C5	95>	04005
325ti Compact AC PS	04>	652DS	Cruze	09>	646CE
25ti Compact AT AC PS	04>	668P	Lumina all models - AC PS	04>	639
325 TDS Diesel	91>	654	Optra all models	04-05	622
330Ci convertible & AT - AC PS		668D	Rekord, Commodore	78-80	621/622
330d & AT - AC PS	04>	668D	Rekord Berlina	80>	621
330i & AT - AC PS	04>	668D	Spark	04-08	615C
330i Convertible	07>	•	Spark	09>	616CS
35i	07>	•	Vivant all models	04-05	638
Series all models	74-89	652	OUDVO: 55		
Series (E28)	82-89	652	CHRYSLER	• -	
Series (E34)	90>	651	300 SRT	06>	657
Series (E60)	04>	663DS	Crossfire all models	04-05	651
Series (F10) Sedan	10>	668	Neon all models	97-05	619
518	81-83	646	PT Cruiser all models	00>	646
520	81-83	646	Sebring 2.4, 2.7	07>	646
520d	07>	•			
525i	01>	658	CITROËN		
530D	01>	658	Berlingo all models	04-05	628CE
530i	01>	658	C1	06>	619
530i, 530d & Steptronic - AC PS	6 04>	668D	C1	10> 6	28CE/612CE
535	80-89	652	C2 all models	05>	619/628CE



MODEL	YEAR	BATTERY	MODEL	YEAR	BATTERY
C2 1.4i VTR AC PS	04>	628CE	Mondial, 400	80-86	646
C2 1.4i Play	<80	619/612CE	308	80-88	652
C3 all models	01>	619/628CE	360	04>	652
C4 all models	05-09	628/646	456, 550, 575	05>	652
C4	10>	619/646	575M all models - AC PS	04>	652
C5 2.0 & AT - AC PS	04>	619	612 Scaglietti AC PS	04>	652
C5 2 Ltr, 3 Ltr.	01>	641			
C5 3.0 AT AC PS	04>	652	FIAT		
C5 all models	05>	646	Bravo 1.4 & 1.9	07>	612/619
DS3	10>	628CE	Croma	06>	628/628CE
Picasso all models	05>	628CE/646	Linea	09>	619
Ksara 1.6 & AT - AC PS	04>	619	Multipla all models	04-05	
Ksara 1600	01>	628CE	Palio - AC PS	04>	612
(sara 2.0, AT & HDi - AC PS	04>	619/628CE	Palio 4-dr	04>	646
Ksara 2 Ltr.	01>	646	Palio 2, 1.2, 1.6	05>	612
TOUIU E EII.	01/	0-10	Palio 1.7 all models	05>	619
DACIA			Palio 1.7 all models  Palio 11 Active	08>	612
Oristal	96>	628CE	Palio Weekend all models	06 <i>&gt;</i>	619
Silstai	90>	020UE	Panda 1.2 all models	05>	612
24514/00					
DAEWOO			Punto all models	04>	612
			Sciento	01>	612
WITH BOTTOM HOLD DOWN 6			Scudo	08>	619
WITHOUT BOTTOM HOLD DO	NN 639		Seicento S 1.1, Sporting 1.1	00>	619
			Siena all models	00-05	
Cielo	96>	639/639C	Stilo all models	05>	646
Copen (sport)	96>	639/639C	Stilo all models & multiwagon	04>	619
Espero	96>	639/639C	Strada all models	05>	628
_andis 1600	00>	622/628CE	Uno	90>	619
_anos	97-01	621/628CE	Uno Cento	96>	619
_anos	02>	622/628CE	Uno Mia 100 3-dr	04>	612
Matiz	<80	615C	Uno Turbo	90>	628CE
Matiz	09>	616C	1.4 16V	10>	619
Nubira	00>	622/628CE	1.7TD EL 5Dr	05>	628CE
			124, 125, 128, 130, 132	67-84	610
DAIHATSU			178 1200cc, 178 1600cc	00>	619
Charade	83-86	630	500	<80	628CE
Charade all models	05>	616C			
Charade Celeb	09>	616CS	FORD		
Copen	06>	616CS	Cortina Leisure 3.0L	86-93	651
Cuore, Gran Move, Feroza	97>	616CS	Escort 1300 & 1600 FWD	81-83	
Materia	07>	616CS	Escort 1400, 1600, 1600i,	3. 50	0.0
Sirion all models	00>	616CS	1800i FWD	95>	628CE
J511 dii 1110d010	00/	01000	Escort 1600	83-94	
DAIMLER			Escort 1800 D	97>	651
All models		622	Falcon all models	96>	643
นา เมษนะเอ		022	Fiesta 1.4i all models	96 <i>&gt;</i> 97>	619
OODGE			Fiesta 1.4i all models	97 <i>&gt;</i> 05>	628
DODGE	065	610			
Caliber	06>	619	Figo All Models	11>	619CE
			Focus	00-03	
FERRARI		225	Focus	05>	651
All modele	80-83	622	Focus ST170 3-dr AC PS	04>	619
All models All models	83>	652	Focus 1.6 all models	05>	628CE



MODEL	YEAR	BATTERY	MODEL	YEAR	<b>BATTERY</b>
lkon all models	00-05	619	Getz	09>	636C/619
lkon	06>	612	i10	10>	616CS
Ka	05>	619	i10 1.2 GLS Auto/Man	08>	636C
Ka 1.3 Ambiente	06>	615C	i20	09>	619
Laser 1300	86-93	630	i30	10>	619
Laser 1300	94>	611	Matrix 1.6 AC PS	04>	628CE
Laser 1400, 1500, 1600	87>	621	Matrix FC	08>	612
Laser/Meteor/Tracer 1600	96>	621	Sonata	93-03	634/646
Meteor 1.3GL, 1.5GLS and GLI	86-87	631	Sonata 2.0 & AT - AC PS	04>	638/646
Meteor 1.3GL, 1.5GLS and GLI	87>	621	Sonata NF	08>	652
Mondeo 2L, 2,5L	97>	628CE	Tiburon & V6 - AC PS	04-07	651
Mondeo	04>	651	Tiburon	97-03	646
Sapphire 2L, GLE, GLI, 3L A/C	89-93	651	Tiburon V6	08>	652
Sierra all models	83-89	646	Tiburon 2.0L	08>	646
Sierra A/C, 2.5, 3.0, 5.0, XR8	83-89	651	Trajet	06-07	650C
Sierra 1.6, 2.0, 2.3	83-88	645	Trajet FO 2.0L	08>	646
Telstar all models, TX5	93>	639	Trajet FO V6	08>	652
Tonic	99>	611			
			JAGUAR		
GEELY			S Type	08>	658
All models	07>	622	XF	08>	658
			XF	09>	668P
HONDA			XJ, XK	98>	658
Ballade	83>	630	XJ6 and Executive	68-77	628CE
CR-V i-CTDi	07>	SMF65	XJ6 3.6	89>	646
Jazz	09>	616C	X-Type	04>	668P
Prelude	85-88	638/639			
S2000 Roadster	00>	636	KIA		
S2000	04>	634	Carnival	99>	646
2.0 RVi &RVSi	05>	634	Carnival 2.9 Turbo, diesel	00>	674
			Cerato all models	05-08	628CE
HYUNDAI			Cerato 1.6 Sedan	09>	621/638
Accent	93>	628CE	Cerato 2.0	09>	628CE
Accent 1.6 3 Door SR	08>	612	Clarus Range	97-98	628CE
Accent MC	08>	612D	Clarus	99>	646
Atoz	00>	631	Magentis all models	01-05	646
Atoz New	07>	615/616C	Picanto LX	04>	639
Atoz all models	05>	616CS	Picanto all models	05>	616CS
Atoz Prime	02>	616C	Pride	97>	619
Atoz MXi	08>	616C	Pro_cee'd	09>	616C
Azera	05>	643	Rio 1300, 1500,	00-03	621
Azera TG	08>	652	Rio 1.3 PS	04>	639
Elantra	93-03	622	Rio all models	05>	628CE
Elantra all models	07>	612	Rio 1.6	08>	621/638
Elantra 1.6 & 2.0	05>	628CE	Sedona all models	05>	650C
Elantra HD 1.6	03>	612	Sephia Range	97>	628CE
Elantra HD 2.0	08>	646	Shuma all models	99-05	646
Getz all models	03-04	615/619/	Soul	09>	628CE
JOLE AII HIOUGIS	00-04	628CE	Spectra 1600	00>	646
Getz	0E>	616CS	Specifa 1000	00>	040
	05>		LADA		
Getz TB CRDi Getz TB 1.4, 1.6	08> 08>	652 612	LADA Niva all models	90>	642
		עדא	I MINA AII WOUQDIG	un	



MODEL	YEAR	BATTERY	MODEL	YEAR	BATTERY
LAMBORGHINI			626, 1600, 2000	83-86	630
Countach	99>	622	626, SLX, SLE	85>	621
Gallardo & Murciélago AC PS	04-05	652	626, MX6	93>	639
LANCIA			MERCEDES BENZ		
Beta	86-93	628CE	A Class	00>	646
Delta	95>	646	B Class	07>	•
Gamma, Trevia	86-93	646	C Class Estate	07>	•
Kappa	02>	646	C Class, W203	00>	658
Prisma	83-86	619	C55 AMG & SW - AT AC PS	04>	658D
Thema	86-93	646	C55 AMG AT	07>	•
			C63 AMG	07>	•
LEXUS			C180 Kompressor	07>	•
300,400	92-95	657	C180	95>	658D
All models	04-05	639/657	C180	05>	658
GS300 & IS250	06>	639	C180K SW Classic AC PS	04>	658D
GS450h	08>	650C	C200	05>	658
IS250	09>	639	C200K all models	07>	•
LS	10>	652	C220	05>	658
LS 460	06>	650C	C220 CDI all models	07>	•
SC430	08>	650C	C220 CDI Blue Efficiency	07>	•
			C220K Elegance AT AC PS	04>	658D
LOTUS			C230K Sports Coupé &		
Lotus	05>	619	AT - AC PS	04>	658D
Evora	10>	646	C230	05>	658
			C240 SW Elegance AT AC PS	04>	658
MASERATI			C250 (D)	95>	658D
All models	04>	626	C270 CDI SW Elegance AT AC PS	04>	658
******			C270K CDI Elegance AT AC P		658
MAYBACH	0.4	0500	C280	95>	658D
Maybach all models	04>	650C	C280 all models	07>	030D
MATD A			C320	05>	658
MAZDA	05	004	C320 CDI all models	07>	030
Astina 1800	95>	621	C320 SW Elegance AT AC PS	04>	658D
Etude all models	95>	639	C320K Elegance AT AC PS	04>	658D
Mazda 2	03>	639	C350 all models	07>	030D
Mazda 3 & 6	05>	646	C350	05>	658
Mazda 5	07>	639	CL all models	07>	•
MX-5	05>	639	CL55 AMG AT AC PS	07>	658D
Mazda 6	03-09	639	CLK55 2-dr AMG AT AC PS	04>	658D
Mazda 6	10>	622/639/ SME65	CLK320, CLK55, 500E (Guard		658D
Mazda 6 MDS	065	SMF65 621/622	CLK320 2-dr AT AC PS	04>	652
Mazda 6 MPS	06>		CLK500 2-dr AT AC PS	04>	658D
Midge 1300, 1600 MX-5	95> 99>	621 636	CLK320 2-dr Elegance	0.72	0000
MX-5 AC PS	99> 04>	639	cabrio AT AC PS	04>	652
		639	CLK500 2-dr Elegance	01/	30L
RX8 Soho	03>	639 619	cabrio AT AC PS	04>	658D
	97>		CLS	07/	•
323 RDW, FWD	85-93	630 611	CL500 AT AC PS	04>	652x2
323 1.3	93-04	611 621	CL65 AMG Speedshift	07>	03282
323 1.6	93-04	621	CL600 AT AC PS	04-06	
323, RX7	80-83	631	CL600 AT AC F3	07>	, 030D
323 all models	05>	611	· OLUUU	01>	•



07> 07> 07> 04> 07> 04> 07> 05-06 07> 04> 07> 07> 07> 07> 07> 07> 07> 07> 07> 07	658 658 658 658 658 658 658 658 658D 658D	MINI Mini all models BMW Mini  MITSUBISHI Galant Lancer Tredia 1400, 1600 Tredia 1.8 Turbo Turbo  MORGAN Aero 8 PS Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa GTR	<01 02> 77-84 02> 83-86 83-86 93> 04> 05> 04> 05> 05> 05>	628/610 646 630/631 639 630 622 621 619 619 619 622 622
04> 07> 95-06 07> 04> 07> 07> 07> 07> 07> 04> 07> 04> 07> 04> 07> 04> 07> 04> 07> 04> 07>	658D 658 658 658 658 658 658D 658D 658D	MITSUBISHI Galant Lancer Tredia 1400, 1600 Tredia 1.8 Turbo Turbo  MORGAN Aero 8 PS Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	02> 77-84 02> 83-86 83-86 93> 04> 05> 04> 05> 05> 05> 05>	646 630/631 639 630 622 621 619 619 622 622
07> 95-06 07> 04> 07> 07> 04> 07> 07> 04> 07> 07> 07> 07> 07> 07> 07> 07> 04> 07> 04> 07> 04> 07> 04> 07> 04> 07> 04> 07> 04> 07> 04> 07> 07> 07> 08> 08> 08> 08> 08> 08> 08> 08> 08> 08	658D 658 658 658 658 658 658D 658D 658D	MITSUBISHI Galant Lancer Tredia 1400, 1600 Tredia 1.8 Turbo Turbo  MORGAN Aero 8 PS Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	77-84 02> 83-86 83-86 93> 04> 05> 04> 05> 05> 05>	630/631 639 630 622 621 619 622 619 622 622
95-06 07> 04> 07> 07> 04> 07> 07> 07> 07> 07> 07> 07> 07> 07> 07	658D 658 658 658 658 658 658D 658D 658D 658D	Galant Lancer Tredia 1400, 1600 Tredia 1.8 Turbo Turbo  MORGAN Aero 8 PS Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	02> 83-86 83-86 93>  04> 05> 04> 04-05 05> 05> 00>	639 630 622 621 619 622 619 622 622
07> 04> 07> 07> 07> 07> 07> 07> 07> 07> 07> 07	658 658 658 658 658 658D 658D 658D 658D	Galant Lancer Tredia 1400, 1600 Tredia 1.8 Turbo Turbo  MORGAN Aero 8 PS Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	02> 83-86 83-86 93>  04> 05> 04> 04-05 05> 05> 00>	639 630 622 621 619 622 619 622 622
04> 07> 07> 04> 07> 07> 07> 04> 04> 01> 04> 01> 05> 04> 05> 04>	658 658 658 658 658 658D 658D 658D 658D	Lancer Tredia 1400, 1600 Tredia 1.8 Turbo Turbo  MORGAN Aero 8 PS Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	02> 83-86 83-86 93>  04> 05> 04> 04-05 05> 05> 00>	639 630 622 621 619 622 619 622 622
07> 07> 04> 07> 07> 07> 07> 04> 01> 04> 01> 04> 01> 04> 04> 04> 04>	658 658 658 658 658D 658D 658D 658D	Tredia 1400, 1600 Tredia 1.8 Turbo Turbo  MORGAN Aero 8 PS Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	83-86 83-86 93> 04> 05> 04-05 05> 05>	630 622 621 619 622 619 622 622
07> 04> 07> 07> 07> 07> 07> 07> 04> 07> 04> 07> 04> 06> 06> 07> 06> 07> 07> 08> 08> 08> 095> 08> 08> 08> 08> 08>	658 658 658 658 658D 658D 658D 658D	Tredia 1.8 Turbo Turbo  MORGAN Aero 8 PS Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	83-86 93> 04> 05> 04-05 05> 05>	622 621 619 622 619 619 622
04> 07> 07> 07> 04> 04> 04> 04> 04> 04> 04> 07> 04> 07> 04> 07>	658 658 658 658 658D 658D 658D 658D	Tredia 1.8 Turbo Turbo  MORGAN Aero 8 PS Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	93> 04> 05> 04> 04> 05> 04> 04-05 05> 05>	621 619 622 619 619 622
07> 07> 07> 04> 04> 04> 04> 11> 07> 95> 95> 04>	658 658 658 658D 658D 658D 658D	MORGAN Aero 8 PS Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	04> 05> 04> 04-05 05> 05>	619 622 619 619 622
07> 07> 04> 04> 04> 01> 04> 01> 07> 95> 04> 04>	658 658 658D 658D 658D 658D	Aero 8 PS Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	05> 04> 04-05 05> 05>	622 619 619 622 622
07> 04> 07> 04> 04> 01> 07> 95> 95> 04> 04>	658 658 658D 658D 658D 658D	Aero 8 PS Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	05> 04> 04-05 05> 05>	622 619 619 622 622
04> 07> 04> 04> 01> 07> 95> 95> 04> 95>	658 658 658D 658D 658D 658D	Aero 8 4.4L Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	05> 04> 04-05 05> 05>	622 619 619 622 622
07> 04> 04> 11> 07> 95> 95> 04> 95> 04>	658 658 658D 658D 658D 658D	Runabout 4/4 2 and 4 seater 4/4 +8 4L  NISSAN Almera all models Exa	04> 04-05 05> 05>	619 619 622 622
04> 04> 11> 07> 95> 95> 04> 95>	658 658 658D 658D 658D 658D	4/4 2 and 4 seater 4/4 +8 4L  NISSAN  Almera all models  Exa	04-05 05> 05>	619 622 622
04> 11> 07> 95> 95> 04> 95>	658 658D 658D 658D 658D	4/4 2 and 4 seater 4/4 +8 4L  NISSAN  Almera all models  Exa	05> 05>	619 622 622
11> 07> 95> 95> 04> 95>	658D 658D 658D 658D	4/4 +8 4L NISSAN Almera all models Exa	05> 05>	622 622
07> 95> 95> 04> 95> 04>	658D 658D 658D 658D	+8 4L  NISSAN  Almera all models  Exa	05>	622
95> 95> 04> 95> 04>	658D 658D 658D 658D	NISSAN Almera all models Exa	00>	
95> 04> 95> 04>	658D 658D 658D	Almera all models Exa		
04> 95> 04>	658D 658D	Exa		
95> 04>	658D	Exa		611
04>		CTD	88>	621/622
	658D	I GIR	09>	658
95>		Infinity ZX 280/300	94>	638
	658D	Langley, Pulsar, Stanza, Sentra	81-84	621/622
04>	652	Langley and Turbo	85-86	611
04>	652	Laurel	84-86	622/638
04>	652	Laurel 240C, 260C, 300C,280L,		
04>	658D	280SGL	75-85	638
04-06	658D	Lavina & Grand Lavina	08>	631P
04>	658D	Maxima 300E 3SE	93-96	638/639
07>	•			639
04>	658D			639
95>	658D	Maxima QW 2.7 & 3.2	06>	638/643
04-06	658D			612/619
04>	658D			638/639
93>	658	i i		646
93>	646	Sabre all models	92>	621/622
			86>	622
			86>	638
77-93	652	*	96>	638
89-93	658	1 '		631
89-93	658			690C
89-93	658	· · · · · · · · · · · · · · · · · · ·		621
89-93	658			639
77-86	652	3.32 33350	552	003
89-93	658	OPFI		
			<b>~</b> 87	628CE
				628CE
02>	646	·		628CE
80>				638
	<u> </u>	1		646
0 0 9 0 9 0 9 7 8 8 8 7 8	7> 4> 5> 4-06 4> 3> 3> 7-93 9-93 9-93 9-93 7-86 9-93	7> 4> 658D 5> 658D 4-06 658D 4> 658D 3> 658 3> 658 3> 646  7-93 652 9-93 658 9-93 658 9-93 658 9-93 658 9-93 658 9-93 658 9-93 658	Maxima  Maxima  Maxima  Maxima  Maxima 3,0 QX AT AC PS  Maxima QW 2.7 & 3.2  Micra all models  Missan ZX200, 350Z  Primera 1600, 2000  Sabre all models  Skyline  Skyline  Skyline automatic  Skyline ZX200  9-93  658  9-93  658  9-93  658  350Z AC PS  370Z Coupe  OPEL  Ascona FWD all models  Astra Twin Top  Astra all models	Maxima       97-05         4>       658D       Maxima 3,0 QX AT AC PS       04>         5>       658D       Maxima QW 2.7 & 3.2       06>         4-06       658D       Micra all models       03>         4>       658D       Nissan ZX200, 350Z       96>         3>       658       Primera 1600, 2000       98>         3>       646       Sabre all models       92>         Skyline       86>       Skyline ZX200       96>         9-93       658       230ZX, 280ZX       82-84         9-93       658       350Z AC PS       04>         9-93       658       370Z Coupe       09>         7-86       652         9-93       658       9-93       658       9-93         9-93       658       370Z Coupe </td



MODEL	YEAR	BATTERY	MODEL	YEAR	BATTERY
Commodore	82-86	638	5008	11>	652
Corsa New (Diesel)	02>	651	605 V6 Import	79	622
Corsa New (Petrol)	02>	628CE	605	96>	638
Corsa 1300i	96-03	619	607	00>	646
Corsa 1600i	96-03	628CE	806	96>	622
Corsa Lite	04>	619	807 all models	05>	646
Corsa Hatch all models	04>	628CE			0.0
Corsa Classic all models	04>	628CE	PORSCHE		
Corsa 1.6 all models	05>	628CE	PUTTING VEHICLE IN OPE	RATION	
Corsa 1.6 Sport 5 dr	09>	628CE/646	AFTER THE BATTERY IS O		AFTER AN
Corsa 1.7, 1.8	05>	646/651	EXHAUSTIVELY DISCHAR		
Corsa OPC	08>	619/628CE	THE MULTI-FUNCTIONAL		·
Kadett	80-93	619	INSTRUMENT PANEL AND		
Kadett 1600, 1800, 2000	82>	628CE/646	ON-BOARD COMPUTER TO		
Kadett with A/C	93>	646	THIS FAULT CAN BE REM		
Kadett 1.3, 1.4, 1.6, 1.8. 2.0	93>	628CE	1. START THE ENGINE	LDILD WITHAT	Omi LE OTEI O.
Kadett 1.6 GLS, 1.6 GSE	88-93	628CE	2. WITH THE VEHICLE ST	ATIONARY PERF	ORM A FEW
Kadett 2.0 GSI	88>	646	STEERING MOVEMENT	•	
Kadett, T Cars, 2.0 GSI	84>	628CE	THEN DRIVE A SHORT		
Meriva 1,6 Club & Comfort -	042	OZOOL	UNTIL THE MULTIFUNC		· ·
AC PS	04>	646	AND THE MESSAGE OF		•
Meriva	05>	651	DISAPPEARS.	THE ON-BOAM	DCOMPOTEN
Monza, Cabriolet automatic	03/	031	3. IF THE WARNINGS DO	NOT DISABBEAD	DDIVE CAREEIII I V
& manual	86-93	628CE	TO THE NEAREST QUA		•
Omega 2.2, 2.6 V6	00-93	651	HAVE THE FAULT REM		ist wonkshor.
Rekord	82-93	638	4. AFTER THE WARNINGS		OD THE VEHICLE IN
Rekord 2.0, 2.2, A/C, 380i V6	82-95	646	A SUITABLE PLACE, AI	· · · · · · · · · · · · · · · · · · ·	
Senator 2.0, 2.2, A/O, 3001 V0	82-86	638	POWER WINDOWS. TO		
Tigra	06>	619	WITH THE ROCKER SW	*	
Utility 1.8 & 1.7	05>	619	UPWARDS AGAIN TO S		
2L 16 valve	89>	652	WINDOW IN THE CONT		L POSITION OF THE
PEUGEOT			All models	94-96	652
SFI	97>	635	Boxster	97>	668
101 1.0 Trendy	10>	612	Boxster all models - PS	04>	668
107 1.0 Urban	10>	612	Boxster all models	05>	668
1007	06>	628CE	911	04>	652
206 all models	01>	628CE	911 Carrera TE/S	<08	628CEx2
207	06>	628CE	911 3, 3.3 L	80-86	652
305	79-84	631	911 GT3	09>	668/669
306	96>	628CE	924, Turbo	<08	628CE
307 all models	04>	646	928	85>	652
307 Oxygo	07>	628	944	85>	646
308	<80	646	Panamera	09>	668/669
3008	10>	652			
404, 406	96>	628CE	PROTON		
406 all models - AC PS	04>	646	Arena Sport Line	08>	636
406 & 407 all models	05-07	612	Gen 2 1.6 all models	05>	643
407	<80	652	Persona	08>	636
504	68>	622	Savvy	05>	615C
505	79-85	622			
505 STI	79-83	638			



MODEL	YEAR	BATTERY	MODEL	YEAR	<b>BATTERY</b>
RENAULT			Streetwise	<04	652
200 Clio 1.2 all models	07>	628CE	Streetwise	05>	651
All models	75-86	634	TS Connoisseur	03>	652
All models	86-95	630			
Clio 11 2.0 Sprt R27 Ltd Edition	08>	646	SAAB		
Clio 1.2 16V	08>	619	9-3 E, 9-5 SE, Griffin	97>	652
Clio 3	00-03	628CE	9-5 Sport 2.3 Hot Aero	06>	652
Clio all models	04>	619	93 2.8T Turbo X	<80	646/652C
Connisseur	04>	652	900 SE	95>	646
Espace	96-02	652	900 CD CS CDE CSE	95>	652
Espace 2.0	03>	646	SportCombi	<80	652
Grand Scenic 2.0 & 1.9	05>	628CE			
Fluence	11>	646	SEAT		
_aguna	96-02	646	Altea	06>	652
aguna 1.9 Diesel and V6	03>	651	Leon	06>	652
aguna 2	03>	628CE	Leon Cupra	08>	640
aguna Expression all models	04>	651	Ibiza	06>	646
aguna Privilege 3,0 AT AC PS	04>	651	Ibiza 1.4 1.6	07>	619
_aguna all models	05>	646	Ibiza Cupra	06>	640
_ogan	08>	646			
Megane 1.6, 1.8, 2.0L	96-02	628CE	SMART		
Megane all models	03-04	619	Fortwo	04>	619
Megane all models	05>	646	Roadster Cabriolet & Coupe	05>	612
Megane Coupe Cabriolet 2.0 T	08>	652	Roadster & Coupé - AC	04>	619
Megane Coupe	09>	646	,		
Megane Coupe 1.4TCe	10>	628CE	SUBARU		
Megane F1 R26	08>	668	Impreza	95-03	636
Megane Hatch 1.6	07>	668	Impreza all models	<04	615C
Megane Hatch 2.0 5 Door	08>	668	Impreza all models	05-09	
•	10>	628CE	Impreza	10>	639
Megane Hatch 1.4 TCe	10>	020CE	Impreza Prodrive	07>	634
Megane Hatch 1.6 5 Dr Ltd Edition	005	60005	Impreza 2.5 WRX STI	10>	639
	09>	628CE	Legacy	95-03	
Megane Hatch 2.0T Sport	08>	628CE	Legacy all models - AC PS	04>	615C
Modus all models	05>	619	Legacy all models	05>	634
Safrane	98>	646	Legacy 2.5 GT Premium	10>	639
Sandero	09>	646E	Legacy 2.3 GT FTermum	10>	039
Scenic, 1.6	03>	619	SUNBEAM		
Scenic 1.6 Expression 200	07	050	All models		622
Collection	07>	652	All IIIOGGIS		022
Scenic 1.6 Privelege 200	07	0.10	TATA		
Collection	07>	619		08>	615C
Scénic 1 old type	03>	618	B Line LE (AC)	08>	636C
Scénic 2 all models	04>	628CE	B Line LE (AC)		
Scenic all models	05>	628CE	Indica Indica Pounce	05>	615C
Spider	98>	628CE	Indica Bounce	08>	636C
Twingo	<80	646	Indigo	04-08	
Vel Satis	03>	652	Indigo	09>	636C
ROLLS ROYCE			ТОУОТА		
All models		SMF65	Auris	08-09	
ROVER			Auris	10>	646
75	02>	652	Auris Petrol	06>	646
75 all models	05>	651	Avanza	06-08	615CE



MODEL	YEAR	<b>BATTERY</b>	MODEL	YEAR	<b>BATTERY</b>
Avanza	09>	615C	Golf 1 & 2 Citi/Chico 1100, 130	00 78-97	7 619
Avensis	<80	646	Golf 1 & 2 Citi/Chico 1.5, 1.6,	1.8 78-97	7 628CE
Avensis Diesel	06>	668	Golf 1 & 2 Citi/Chico with A/C	78-97	647
Aygo	11>	619	Golf 1 & 2 Citi/Chico diesel	78-84	647
Camry all models	92-98	646	Golf 3 VR6	92>	647
Camry all models - AC PS	03-04	646	Golf 4	99-04	652
Camry all models	05>	639/SMF65	Golf 4	99-04	652
Camry 220 all models	99>	641	Golf 4	99-04	646
Conquest	85-88	630	Golf 4	99-04	646
Corolla	78-89	631	Golf 1.6i, 2.0i, 1.8T & 1.9 - AC	PS 04>	646
Corolla all models	04>	636	Golf 4 1.6 & 1.8	05>	646D
Corolla 1300, 1600, 1800	90-96	619	Golf 4 1.9 & 2.0	05>	652
Corolla 130, 160, 180, RXI	97>	636	Golf 5 & V	05>	652
Corolla 140, 160 & 180	05-06	636C/	Golf 5	09>	646
		636CS	Golf VI GTI	09>	652
Corolla 1.4 & 1.6	07>	646	Golf VI DSG	09>	652
Corolla Verso all models	04>	612	Jetta	10>	646
Corolla Verso 180	05>	628CE	Jetta CSL, CSX, CLX	85>	628CE
Corolla 1.8	07>	646	Jetta 1 & 2 1300 1500	80-85	
Corolla 2.0D-4D	07>	668PP	Jetta 1 & 2 1600 1800 2000	83-92	628CE
Corolla Sprinter	06>	636	Jetta 1 & 2 with A/C	80>	647
Cressida 1800, 2.0i, 2.4i	90-92	626CE	Jetta 1.6i, 1.8i, 2.2i	99-03	647
Cressida 3.0i, GLi6	90-93	646	Jetta 1.6i, 2.0i, 1.9 & 1.8T		
Cressida GLi6, 2.8, RSI	88-90	638/639	all models - AC PS	04>	646
Cressida GL, GLE, LS	78-89	622	Jetta 2.0i Highline	99-04	652
MR2	01-05	636	Jetta 2.3 V5	99-03	
Previa 2.2L	95>	622	Jetta 2,3 V5 AC PS	04>	646
Prius 1.5i CVT (Starter battery)	05>	615	Jetta 3 - all models	92>	647
RunX all models	03>	636	Jetta 4	99-04	
Supra Celicia	95>	622	Jetta 4 1.9 TDi	99>	652
Tazz	88-99	619	Passat	99-03	
Verso	06>	612	Passat all models - AC PS	04>	646
Yaris T3	05>	636CS	Passat 1600 1800	76-87	
Yaris Sedan		36C/636CS	Passat 1900 2200	81-87	
			Passat 4 cyl. 1.6, 1.8	74-86	
ГПІИМРН			Passat 5 cyl. 1.9, 2.2	84-86	
All models		622	Passat 1.8 Tsi all models	08>	646
			Polo all models	02>	646
ΓVR			Polo (Diesel)	02>	652
TVR all models	05>	628CE	Polo Classic, Playa, 1.4, 1.6, 1		
			Polo Classic 1.9Tdi Highline		
VOLKSWAGEN			(96kW)	08>	646SE
1.4 TSI	09>	646	Polo 1.4 Comfortline	08>	646SE
Beetle 12v	66>	630	Polo Hatch 1.4 & 1.6 Trendline		646D
Beetle (NEW) all models	00>	646	Polo Hatch 1.4 Tdi Trendline	05>	652
CitiGolf all models	93>	628CE	Polo Hatch 1.6 Comfortline	05>	646D
Cross Polo	07>	646	Polo Hatch 1.9 Tdi Highline	05>	652
Eos	07>	652	Polo TDi Highline (96Kw)	08>	646SE
Fox 1300, 1600	87-95	619	Polo 1.4 & 1.6	05>	646
Fox 1600 automatic	87-95	628CE	Polo 1.4 & 1.0		646
Fox 1800 automatic	90-95	628CE	Scirocco	09>	
Golf GTi, CSL, CSX, GTS					652 652
	83-93	628CE	T5 Range	10>	652
Golf GTi, 16V, CLi	91-93	647	l Vivo	10>	646SE



MODEL	YEAR	<b>BATTERY</b>	MODEL	YEAR	<b>BATTERY</b>
VOLVO			CHEVROLET		
C30	07>	652	Corsa Diesel	10>	651CS
C70	07>	652	Corsa Petrol	10>	628CSE
S60	03>	652	Lumina SS	00>	639
S60	05>	652	Wrangler / Jeep	97>	657
660 2.4 D5 (Diesel) & AT	05>	668	Ute SS	04>	619
S80	08>	658			
/40	05>	652	CHRYSLER		
/50	05>	652	300C 5.7 Touring	07>	657
/60	10>	652	Grand Voyager all models	05>	657/640
/70	05>	652	Grand Voyager all models -		
(C60	09>	652	AC PS	04>	652
(C70 VOR	08>	668	PT Cruiser all models - AC PS	04>	628CE
950 all models	95>	646	Voyager	97>	652
or an inoution	00/	0.10	Voyager SE 2.4 SWB	05>	657
CUV 4V4 AND LIC	'UT DEL	IVEDV	CITROËN		
SUV, 4X4 AND LIC		IVERY	Berlingo	04>	628CE
VEHIC	LES		Dispatch	11>	628CE
ASIA			Picasso 1.6 litre and 1.8 litre	01>	628CE
Asiawing City Blitz 1.0	07>	622	C4 Picasso	08>	646
Rocsta GT Diesel 4X4	96>	657	Picasso	01-07	
Rocsta GT 4x4	96>	621			
			COLT		
AUDI			1.6	96>	622
1x4	00>	647	2.0, 2.5, 2.6 & 2.8 Diesel Hi-Lir	ne 96>	657
A6 all models - AC PS	04>	647			
\8 4x4	03>	647	DACIA		
Q5	09>	668	All Models	96>	628CE
27	06>	652			
28.4\A/			DAEWOO	005	600
ME Touring	00-	•	Tacuma	00>	622
M5 Touring	08>	•	DAILIATELL		
X3 & X5 all models E83/E53	00>	•	Delta	07-	075
X3 2.0d Steptronic	07>	•	Extol 7 seater	97>	675
K5 3.0sd 7 M Sport	07>	•		03>	615C
(6	08>	•	Feroza	97>	630
CAM	07	000	Gran Maz	10>	615C
nyathi	07>	638	Rocky	97>	674
Rhino 2.2 All models	08>	638	SUV	03>	615C
			Sirion	03>	615C
CHANA			Terios	97-04	
Double Cab	09>	636C	Terios	05-06	
Maxistar	<80	630	Terios	07>	615C
Star Club Cab, Panel Van			Terios 11 LWB	<80	636C
& Rainbow	07>	634	YRV	01>	615C
CHERY			DODGE		
Tiggo 1.6 TX	09>	638	Husky	94>	630
			Journey	<80	646



MODEL	YEAR	<b>BATTERY</b>	MODEL	YEAR E	BATTERY
FIAT					
Doblo all models	03-05	646	HAFAI	<80	•
Ducato	06>	646			
Ducato Chassis Cab	08>	619	HONDA		
Multipla	03>	646	Accord 2.4iVtec Tourer		
Palio	03>	612	Executive Auto	09> 6	36C/636CS
Panda	06-09	612	FR-V	06>	634
Panda	10>	619	Odyssey VTEC 2.3	98>	639
Stilo	03>	646			
Strada	06>	612	HUMMER		
Jno Espresso Panel Van Weekend SW 1,6 EL & ELX -	96>	628CE	Hummer	07>	639/640
AC PS	04>	612	HYUNDAI		
			Bakkie 2.6 Tipper	06>	650C
FORD			H1 Panel Van / 9 Seater	09>	646
Bantam all models	93>	619	IX35 Petrol	10>	646
Courier 2.2 (diesel)	83-96	638	IX35 Diesel	10>	669
Courier 1800, 2200 (petrol)	95>	622	H100 Panel Van	04>	650CR
Courier 3000, 3400 (petrol)	85-96	638	Mini Bus, Van H100	99>	652
Courier 2.5L Turbo Diesel	96>	652	Sante Fe	00-05	639
Escort Bantum Pick-up	82-83	619	Santa Fe	06>	668
Ford Explorer	97>	657/658	Sante Fe CM Diesel	08>	650C
Husky Bus	86-93	634	Terracan all models - AC PS	04-05	646
Ranchero	79-93	638	Terracan HP	08>	650CR
Ranger all models	00-04	657	Tuscon	06-07	646
Ranger 1800 & 2200	05>	622	Tuscon JM 2.0L	08>	646
Ranger	07>	650C	Tuscon JM V6	08>	652
Ranger 4.0 all models	05>	646	Tuscon JM CRDi	08>	650C
Ranger Double Cab 4.0i V6 HI			2.5 IDT, 2.6 IDT	97>	674
Trail XLE	07>	SMF65	2600i D Chassis & Deck	05>	650CR
Ranger 3.0DIT D/Cab AT	08>	657			
Ranger Wildtrack 3.0 TDCI			ISUZU		
4x4 Territory	06>	657	KB Diesel	08>	669PS
Ranger T6 Diesel	11>	659PP	KB Petrol	<80	657CS
Ranger T6 Petrol	11>	651	KB21, KB24, KB24 LE (petrol		
Territory	06>	657/SMF65	2,6 LE	88-93	622
Tonner Diesel 2,4	82	627	KB160/KB 230	93>	622
600 1 Tonner	77-93	630	KB 200 (petrol)	95-07	622
3000 1 Tonner	77-93	627	KB 200	<80	669
		2 <u>—</u> -	KB200i LWB	05>	669
GO NOW			KB 220 DC LE AC PS	04>	657
Hafei	08>	622	KB240	05>	669
Space 2.8 TD	08>	639	KB 250/KB 270	93-04	638/657
•			KB250 all models	05-07	650C
GWM			KB250	08>	669
Double Cab 2.2 Lux	07>	650CR	KB 260/KB 280	93>	657
Hover	08>	SMF65	KB300 & KB350	05>	669
Hearse	08>	SMF65	KBD, 23 KBD, 23 LE (diesel)	88-93	652
Multi wagon 2.2	00>	650CR	Trooper 4x4	95>	657
Single Cab 2.2	07>	650CR	WFR	84-93	630
Steed Lux	07>	652CR	320 J6 Petrol Frontier	98>	643
Steed 3	10>	652CR			2.0



MODEL	YEAR	BATTERY	MODEL	/EAR	<b>BATTERY</b>
JEEP			Range Rover 5.0 Supercharged	09>	658
2.0L CRD Limited	07>	628CE	Sport	<80	658
2.4L Limited CVT Auto Stick	07>	628CE	SVM 3000	93>	628
Cherokee/Grand Cherokee	97-03	652			
Cherokee all models - AC PS	04-05	628CE	LEXUS		
Cherokee Limited all models	05>	640	RX300 AT	04>	638
Cherokee range (diesel)	97-04	651	RX300	03>	638/639
Cherokee range (petrol)	97-04	643	RX400h/RX450h	<80	650C
Cherokee Sport all models	05>	626			
Cherokee	06>	668D	LEYLAND		
Commander	06>	668D	Bakkie	95>	628CE
Compass 2.4L Limited	07>	646			
Grand Cherokee range	97-04	657	MAHINDRA		
Grand Cherokee all models	05	626	Bolero all models	05>	650C
Grand Cherokee	06>	640	Scorpio all models	05>	650C
Patriot 2.4L Limited	07>	646	Thar	10>	652
Wrangler	97-01	622	Xylo	09>	622
Wrangler	02>	668D			
<u>-</u>			MANDARIN		
KIA			Soyat Junda all models	07>	SMF65/639
Carens	97-99	628CE			
Carens 1800	00>	646	MAZDA		
Carens 2.0	07>	SMF65	B Series 1.6, 2.0L	84-93	622
Carens 2,0 CRDi & AT - AC PS	04>	628CE	B1800/2200	96>	622
Carens 2.0 CRDi (Diesel) & AT	05>	650C	B2200 Diesel	83-86	657
Carnival	00>	674	B2500 Diesel & Turbo	98>	657
Ceres Bakkie	01>	674	B3000, 3400 Petrol	98>	638
K2700 all models	01>	650CR	BT-50	<80	657
Pregio 2.7 Panel Van	01>	674	CSX-7 2.3	<80	639
Pregio 12-seat AC PS	04>	658	Drifter	03-04	621
Pregio 2.7 Mini Bus Cargo Van	05>	650CR	Drifter all models - AC PS	04	657
Sorento	<04	652	Drifter	05>	638
Sorento all models	04>	650CR	Magnum 4x4	95>	622
Sportage	97-98	626	Marathon 2.2 Panel Van 16		
Sportage	99-04	643	seater	91>	622
Sportage all models	05>	646	Rustler 1400	86-94	645
Sportage 4x4 2.0	00>	646	Rustler (Pup) 130, 160, 160i	94>	621
LADA			MEIYA		
Niva all models	00>	638	All models	07>	SMF65
_ANDROVER			MERCEDES BENZ		
AAD LR 110 Pup	88>	658AGM	350ML (SUV)	03>	658
V8 110 Pup 127 (petrol)	88>	658AGM	E-Class Estate	07>	•
Defender all models	88>	658AGM	G55 Kompressor AMG Touchsh	ift 07>	•
Discovery all models & TDS	98>	658AGM	GL Class	07>	•
Discovery all models	05>	658AGM	ML all models	07>	•
Discovery V8	92-94	622/646	ML Series 230ML, 320ML, 430M	/IL 01>	658
Freelander	98>	646	ML270CDi AT AC PS	04>	658
Freelander 2	07>	658	ML350 AT AC PS	04>	658
Freelander 2D	<80	668P	ML500 AT AC PS	04>	658
Range Rover	79-92	621	ML55 AT AC PS	04>	658
Range Rover all models	98-05	671	PT Cruiser	03>	646



MODEL	YEAR	BATTERY	MODEL	YEAR	BATTERY
R-Class	07>	•	E20 Ekonowagon 10/16 seats	93>	622
Sprinter Bus	95>	663/658	E20 Panel Van	82-83	610
Sprinter	97>	658	E20 Panel Van/Bus	93>	638
Viano 2.2CDi Trendline	07>	•	Hardbody all models	04>	638
Viano 3.0CDi Ambiente	07>	•	Hardbody 2700D	04>	657
Vito all models	04>	651	Hardbody 3000TD	04>	657
Vito 120 CDI Sport Crew Bus	07>	FV70	Hardbody 3200	04>	657
·			Hardbody 3300i	05>	657
MITSUBISHI (DODGE)			Interstar	05>	638
3000i D-Cab Rodeo V6 4x4	05>	657	*Murano	06>	646
Club Cab 2.8 TDi (Diesel) 4x4	05>	657	*Navara	06>	646/SMF65
Colt all models	04>	638	NP200	08>	646
L300 Express/Spacestar	95>	630	NP300	09>	643
L300, Starwagon 2.0	85-94	634	Pathfinder	05>	646
Mitsubishi Vans - all models	83-85	630	Patrol SW SGR 4x4	93-98	652
Mitsubishi 2.5, 2.8 Diesel	99>	657	Patrol	98>	622
Outlander	03>	657	Patrol	05>	650CR
Pajero	93-95	657	Primastar	07>	657
Pajero	96>	657	Safari & Tracker (petrol)	82-85	
Pajero CK 4x4	01>	657	Safari & Tracker T20 (diesel)	82-86	
Pajero i0 4x4	01>	639	Safari 3000D 4x4	93-96	
Pajero all models - AC PS	04>	658	Safari New Range	98>	622
Pajero 3200 Di-D SWB 4x4 3-dr		650	Sani 2.4, 3.0 V6	88-93	
Pajero 3200 Di-D SWB 4x4	002	000	Terrano	02>	657
3-dr AT	05>	650P	Tracker 4x4	81-82	
Pajero 3200 LWB 4x4 5-dr	05>	638	*X-Trail	02>	639
Pajero 3200 LWB 4x4 5-dr AT	05>	638	*X-Trail Diesel	08>	646
Pajero 3800i LWB 4x4 5-dr AT	05>	638	Qashqai 1.6 & 2.0	07>	646
Pajero 3800i SWB 4x4 3-dr AT	03>	638	Qashqai +2	10>	652
Pajero	07>	650C	1 Ton 21	00>	610
Pajero Sport 302 DL-D Automatic		668P	1 Ton 2.41M, 3.01M	00>	622
Star Wagon L300	83-85	630	1/2 Ton B140	00>	610
Star Wagon L300	85>	634	1 Ton diesel 2.7	00>	638
Triton	07>	639	1 Ton diesel 3.2	00>	643
	07>	657	1200, 1400, 1800 LDV	75-93	
Triton 2.4, 3.2 Di-D & 3.5	01>	057	1400 & Champ	75-93 04>	611
NISSAN			1400 & Champ	88-99	
NISSAN			2.4 Petrol, G21, 22, 23, 24 Ser		622
* (ND. WHEN FITTING A NEW DAT	TERV TO	THESE VEHICLES	l ' ' ' '	93-99	
* (NB: WHEN FITTING A NEW BAT ONCE THE OLD BATTERY IS DISC		· · · · · · · · · · · · · · · · · · ·	2400, 3.0 V6 Petrol 2.7, 3.2 Diesel	96-99	
			2.7, 3.2 Diesel 2.5 Diesel & all 4x4 models	90-99 88>	652
ONLY ± ONE MINUTE BEFORE A C			720 Diesel and E.20 Ambulanc		
EFFECT. THE VEHICLE WILL ONLY					
BEEN RE-PROGRAMMED BY A NI			*4x2	03>	657
BE OVERCOME BY USING A "SPA			ODEL		
SOURCE TO MONITOR THE POWE	ER SUPPL	Y WHILE THE	OPEL	0.5	010
BATTERY IS BEING REPLACED.)			Corsa 1.4 & Utility all models	05>	619
All Handle all Alak 6 Chr. (CT	1000		Corsa Utility 1300i	97>	619
All Hardbodies AW & QW 1600,		000	Corsa Utility 1600i	97>	628CE
2000 Petrol	93-99	622	Corsa Utility 1900 Diesel	97>	628CE
Cabstar 3 Ton diesel	91-93	622x2	Movano	06>	646
Cabstar 2.0	05>	622X2	Vivaro	06>	638
Cabstar 2.0 DC	05>	622X2	Zafira all models	05>	651
Cabetar LID all	05>	GOOVO	l .		

05>

Cabstar UD all

638X2



MODEL	YEAR	<b>BATTERY</b>	MODEL Y	EAR	<b>BATTERY</b>
PEUGEOT			SVX 3.3 4x4 and 2.5 4x4	95>	622
Boxer	00>	658	XV	11>	•
Boxer 350 LH 2.8 DT Panel					
Van807 MPV	03>	646	SUZUKI		
Expert	09>	652/657	All models	93>	630
Partner all models	05>	612	Grand Vitara all models - AC PS	04>	639
Partner 1.6 Hdi	09>	646/658	Grand Vitara all models	05>	616CS
Partner 1.9D panel van	04>	628CE	Grand Vitara	<80	639/SMF65
306	00>	646	Jimmy		616C/616CS
			Swift		616C/616CS
PORSCHE			SX4		616C/616CS
SEE NOTE ON PAGE 7)			SX4 2.0 AWD	10>	
Cayenne	03>	651	SJ 410 Pick-up	85-90	
Cayenne all models	05>	658	SJ 410, SJ 413 Jeep	83>	616C
Cayenne GTS	<80	651	ST 90 0.8 Panel Van high roof	83-93	
Cayenne S Tiptronic AC PS	04>	651	Vitara Samurai	<00	630
Cayenne Turbo Tipt AC PS	04>	651	Vitara 4 Cyl & V6 4x4	93>	630
PROTON			ТАТА		
Arena	06>	638	Diesel Bakkie	04>	650C
			Indica Lxi Bounce	<80	615
RENAULT			Telcoline	06>	657
Espace 3	03>	652	Telcoline 4x2 270 Di S/Cab	06>	639/SMF65
Espace 2.0	04>	646	4x4/SUV all models	02>	657
Kango	01>	619	Xenon 3.0 D Single Cab	07>	639/SMF65
Koleos	<80	646	Xenon 3.0D S/Cab	<80	639/SMF65
_aguna 1.9 Diesel	04>	651	Xenon Single Cab 4x2	<80	638/657
Scenic	01>	646	Xenon Single Cab 4x2 A/C	<80	638/657
Frafic 1.9 dCi Panel Van	05>	668	ТОУОТА		
SAAB			Avanza 1.3 Panel Van	08>	615
KWD 6 SPD Auto	08>	646	100 Facelift	03>	636
AND O OI D'AUIO	00>	U <del>1</del> U	Carri 1300 Panel Van	05>	619
SSANGYONG			Corolla Panel Van	82-88	
Actyon Sports	07>	650C	Coaster (Bus) petrol	93>	622
Korando	98-03	638	Coaster (Bus) diesel	93>	657
Korando K290 EL TDi AC PS	96-03 04>	657	Condor 1800	00>	641
(yron	06>	657	Condor 2400	00>	643
Musso all models - AC PS	95-04	657	Condor 3000 Diesel	00>	657
Rexton all models - AC PS	93-04 04>	657	Condor 2Y	03>	641
Stavic SV 270 xdi Tiptronic	04>	650C	Condor 2RZ-E	03>	643
Stavic	06-07	657	Condor 5L	03>	657
	00 07	007	Condor all models	04>	641
SUBARU			Condor 2400i TX 4x4 AC PS	04>	641
			Condor 3000 D TX 4x4 AC PS	04>	657
MAY HAVE TO CHANGE TO B	OSCH TERM	IINALS	Condor 2000i & 2400i Estate	05>	628CE
MATTIAVE TO OTIANGE TO BE	JOON TENIN		Condor 3000D 4x4 TX (Diesel)	05>	628CE
39 Tribeca	08>	639	Condor 3000D Estate TE (Diesel		628CE
Forester all models - AC PS	95>	639	Conquest Carri van	04>	619
-egacy 3.0 ORB Wagon Auto/N		639/646	Dyna Diesel, all models	75-87	
Outback all models - AC PS	04>	639	Dyna Diesel, all models	88-89	
Outback all models	95>	634	Fortuner 4L-V6	06>	652PS
Outback 3.6R Premium	10>	646	Fortuner 3.0 Diesel	06>	668P



MODEL	YEAR	BATTERY	MODEL	YEAR	BATTERY
Fortuner 3.0 D-D 4x2 AT	09>	668PP	Land Cruiser 100 VX V8 AT		
Fortuner Epic Ltd Edition	09>	652PS	4x4 AC PS	04>	638/639
Hi-Ace - all models	80-89	638	Land Cruiser 200	<80	638/639
Hi-Ace GLX 2.2	90-92	638	Land Cruiser Prado TD		
Hi-Ace 220 LWB van	04>	638	4x4 AC PS	04>	638/639
Hi-Ace 2200 Blind Panel Van			Land Cruiser Prado VX TD AT		
LWB	05>	622	4x4 AC PS	04>	638/639
Hi-Ace 2200 Siyaya 16 Seater	05>	622	Land Cruiser Prado VX AT		
Hi-Ace 2200 Super 16 & 2200			4x4 AC PS	04>	638/639
Siyaya	04>	638	Land Cruiser 4x4 PS	04>	657
Hi-Ace 2200 Super 16 Seater	05>	622	Land Cruiser 4x4 diesel PS	04>	657
Hi-Ace 4Y	03>	638	Landcruiser 70 pick up	07>	SMF65/657
Hilux all models	05>	668/652	Landcruiser Bakkie	06>	SMF65/657
Hilux Diesel 2.4, 2.7 4x4	90-98	646	Local Land Cruiser Diesel,		
Hilux Diesel all Models & 4.4	99>	657	all models	75-99	656/657
Hilux Fuel Injected 2.7	98-99	657	Local Land Cruiser Petrol,		
Hilux Legends Ltd Edition	10> 65	52PS/668PP	all models	75-99	622
Hilux Raider, 2.4 & 2.7 Petrol	98>	646	Previa	96>	622
Hilux RZ Conerz	04>	643	Quantam	06>	638
Hilux 1RZ/3RZ-FE	03>	641	Quantum all models	05>	646/652
Hilux 1800, 2000 (Petrol)	90-98	626CE	RAV4 all models - AC PS	96>	634
Hilux 1800 Petrol & 2.2	99>	626CE	RAV4 all models	05>	634/636
Hilux 2Y	03>	626CE	RAV4 Up	07>	652
Hilux 2,4	95>	626CE	RAV4 2.0 GX 5 Door 4x4 AT	10>	650CR
Hilux 2.8 Diesel	98>	657	Raider	94>	635
Hilux 2000, 2700 Petrol	99>	641	Ses'fekile 2.7 14 Seater taxi	08>	638/639
Hilux 2700 Petrol 4x2	98-99	652PS	Stallion	90-93	
Hilux 2700 all models	04>	652PS	Stallion 2000i van & panel van	04>	643
Hilux 3,0KZ-TE DC R/B Raider			Stout, Dyna, Petrol	75-82	
AC PS	04>	668PP	T.U.V Stallion	90-99	
Hilux 3,0KZ-TE DC Raider			Venture Diesel	93>	619
4x4 AC PS	04>	668PP	Venture, Bus & 2.2	91>	619
Hilux 3,0KZ-TE R/B Raider			Venture 1.8, 2.2	91>	635
AC PS	04>	668PP	Venture Diesel 2.4L	93>	643
Hilux 3000D-E R/B PS	04>	668PP	Quantum 2.5 D-4D 10 seater b		638/639
Hilux 3000D-E 4x4 DC	04>	668PD	Quantum 2.7 10 seater bus	06>	SMF90
Hilux 3000D-E 4x4 PS	04>	668PD			
Hilux 5L-E/AKZ-TE	03>	668PD	VOLKSWAGEN		
Land Cruiser Brutus	06>	650C	Caddy	04>	628/646/651
Land Cruiser Prado Imported	97>	SMF101	Caddy Kombi	06>	652
Land Cruiser all models	05> 6	50C/650CR	Caddy Kombi Maxi 1.9TDi	08>	658
Land Cruiser Diesel	76-92	657	Caddy Panel Van, Volksiebus,	2.3	
Land Cruiser Petrol	95>	621	Microbus and Caravelle 2		647
Land Cruiser Prado	00>	638/639	Caddy Panel Van Maxi 1.9TDi	08>	658
Land Cruiser Prado Diesel	00>	657	Caddy Panel Van 1.6i	05>	628CE
Land Cruiser 100 GX 4x4 AC PS		638/639	Caddy Panel Van 2.0 SDi	05>	628CE
Land Cruiser 100 GX dsl AC PS		638/639	Caddy Pickup 1.6	05>	628CE
Land Cruiser 100 Series			Caddy Pickup 1.6 Club	05>	628CE
SW Diesel	00>	SMF101	Caddy 1.6i	05>	628CE
Land Cruiser 100 SWB	00>	638/639	Caddy 1.9 Tdi	05>	628CE
Land Cruiser 100 VX TD AT	-	<del>-</del>	Caddy 1.9 Tdi Life	05>	628CE
4x4 AC PS	04>	638/639	Caravelle all models	05>	652
- <del>-</del>					



MODEL	YEAR	BATTERY	MODEL	YEAR B	ATTERY
Golf Pick-up 1500cc (Diesel)	82-83	647	COMMEDIA	VELUC	N EO
Kombi	80-85	619	COMMERCIA	L VEHIC	LES
Kombi T5 (Diesel)	05>	652			
Kombi 1.8, 2.5, 2.6i, V6, Kombi			ASHOK LEYLAND		
2.1/Caravelle 2.6i	85-93	647	All models	05>	683x2
Kombi 1.9	83-89	628CE	All Illodels	05/	003,2
Kombi 2000cc	82-85	628CE	ASIA		
LDV	98>	647	Coastal	97>	671x2
LT 35	05>	658	Coastal	31>	07112
LT 46 Long Wheelbase High Ro	oof 05>	658	COLT		
T4 Caravelle TDi Trend AC PS	04>	646		96>	622
T4 Caravelle TDi Trend AT AC	PS 04>	651	1.6 SWB, A.6 LWB/KAA, LAA	96>	622
T4 Caravelle TDi all models -			2.0 LWB/LAA, Hi-Line	96>	652
AC PS	04>	651/652	2.5 Hi-Line Diesel		
Microbus and Camper	80-87	628CE	2.6 4x4, 3.0 V6 & 4x4, Rodeo	96>	622
Microbus, Caravelle	88>	647	D. 0.14		
Microbus T3, T4	00>	646	DACIA		
Microbus/Kombi 1800, 1900,			Elan Pick-up, Magic Double	96>	628CE
2100, 2300, 2500, 2600					
water cooled	83-95	647	DAF		
Pick-up	81>	619	85/360 ATi, 95/430 ATi	95>	692x2
Sharan all models - AC PS	04>	652	95XF, 85CF, 85LF	02>	696x2
Sharan all models	05>	646/652	45LF, 55LF	02>	675x2
Tiguan	08>	628			
Tiguan 2.0TSI 4 Motion	08>	652	DAIHATSU		
Touareg all models		(Nearest x2	Delta	97>	675
roddiog dii modolo		al Batteries)	F110, F118, F1188, V200	70>	631
Touareg all models	05>	658	Rocky	97>	674
Toureg R50 Tiptronic	08>	658	Terios, Feroza	97>	630
Touran all models	04-05	652/657			
Touran	05>	652	DMA		
T5 Transporter	06>	658	Panther 2.5L One Tonner	97>	638
T5 Crew Bus Tiptronic & 4 Moti		646	YC1050 2.8 Tonner Range	97>	638x2
T5 Kombi Lwb 4 Motion	06>	646			
	0.07	646	DODGE		
T5 Panel Van Tiptronic & 4 Mot			Husky	94>	610
Utility	06>	619			
1.9 Tdi S/Cab SWB	08>	652	E.R.F.		
2.5 Tdi S/Cab SWB 96kW	<80	652	ADE Engines	00>	675x2
2.5 Tdi S/Cab SWB 128kW	<80	652	All models	88-99	689x2
VOLVO			Cummins Engines	00>	689
VOLVO			3 3		
Estate	95>	652	FAW		
V50	10>	668	All models	01>	674X2
V90	97>	652	1.5 Ton, 2 Ton	01>	674
XC70	04>	652	1.5 1611, 2 1611	0.17	07.1
XC90	03>	658	FODEN		
850 Sportwagon	94>	646	All models	88>	688x2
			FORD		
			Cargo all models	82-86	675x2
			Ford 3 Tonner, Petrol	86>	638
			Ford 3 Tonner, Diesel	86>	638x2
			1		300/L

## **COMMERCIAL VEHICLES**



MODEL	YEAR	<b>BATTERY</b>	MODEL	YEAR	BATTERY
Freightliner	86>	671x2	IVECO		
Louisville all models		688x2	All models	92>	689x2
Triton all models	88-93	638	Euro Cargo 150E18N	97>	658x2
			Eurotech	97>	658x2
FOTON			Super 260c 27	97>	683x2
Panel Van 2.2	07>	650C	Super Euro	97>	658x2
Taxi 2.2	07>	650C	Turbo Daily	97>	674
			Turbo Charge 712/1414/709	97>	658x2
FREIGHTLINER			BUSES	012	03072
Argosy all models	05>	SMF100x4	100E17	04>	689x2
<i>.</i>			100217	0.12	CCOXL
FUDI			KIA		
Lion All models	07>	639/SMF65	All models	04>	650CR
GAZ			KOMATSU		
Gazelle Bus	07>	639/SMF65	All models WA 250, 350		682/683
Double Cab	07>	639/SMF65	GD 523 A-1		674
Single Cab	07>	639/SMF65			57.1
÷			LEYLAND		
HYUNDAI			1410, 1412, 2212	81-85	671x2
Atoz Prime	02>	615/616	1614, 1617, 121, 2421, 2424,		
H100	04>	650CR	1612, 2412	83-85	
	0		18 - 140	95>	683x2
INTERNATIONAL			AAD LDV 400	95>	628CE
9400 NS, 9400 S, 9700	93>	674x2	Concoy, 400, Maxi 320 Diese		
All models	80-83	674x3	1		628CE
Eagle Range	97>	SMF100/	DAF 85, 95	94>	689x2
Lagio Harige	517	SMF101 X4	Endurer BW	97>	628CEx2 674x2
New Series	95>	674x2	Leyland DAF 45, 50	94>	0/4XZ
New defies	552	07 472	MACK		
ISUZU			R686, F786	85>	688x2
BD 61/65	82-86	690x2	Series RD, CH, CL		Nearest Local
EXR, EXZ, CUR, CXZ	83-88	682x2	Genes Fib, OFF, OE	317 (	Battery x 4)
F-Series all models	04>	689x2			Dattery X 4)
F3500, F4000, F5000, F6500,	0 12	OOONE	MAGIRUS DEUTZ		
F8000, F9000	89>	674x2	All models		685x2
F8000D, F9000D, F5000D	93>	674x2	All models		00002
FSR, FTR, FVR, FVT	83-87	671x2	M A N		
KB all models - PS	04>	638/657	M.A.N.		
MQR 500	04>	638x2	* THE EV 475 BATTERY OR 60	FIED FOR	MANUTE AND MOT
N-Series all models	04>	689x2	* THE FV 175 BATTERY SPECI		
NKR 99/NPR 99	83-89	685	VEHICLES IS SUPPLIED AS OF	NGINAL EQ	UIPMENI.
SHR, SHX, VHZ	81-86	682x2		00.00	000.0
SPZ 440, 580, 451, 581,	01-00	JUZAZ	9	80-92	
	00 00	600-0	26, 552	96>	675x2
VPR 290	80-88	689x2	Bus Range 16,17	96>	685x2
TLD 44A /54A	83-86	689	Bus Range 19	92-93	
TXD 50L	82-86	683x2	Series 14, 16, 19, 22, 24, 26	80-94	
TXD 45/55	80-86	671x2	All	05>	*FV175x2/
VHZ 441, VPZ 441	83-86	690x2			696Zx2
			L/M Chassis Range all model		696Zx2
			TGA Chassis Range all mode	els	696Zx2
			Bus Range all models		696Zx2



## COMMERCIAL VEHICLES

MODEL	YEAR	BATTERY	MODEL	YEAR I	BATTERY
MAZDA			оѕнкоѕн		
Drifter all models- AC PS	04>	657	All Models		SMF101x2
MERCEDES BENZ			PETERBILT		
Actros	09>	696x2	All models	89>	SMF101x4
Actros 2	<09	689x2			
Atego	04>	689x2	RENAULT		
Axor 2	04>	689x2	R385	97>	689x2
BUS			Kerax	01>	692x2
DF1113, OF1313		688	Midlum 220/2701	01>	689x2
DF1317, OF1417, OF1617		683x2	Premium 420	01>	689x2
DF1419, OF1619, OF1624		682x2			
DH1625, OH1628		689x2	SAMAG		
DF1724		683x2	70 L, 120 L	88-92	682x2/
//B800		674x2	,		683x2
-TYPE			16814, 16816, 24016, 24026,		
N 1 (Speedliner) 609, 811		674	13012	83-85	685x2
N 2 (Econoliner) 1114, 1314,			All SADF Trucks	88-92	682x2/
1417		671x2			683x2
NEW GENERATION		0 <u> </u>	Turbo Star	90-93	689x2
Medium 1213, 1413, 1417		690	Turbo ota.	00 00	OCCAL
Heavy 1419, 2219, 1924, 1926,		000	SCANIA		
1928, 1933, 2624, 2628, 2632	<u>.</u>		All models	01>	683x2
2633, 2636, 2638, 2224, 2225			7 til Modele	012	OCONE
2233, 3333, 2626, 2637		82x2/683x2	TATA		
SK (Powerliner)	·	OLAL, OCCAL	1518 - 8T	09>	682x2
RANSPORTERS			2 Ton, 4 Ton	02>	683
.508, L608, L613		652x2	Bus 32 seater	02>	696
1000, 2000, 2010		OOLAL	K4	02>	698Z
MITSUBISHI			LPT		698Z
Canter Diesel	81-85	638x2	LP 713S		698Z
Canter Diesel	98>	638	LPTA 713S		698Z
Canter Petrol	81-85	638	LPT 1518TC (8 Ton Payload)		698Z
Fuso 3 Ton	06>	652PSx2	SFC 407 Chassis Cab		0962
-uso 3 1011 -K	81-85	682x2			698Z
-K -K and FM	84-86	671x2	(1-2 Ton Payload)		0902
Series	10>		SFC 407 Indian Dropside Loadbody (1-2 Ton Payload)		698Z
Coeries	10>	690x2			
NICCAN			V3TVF 6X4 Truck Tractor		698Z
NISSAN	75.00	6570	TOYOTA		
5 ton CM8, 6 ton CM10, Diesel	75-93	657x2	TOYOTA	0.4-	0000
CK 30D	88>	682x2	All Trucks	94>	689x2
CW	87>	682x2	6000 DA 110/115/116	74-93	682x2
Cabstar 20 T90 S/C, T91 D/C	01>	657x1	D4D		668P/668CE
Cabstar	01>	638x2	D.A. Series	77-93	692x2
CB31R BUS T04	01>	682x2	DA 110/116	85	682x2
JD35/40/60/70/80/85/90/95	01-10	657x2	Dyna (Diesel)	82-85	674
JD 290	01-10	682x2	Dyna (Petrol)	82-85	622
JD 350	01-10	682x2	Dyna CW U95, Hino FD19-176		
UD440	01-10	682x2	FF13-176, FG14-77	88-93	682x2
JD 430 WT T17	01-10	682x2	Dyna	04>	657x2
UD Range	11>	690CPx2	42/260, 39/260, 26/260	79-84	689x2

## **COMMERCIAL VEHICLES**



35-240, 41-280, 44-280,   55-330, 55-380   88-93   682x2   683x2   6	MODEL	YEAR	BATTERY	MODEL	EAR BATTERY
Hino 25-173 93 682×2/ Hino 25-173, 35-243, 41-293, 47-294, 57-354 93 689×2 Hino "F" 83-93 682×2 LANCER BOSS SUper Dolphin 88-93 690 M, H, C (petrol & diesel) 674 NEW GENERATION DYNA 4-093 657×2 F-103/104 07> 657×2 F-103/105 07> 657×2 F-103/105 07> 657×2 F-105/145 07> 657×2 F-		88-93	682x2	FG 10-10 (petrol), FG 15-10	681x2
Hino 25-173, 35-243, 41-293, 47-294, 57-354 93	Hino 25-173	93>		FG 25-6 (petrol)	630
Hino 'F' 83-93 682x2 Peterbitt all models SMF101x4 Super Dolphin 88-93 690 M, H, C (petrol & diesel) 674 NEW GENERATION DYNA 4-093 657 5-103/104 07> 657x2 F103/105 07> 657x2 F105/145 07> 657x2 F2 F3 15, F3 25, F3 30 F3 15 10,	Hino 25-173, 35-243, 41-293,			1	657
Hino "F" 83-93 682x2 Peterbilt all models SMF101x4 Super Dolphin 88-93 690 NEW GENERATION DYNA 4-093 657 5-103/104 07> 657x2 6-104/105 07> 657x2 6-104/105 07> 657x2 7-105/145 07> 657x2 700 Series 07> 657x2 700 Series 07> 657x2 700 Series 07> 6982x2   VOLKSWAGEN All models 11> SMF101  FORKTRUCKS  HENLEY Hawk: 5 Ton, 6 Ton, (diesel & petrol) Husky: 8 Ton, 10 Ton, 12 Ton, 14 Ton (diesel) Haron (diesel) Heron 15 (diesel) G75 Hercules: 15 Ton, 18 Ton, 22 Ton, 26 Ton, (diesel) G75 HYSTER H 1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) K diesel) G75 HYSTER H1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) K diesel) G77 SMF101  HENLEY H1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) K diesel) G75 HYSTER H1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) K diesel) G77 K diesel H1,0,0 - 12,0 - 22,5 (petrol	,			Shovel Loader SD 10-3, SD 20-	5 681x2
Peterbilt all models				LANCER ROCC	
Super Dolphin   88-93   690   M, H, C (petrol & diesel)   674		83-93		1	0 074
NEW GENERATION DYNA 4-093 657 5-103/104 07> 657x2 6-104/105 07> 657x2 7-105/145 07> 698Zx2 7-105/145 07 07 07 08 reics 07 07 07 07 07 07 07 07 07 07 07 07 07		00.00		<b>I</b>	
5-103/104 07> 657x2 FD 15, FD 25, FD 30 630x2 6-104/105 07> 657x2 FD 45 622x2 FD 45 622x2 FD 45 622x2 FG 15, FG 25, FG 30 630 FG 45 622x2 FG 45 622x2 FG 45 622 FG 45 FG 4	NEW GENERATION DYNA	88-93	690	M, H, C (petrol & diesel)	674
5-103/104 07> 657x2 FD 15, FD 25, FD 30 630x2 6-104/105 07> 657x2 FD 45 622x2 FD 45 622x2 FD 45 622x2 FG 15, FG 25, FG 30 630 FG 45 622x2 FG 45 622x2 FG 45 622 FG 45 FG 4	4-093		657	MITSUBISHI	
6-104/105 07> 657x2 FD 45 62x2 7-105/145 07> 657x2 FG 15, FG 25, FG 30 630 8-145 07> 657x2 FG 45 622 700 Series 07> 657x2 700 Series 07> 698Zx2 TC.M.  FD 1,5 to 2,5 622 FD 3,0 upward 671 FG 1,5 to 2,5 610 FG 3,0 upward 671 FG 1,5 to 2,5 610 FG 3,0 upward 671 TOYOTA  FFORKTRUCKS  FFO 1,5 to 2,5 622 FD 3,0 upward 671 TOYOTA  FFORKTRUCKS  FFO 1,5 to 2,5 622 FD 3,0 upward 671 TOYOTA  5 FG 1,5 to 2,5 622 FD 3,0 upward 671 TOYOTA  5 FG 1,5 to 2,5 622 FD 3,0 upward 671 TOYOTA  5 FG 1,5 to 2,5 622 FD 3,0 upward 671 TOYOTA  5 FG 1,5 to 2,5 622 FD 3,0 upward 671 TOYOTA  5 FG 1,5 to 2,5 622 FD 3,0 upward 671 TOYOTA  5 FG 1,5 to 2,5 622 FD 3,0 upward 671 TOYOTA  5 FG 1,5 to 2,5 622 FD 2,0 upward 671 TOYOTA  5 FG 1,5 to 2,5 622 FD 2,0 upward 671 TOYOTA  5 FG 1,5 to 2,5 622 FD 2,0 FD 25 682 FD 20, FD 25 682	5-103/104	07>		1	630x2
8-145 07> 657x2 500 Series 07> 657x2 700 Series 07> 698Zx2  VOLKSWAGEN All models 11> SMF101  FORKTRUCKS  FORMATION OF The Company o	6-104/105	07>	657x2		622x2
500 Series 07> 657x2 700 Series 07> 698Zx2 T.C.M. FD 1,5 to 2,5 622 FD 3,0 upward 671 All models 11> SMF101 FG 1,5 to 2,5 FG 3,0 upward 671 TOYOTA 5 FG 1,5 -4 622 5 FD 1,5 -4 650C FD 20, FD 25 682 Husky: 8 Ton, 10 Ton, 12 Ton, 14 Ton (diesel) 675 Hercules: 15 Ton, 18 Ton, 22 Ton, 26 Ton, 48 Ton (diesel) Form, 10 Ton, (diesel) 675 HTySTER H1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) H10,0 - 12,0 - 22,5 (petrol &	7-105/145	07>	657x2	FG 15, FG 25, FG 30	630
T.C.M.  FD 1,5 to 2,5 FD 3,0 upward FG 1,5 to 2,5 FG 3,0 upward FG 3,0 u	8-145	07>	657x2	FG 45	622
VOLKSWAGEN All models 11> SMF101  FORKTRUCKS  FOR 3,0 upward 671  TOYOTA  5 FG 1,5 to 2,5 FG 3,0 upward 671  TOYOTA  5 FG 1,5 - 4 FORKTRUCKS  FOR 3,0 upward 671  TOYOTA  5 FG 1,5 - 4 FOR 3,0 upward 671  TOYOTA  5 FG 1,5 - 4 FOR 3,0 upward 671  TOYOTA  5 FG 1,5 - 4 FOR 3,0 upward 671  TOYOTA  5 FG 1,5 - 4 FOR 3,0 upward 671  TOYOTA  5 FG 1,5 - 4 FOR 3,0 upward 671  TOYOTA  5 FG 1,5 to 2,5 e 4 622  5 FD 2,5 r 4 650  FD 20, FD 25  GB2  FD 20, FD 25  GB2  FD 20, FD 25  GB2  FD 20, FD 25	500 Series	07>	657x2		
VOLKSWAGEN           All models         11>         SMF101         FD 3,0 upward         671           FORKTRUCKS           FORKTRUCKS         FG 1,5 to 2,5         610           FG 3,0 upward         671           TOYOTA           5 FG 1,5 - 4         622           5 FD 1,5 - 4         650C           WALE           FB 20 FG 25 (petrol & gas)         682           FD 20, FD 25         682           GPO 20, GPO 30 (petrol)         622           Hercules: 15 Ton, 18 Ton,         675           Diesel 2 Ton         657           Petrol 2 Ton         622           NOTES           NOTES           HYSTER           H 1,75 - 2,0 - 2,5 - 3,0         (petrol & diesel)         622           H4,0 - 5,0 - 6,0 (petrol & diesel)         622         655           H4,0 - 5,0 - 2,0 5,0 - 6,0 (petrol & diesel)         655         655           H10,0 - 12,0 - 22,5 (petrol         655         655	700 Series	07>	698Zx2	T.C.M.	
All models 11> SMF101  FG 1,5 to 2,5				FD 1,5 to 2,5	622
FORKTRUCKS  FG 3,0 upward TOYOTA  5 FG 1,5 - 4 5 FD 1,5 - 4 622 5 FD 1,5 - 4 650C   YALE  Hawk: 5 Ton, 6 Ton, (diesel & petrol) 675 Husky: 8 Ton, 10 Ton, 12 Ton, 10 Ton, (diesel) 675 Hercules: 15 Ton, 18 Ton, 10 Ton, (diesel) 675 HYSTER H 1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) 675 HHOSTER H1,0 - 5,0 - 6,0 (petrol & diesel) 675 HTOYOTA  5 FG 3,0 upward 671 TOYOTA  5 FG 1,5 - 4 622  FG 20 FG 25 (petrol & gas) 682 FD 20, FD 25 682 GPO 20, GPO 30 (petrol) 622 Diesel 2 Ton 657 Petrol 2 Ton 657  NOTES  HYSTER H1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) 622 H4,0 - 5,0 - 6,0 (petrol & diesel) 655 H10,0 - 12,0 - 22,5 (petrol	VOLKSWAGEN			FD 3,0 upward	671
## TOYOTA  5 FG 1,5 - 4 5 FD 1,5 - 4 650C  ## HENLEY  Hawk: 5 Ton, 6 Ton, (diesel & petrol)  Hawk: 5 Ton, 10 Ton, 12 Ton, 14 Ton (diesel)  Hercules: 15 Ton, 18 Ton, 22 Ton, 26 Ton, 48 Ton (diesel), Heron 15 (diesel)  ## Horon (diesel)  ## Ho	All models	11>	SMF101	FG 1,5 to 2,5	610
## FD 1,5 - 4 650C  ## HENLEY  Hawk: 5 Ton, 6 Ton, (diesel & FG 20 FG 25 (petrol & gas) & 682 FD 20, FD 25 FD 20, FD 2				1	671
## HENLEY  Hawk: 5 Ton, 6 Ton, (diesel  & petrol)  Housky: 8 Ton, 10 Ton, 12 Ton,  14 Ton (diesel)  Hercules: 15 Ton, 18 Ton,  22 Ton, 26 Ton, 48 Ton  (diesel), Heron 15 (diesel)  Houst: 5 Ton, 6 Ton,  10 Ton, (diesel)  HYSTER  H 1,75 - 2,0 - 2,5 - 3,0  (petrol & diesel)  H4,0 - 5,0 - 6,0 (petrol  & diesel)  H1,0 - 12,0 - 22,5 (petrol)   FG 20 FG 25 (petrol & gas)  FD 20, FD 25  682  GPO 20, GPO 30 (petrol)  622  Diesel 2 Ton  657  Petrol 2 Ton  622  NOTES  ### MOTES	FORKTR	UCKS		5 FG 1,5 - 4	622
Hawk: 5 Ton, 6 Ton, (diesel & petrol) 675 FG 20 FG 25 (petrol & gas) 682  Husky: 8 Ton, 10 Ton, 12 Ton, 622  14 Ton (diesel) 675 Diesel 2 Ton 657  Hercules: 15 Ton, 18 Ton, 622  22 Ton, 26 Ton, 48 Ton (diesel) 675  Side Loader 5 Ton, 6 Ton, 10 Ton, (diesel) 675  HYSTER  H 1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) 622  H4,0 - 5,0 - 6,0 (petrol & diesel) 655  H10,0 - 12,0 - 22,5 (petrol 682				5 FD 1,5 - 4	650C
& petrol)       675       FD 20, FD 25       682         Husky: 8 Ton, 10 Ton, 12 Ton, 14 Ton (diesel)       675       Diesel 2 Ton 657         Hercules: 15 Ton, 18 Ton, 22 Ton, 26 Ton, 48 Ton (diesel), Heron 15 (diesel)       675x2       NOTES         Side Loader 5 Ton, 6 Ton, 10 Ton, (diesel)       675       NOTES         HYSTER H 1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel)       622       H4,0 - 5,0 - 6,0 (petrol & diesel)         H4,0 - 5,0 - 6,0 (petrol & diesel)       655       H10,0 - 12,0 - 22,5 (petrol	HENLEY			YALE	
Husky: 8 Ton, 10 Ton, 12 Ton, 14 Ton (diesel) 675 Hercules: 15 Ton, 18 Ton, 22 Ton, 26 Ton, 48 Ton (diesel), Heron 15 (diesel) 675 Side Loader 5 Ton, 6 Ton, 10 Ton, (diesel) 675 HYSTER H 1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) (petrol & diesel) 675 H4,0 - 5,0 - 6,0 (petrol & diesel) H10,0 - 12,0 - 22,5 (petrol	Hawk: 5 Ton, 6 Ton, (diesel			FG 20 FG 25 (petrol & gas)	682
14 Ton (diesel) 675 Diesel 2 Ton 657 Hercules: 15 Ton, 18 Ton, Petrol 2 Ton 622 22 Ton, 26 Ton, 48 Ton (diesel), Heron 15 (diesel) 675x2 Side Loader 5 Ton, 6 Ton, 10 Ton, (diesel) 675  HYSTER H 1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) 622 H4,0 - 5,0 - 6,0 (petrol & diesel) 655 H10,0 - 12,0 - 22,5 (petrol	& petrol)		675	FD 20, FD 25	682
Hercules: 15 Ton, 18 Ton, 22 Ton, 26 Ton, 48 Ton (diesel), Heron 15 (diesel) 675x2  Side Loader 5 Ton, 6 Ton, 10 Ton, (diesel) 675  HYSTER H 1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) 622  H4,0 - 5,0 - 6,0 (petrol & diesel) 655 H10,0 - 12,0 - 22,5 (petrol	Husky: 8 Ton, 10 Ton, 12 Ton,			GPO 20, GPO 30 (petrol)	622
22 Ton, 26 Ton, 48 Ton (diesel), Heron 15 (diesel) 675x2  Side Loader 5 Ton, 6 Ton, 10 Ton, (diesel) 675  HYSTER H 1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) 622 H4,0 - 5,0 - 6,0 (petrol & diesel) 655 H10,0 - 12,0 - 22,5 (petrol	14 Ton (diesel)		675	Diesel 2 Ton	657
(diesel), Heron 15 (diesel) 675x2  Side Loader 5 Ton, 6 Ton, 10 Ton, (diesel) 675  HYSTER  H 1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) 622  H4,0 - 5,0 - 6,0 (petrol & diesel) 655  H10,0 - 12,0 - 22,5 (petrol				Petrol 2 Ton	622
10 Ton, (diesel) 675  HYSTER  H 1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) 622  H4,0 - 5,0 - 6,0 (petrol & diesel) 655  H10,0 - 12,0 - 22,5 (petrol 655	(diesel), Heron 15 (diesel)		675x2	NOTES	
H 1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) 622 H4,0 - 5,0 - 6,0 (petrol			675		
H 1,75 - 2,0 - 2,5 - 3,0 (petrol & diesel) 622 H4,0 - 5,0 - 6,0 (petrol & diesel) 655 H10,0 - 12,0 - 22,5 (petrol	HVSTER				
(petrol & diesel)       622         H4,0 - 5,0 - 6,0 (petrol					
H4,0 - 5,0 - 6,0 (petrol			622		
& diesel) 655			JLL		
H10,0 - 12,0 - 22,5 (petrol	· ·		655		
	•		300		
	& diesel)		682		

621

680

682x2

687x2

**KOMATSU** 

(diesel)

FD 200, FD 250

All 10S to 20S Fork Trucks

FD 20-6, FD 25-6, FD 35-1

FD 30-FD 50 Fork Trucks

FD 35-1, FD 40-1, FD 50-2, FD



## **BATTERY SPECIFICATIONS**

611C   40   56   275   241   173   215   80   1   0   0   9     612CE   45   70   355   207   175   190   83   1   0   7     612DE   50   80   405   207   175   190   83   1   0   7     612PE   50   80   405   207   175   190   83   1   0   7     612PE   50   80   405   207   175   190   83   1   0   7     612PE   50   80   405   207   175   190   83   1   0   7     612PE   50   80   405   207   175   190   83   1   0   7     612PE   50   80   405   207   175   190   83   1   0   7     612PE   50   50   80   405   207   175   190   83   1   0   7     612PE   50   50   50   205   877   175   190   83   1   0   7     612C   45   50   205   877   175   190   83   1   0   7     616C   45   50   205   877   175   190   83   1   0   7     616C   35   50   265   187   127   224   80   CONIT   0   10     616CS   35   50   265   187   127   224   80   CONIT   0   10     616CE   40   60   330   207   175   175   83   1   0   5     610CE   40   60   330   207   175   175   83   1   0   5     621C   53   80   385   241   173   215   80   1   0   5     622C   53   80   385   241   173   215   80   1   0   5     626CE   50   80   425   245   175   175   83   1   0   5     631C   50   80   425   245   175   175   83   1   0   6     631C   38   55   300   241   135   204   86   1   0   0     631P   45   85   375   241   135   204   86   1   0   0   9     631P   45   85   375   241   135   204   86   1   0   0   9     631P   45   85   375   241   135   204   86   1   0   0   9     631P   45   85   375   241   135   204   86   1   0   0   9     631P   45   85   375   241   135   204   86   1   0   0   9     631P   45   85   375   241   135   204   86   1   0   0   9     631P   45   85   375   241   135   204   86   1   0   0   9     631P   45   85   375   241   135   204   86   1   0   0   9     631P   45   85   375   241   135   204   86   1   0   0   9     631P   45   85   375   241   135   205   80   1   0   1   1   9     631P   45   85   375   241   135   205   80   1   0   1   1   9     632P   50   50   50   247   175   1		20 hour	Res.	IEC	D	imensions (m	m)	Hold	Terminal	Layout	Figure
611C 40 55 275 241 173 215 80 1 0 3 3 612C 45 70 355 207 175 190 83 1 0 0 9 612C 45 80 80 405 207 175 190 83 1 0 0 7 612D 60 80 405 207 175 190 83 1 0 0 7 612D 60 80 405 207 175 190 83 1 0 0 7 612D 60 80 405 207 175 190 83 1 0 0 7 612D 60 80 405 207 175 190 83 1 0 0 7 612D 60 80 405 207 175 190 83 1 0 0 7 612D 60 80 80 405 207 175 190 83 1 0 0 7 612D 60 80 80 405 207 175 190 83 1 0 0 7 6 612D 60 80 80 405 207 175 190 83 1 0 0 7 6 612D 60 80 80 405 207 175 190 83 1 0 0 7 6 612D 60 80 80 405 207 175 190 83 1 0 0 8 8 8 8 1 1 0 0 8 8 8 8 1 1 0 0 8 8 8 8	Battery	C <sub>n</sub> (Ah)	C <sub>r,n</sub> (Min)	CCA (A)	L	W	Н	Down			
611C 40 55 275 241 173 215 80 1 0 3 3 612C 45 70 355 207 175 190 83 1 0 0 9 612C 45 80 80 405 207 175 190 83 1 0 0 7 612D 60 80 405 207 175 190 83 1 0 0 7 612D 60 80 405 207 175 190 83 1 0 0 7 612D 60 80 405 207 175 190 83 1 0 0 7 612D 60 80 405 207 175 190 83 1 0 0 7 612D 60 80 405 207 175 190 83 1 0 0 7 612D 60 80 80 405 207 175 190 83 1 0 0 7 612D 60 80 80 405 207 175 190 83 1 0 0 7 6 612D 60 80 80 405 207 175 190 83 1 0 0 7 6 612D 60 80 80 405 207 175 190 83 1 0 0 7 6 612D 60 80 80 405 207 175 190 83 1 0 0 8 8 8 8 1 1 0 0 8 8 8 8 1 1 0 0 8 8 8 8	610C	40	- í	275	241	173	215	B0	1	1	2
612CE 45 70 355 207 175 190 83 1 0 7 8 16 12		40	55			173				-	3
612D 50 80 405 207 175 190 83 1 0 8 7 612PE 50 80 405 207 175 190 83 1 0 0 7 612PPD 60 100 505 207 175 190 83 1 0 0 8 612PE 60 100 505 207 175 190 83 1 0 0 8 612SE 45 70 355 207 175 190 83 1 0 0 7 615C 35 61 50 205 197 175 190 83 1 0 0 7 615C 35 50 205 197 175 190 83 1 0 0 7 615C 35 50 265 187 127 224 80 CONT 1 0 0 616C 35 50 265 187 127 224 80 CONT 0 10 616C 35 50 265 187 127 224 80 CONT 0 10 616C 35 50 265 187 127 224 80 CONT 0 10 616C 35 50 265 187 127 224 80 1 CONT 0 10 616C 35 50 265 187 127 224 80 1 CONT 0 10 616C 35 50 265 187 127 224 80 1 CONT 0 10 619C 40 80 330 207 175 175 83 1 0 5 619C 40 80 330 207 175 175 83 1 0 5 619C 40 80 330 207 175 175 83 1 0 5 621C 53 80 385 241 173 215 80 1 1 0 5 62C 53 80 385 241 173 215 80 1 1 0 5 62C 53 80 385 241 173 215 80 1 1 0 3 3 62C 54 50 80 425 245 175 175 83 1 1 0 5 62C 54 60 80 425 245 175 175 83 1 1 0 6 62C 54 60 80 425 245 175 175 83 1 1 0 6 62C 54 60 80 425 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 83 1 1 0 6 62C 54 60 80 475 245 175 175 185 185 1 1 0 0 6 60 60 60 60 60 60 60 60 60 60 60											91
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G2BCE B         50         80         425         245         175         175         B3         1         0         B6           G2BCE B         60         80         470         245         175         175         B3         1         0         66           G39C 38         55         300         241         135         204         B6         1         1         8           G31C 38         55         300         241         135         204         B6         1         0         9           G31P 45         85         375         241         135         204         B6         1         0         9           634C 45         85         375         241         135         204         B6         1         1         8           634C 45         85         375         218         135         204         B6         1         0         9           638C 45         85         375         218         135         204         B0         1         0         1         1         2           638C 5         46         85         375         219         135         206											58
628CSE         50         80         425         245         175         175         B3         1         0         66           63DC         38         55         300         241         135         204         B6         1         1         8           63DC         38         55         300         241         135         204         B6         1         0         9           63HC         38         55         300         241         135         204         B6         1         0         9           63HC         45         85         375         241         135         204         B6         1         0         9           63HC         45         85         375         218         135         204         B0         1         1         1         8           63HC         46         85         375         218         135         204         B0         1         0         1         1         2           63BC         46         85         375         219         135         205         B0         1         0         1         1         1         2							175		1	0	60
630C         38         55         300         241         135         204         B6         1         0         9           631P         45         85         375         241         135         204         B6         1         0         9           634C         45         85         375         241         135         204         B6         1         1         0         9           636C         45         85         375         218         135         204         B0         1         1         1         8           636C         40         55         300         218         135         204         B0         1         0         11         9           638C         40         55         300         218         135         204         B0         1         0         11         9         13         215         B0         1         0         11         2         26         80         1         0         11         1         2         26         80         1         0         11         1         2         2         1         1         1         1         1						175					60
631C         38         55         300         241         135         204         B6         1         0         9           634C         45         85         375         241         135         204         B6         1         0         9           634S         45         85         375         241         135         204         B6         1         1         1         8           636C         40         355         300         218         135         204         B0         1         0         1           638C         40         355         300         218         135         204         B0         1         0         1           638         60         100         550         241         173         215         B0         1         1         2           638         60         100         495         241         173         215         B0         1         1         2           638         60         100         495         241         173         215         B0         1         1         1         2           639C         60         100 </td <td></td> <td>60</td>											60
631P         45         85         375         241         135         204         B6         1         0         9           634C         45         85         375         218         135         204         B0         1         1         1         8           636C         40         55         300         218         135         204         B0         1         0         1         1         1         9           638C         45         85         375         219         135         205         B0         1         0         11         0         11         638         60         100         495         241         173         215         B0         1         1         12         838         60         100         495         241         173         215         B0         1         1         2         638         60         100         495         241         173         215         B0         1         0         1         1         2         4         1         1         1         1         64         64         1         1         0         1         1         1         1											8
634C         45         85         375         241         135         204         B6         1         1         8           634S         45         85         375         218         135         204         B0         1         0         1         1         9           636CS         45         85         375         219         135         204         B0         1         0         1           638         60         100         495         241         173         215         B0         1         1         2           639C         60         100         495         241         173         215         B0         1         1         2           639C         60         100         495         241         173         215         B0         1         0         1         2           641         60         100         455         247         175         190         B3         1         1         6         641         60         100         505         242         175         190         B7         1         1         1         1         6         648         60 <td></td>											
634S         45         85         375         218         135         204         BO         1         1         9           636C         40         55         300         218         135         204         BO         1         0         11           638         60         100         550         241         173         215         BO         1         1         2           638C         60         100         495         241         173         215         BO         1         1         2           639C         60         100         495         241         173         215         BO         1         0         3           641         60         100         505         247         175         190         B3         1         1         0         1           643         60         100         505         247         175         190         B7         1         0         1           643         60         100         505         242         175         190         B7         1         1         1         1         1         1         1         1											8
636C         40         55         300         218         135         204         B0         1         0         11         638C         638         60         100         550         241         173         215         B0         1         1         2         638C         60         100         495         241         173         215         B0         1         1         2         638C         60         100         495         241         173         215         B0         1         1         2         638C         60         100         495         241         173         215         B0         1         0         3         640CE         62         100         455         247         175         190         B7         1         0         1         641         60         100         505         242         175         190         B7         1         1         11         643         60         100         505         242         175         190         B7         1         1         11         14         644         640         100         505         242         175 <t>190         B3         1         0<td>634S</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>97</td></t>	634S										97
636CS         45         85         375         219         135         205         BO         1         0         11         2         638C         60         100         495         241         173         215         BO         1         1         2         639C         60         100         495         241         173         215         BO         1         1         2         639C         60         100         495         241         173         215         BO         1         1         2         639C         60         100         495         241         173         215         BO         1         0         3         1         1         2         640CE         62         100         455         247         175         190         B7         1         1         11         643         646         0         100         505         242         175         190         B7         1         1         1         1         643         6460         100         505         242         175         190         B3         1         0         1         1         6460         6460         100         455         247	636C	40					204				11
638C         60         100         495         241         173         215         BO         1         1         2           639C         60         100         495         241         173         215         BO         1         0         3           640CE         62         100         455         247         175         190         B3         1         1         0           641         60         100         505         242         175         190         B7         1         1         1           643         60         100         505         242         175         190         B7         1         1         1         1           646         60         100         505         242         175         190         B3         1         0         1           646         60         100         505         242         175         190         B3         1         0         83           646D         65         110         555         242         175         190         B3         1         0         83         1         0         83         1         0 </td <td></td> <td></td> <td></td> <td></td> <td>219</td> <td></td> <td></td> <td>B0</td> <td>1</td> <td>0</td> <td>12</td>					219			B0	1	0	12
639C         60         100         495         241         173         215         BO         1         0         3           640CE         62         100         455         247         175         190         B3         1         1         66           641         60         100         505         247         175         190         B7         1         0         14           643         60         100         505         242         175         190         B7         1         1         11           648         60         100         505         242         175         190         B3         1         0         11         1         11           646C         60         100         505         242         175         190         B3         1         0         11           646D         65         110         555         242         175         190         B3         1         0         83           64BD         65         120         610         505         242         175         190         B3         1         0         83           64BD	638						215				2
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646         60         100         505         242         175         190         B3         1         0         1:           646CE         62         100         455         247         175         190         B3         1         0         6:           646D         65         110         555         242         175         190         B3         1         0         8:           646DS         60         100         505         242         175         190         B3         1         0         8:           646E         60         100         505         242         175         190         B3         1         0         9:           646E         60         100         505         242         175         190         B3         1         0         9:           646E         60         100         505         247         175         190         B3         1         0         9:           646E         60         100         505         247         175         190         B3         1         0         0         0         0         0         0         0											15
646D         65         110         555         242         175         190         B3         1         0         83           646E         60         100         505         242         175         190         B3         1         0         83           646E         60         100         505         242         175         190         B3         1         0         99           646PD         65         120         610         242         175         190         B3         1         0         98           64PC         54         90         425         290         175         175         B1         1         0         18           650C         90         150         750         302         175         225         B1         1         1		60	100	505		175		B3	1	0	17
646DS         60         100         505         242         175         190         B3         1         0         88           646E         60         100         505         242         175         190         B3         1         0         98           646PD         65         120         610         242         175         190         B3         1         0         98           646SE         60         100         505         247         175         190         B3         1         0         66           64OC         54         90         425         290         175         175         181         1         0         11         650         750         302         175         225         B1         1         1         -         650         650         80         100         550         276         175         175         B3         1         0         99         150         750         302         176         225         B1         1         1         -         651         651         63         100         520         276         175         175         B3         1         0 <td></td> <td>66</td>											66
646E         60         100         505         242         175         190         B3         1         0         98           646PD         65         120         610         242         175         190         B3         1         0         88           648SE         60         100         505         247         175         190         B3         1         0         66           647C         54         90         425         290         175         175         B1         1         0         18           650C         90         150         750         302         175         225         B1         1         0         11           650CR         90         150         750         302         175         225         B1         1         0         11           650CR         90         150         750         302         175         175         B3         1         0         29           651C         63         100         520         276         175         175         B3         1         0         22           651CP         70         110         565<											82
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650CR 90 150 750 302 175 225 B1 1 0 —651 63 100 565 276 175 175 B3 1 0 0 99 651C 63 100 520 276 175 175 B3 1 0 0 20 651CS 63 100 520 276 175 175 B3 1 0 0 20 651CS 63 100 520 276 175 175 B3 1 0 0 20 651CP 70 110 565 276 175 175 B3 1 0 0 20 651CP 70 110 565 276 175 175 B3 1 0 0 20 652AGM 70 120 760 276 175 190 B3 1 0 10 62C 652C 66 110 505 276 175 190 B3 1 0 0 20 652CP 75 120 555 276 175 190 B3 1 0 0 20 652DS 70 110 610 276 175 190 B3 1 0 0 83 652DS 70 110 610 276 175 190 B3 1 0 0 83 652PD 75 120 660 276 175 190 B3 1 0 0 83 652PD 75 120 660 276 175 190 B3 1 0 0 83 652PDS 74 120 660 276 175 190 B3 1 0 0 83 652PDS 74 120 660 276 175 190 B3 1 0 0 83 652PDS 75 133 710 276 175 190 B3 1 0 0 83 652PDS 75 120 660 276 175 190 B3 1 0 0 83 652PDS 75 120 660 276 175 190 B3 1 0 0 83 652PDS 75 120 660 276 175 190 B3 1 0 0 83 652PDS 75 120 660 276 175 190 B3 1 0 0 83 652PDS 75 120 660 276 175 190 B3 1 0 0 83 652PDS 75 120 660 276 175 190 B3 1 0 0 83 652PDS 75 120 660 276 175 190 B3 1 0 0 83 652PDS 75 120 660 276 175 190 B3 1 0 0 83 652PDS 75 120 660 276 175 190 B3 1 0 0 70 652PS 75 120 660 276 175 190 B3 1 0 0 70 652PS 75 120 660 276 175 190 B3 1 0 0 70 652PS 75 120 660 276 175 190 B3 1 0 0 70 652PS 75 120 660 276 175 190 B3 1 0 0 70 652PS 75 120 660 276 175 190 B3 1 0 0 70 652PS 75 120 660 276 175 190 B3 1 0 0 70 652PS 75 120 660 276 175 190 B3 1 0 0 70 652PS 75 120 660 276 175 190 B3 1 0 0 70 652PS 75 120 660 276 175 190 B3 1 0 0 70 652PS 75 120 660 276 175 190 B3 1 0 0 70 652PS 75 120 660 276 175 190 B3 1 0 0 70 652PS 75 120 660 276 175 190 B3 1 0 0 10 658C 100 170 860 352 175 190 B3 1 0 0 10 658C 100 170 860 352 175 190 B3 1 0 0 10 658C 100 170 860 352 175 190 B3 1 0 0 10 658C 100 170 860 352 175 190 B3 1 1 1 1 86 662PS 75 120 660 276 175 190 B3 1 1 1 1 86 662PS 75 120 660 276 175 190 B3 1 1 1 1 86 662PS 75 120 660 276 175 190 B3 1 1 1 1 86 662PS 75 120 660 276 175 190 B3 1 1 1 1 86 662PS 75 120 660 276 175 190 B3 1 1 1 1 86 662PS 75 120 660 276 175 190 B3 1 1 1 1 86 662PS 75 120 660 276 175 190 B3 1 1 1 1 86 662PS 75 120 6											18
651         63         100         565         276         175         175         B3         1         0         99           651C         63         100         520         276         175         175         B3         1         0         20           651CS         63         100         520         276         175         175         B3         1         0         20           651CP         70         110         565         276         175         175         B3         1         0         20           652AGM         70         120         760         276         175         190         B3         1         0         20           652CB         66         110         505         276         175         190         B3         1         0         20           652CP         75         120         555         276         175         190         B3         1         0         22           652CP         75         120         555         276         175         190         B3         1         0         28           652DS         70         110         6						175	225		1	1	-
651C         63         100         520         276         175         175         B3         1         0         20           651CS         63         100         520         276         175         175         B3         1         0         20           651CP         70         110         565         276         175         175         B3         1         0         20           652AGM         70         120         760         276         175         190         B3         1         0         10           652C 66         110         505         276         175         190         B3         1         0         10           652CP 75         120         555         276         175         190         B3         1         0         2           652D 70         110         610         276         175         190         B3         1         0         2           652D 75         120         660         276         175         190         B3         1         0         8           652D 75         120         660         276         175         190         B3											-
651CS         63         100         520         276         175         175         B3         1         0         20           651CP         70         110         565         276         175         175         B3         1         0         20           652AGM         70         120         760         276         175         190         B3         1         0         10           652C         66         110         505         276         175         190         B3         1         0         12           652CP         75         120         555         276         175         190         B3         1         0         22           652D         70         110         610         276         175         190         B3         1         0         83           652DS         70         110         610         276         175         190         B3         1         0         83           652PD         75         120         660         276         175         190         B3         1         0         83           652PDS         75         120 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td><td>99</td></td<>									1		99
651CP         70         110         565         276         175         175         B3         1         0         20           652AGM         70         120         760         276         175         190         B3         1         0         10           652C         66         110         505         276         175         190         B3         1         0         2           652CP         75         120         555         276         175         190         B3         1         0         2           652D         70         110         610         276         175         190         B3         1         0         8           652DS         70         110         610         276         175         190         B3         1         0         8           652DS         70         110         610         276         175         190         B3         1         0         8           652PD         75         120         660         276         175         190         B3         1         0         83           652PDS         75         133         710<									1		20 20
652AGM         70         120         760         276         175         190         B3         1         0         10           652C         66         110         505         276         175         190         B3         1         0         22           652CP         75         120         555         276         175         190         B3         1         0         22           652D         70         110         610         276         175         190         B3         1         0         22           652DS         70         110         610         276         175         190         B3         1         0         83           652DS         70         110         610         276         175         190         B3         1         0         83           652PD         75         120         660         276         175         190         B3         1         0         83           652PDS         74         120         660         276         175         190         B3         1         0         76           652PS         75         120 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>20</td></td<>											20
652C         66         110         505         276         175         190         B3         1         0         22           652CP         75         120         555         276         175         190         B3         1         0         22           652D         70         110         610         276         175         190         B3         1         0         83           652DS         70         110         610         276         175         190         B3         1         0         83           652PD         75         120         660         276         175         190         B3         1         0         83           652PDS         74         120         660         276         175         190         B3         1         0         83           652PPS         75         133         710         276         175         190         B3         1         0         83           652PS         75         133         710         276         175         190         B3         1         0         76           652PS         75         120 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>103</td></td<>											103
652D         70         110         610         276         175         190         B3         1         0         83           652DS         70         110         610         276         175         190         B3         1         0         83           652PD         75         120         660         276         175         190         B3         1         0         83           652PDS         74         120         660         276         175         190         B3         1         0         83           652PPS         75         133         710         276         175         190         B3         1         0         76           652PS         75         120         660         276         175         190         B3         1         0         76           652PS         75         120         660         276         175         190         B3         1         0         77           654C         80         140         755         352         175         175         B3         1         0         77           657C         70         110	652C	66	110		276	175	190	В3			21
652DS         70         110         610         276         175         190         B3         1         0         86           652PD         75         120         660         276         175         190         B3         1         0         86           652PDS         74         120         660         276         175         190         B3         1         0         83           652PPS         75         133         710         276         175         190         B3         1         0         76           652PS         75         120         660         276         175         190         B3         1         0         76           652PS         75         120         660         276         175         190         B3         1         0         76           652PS         75         120         660         276         175         190         B3         1         0         76           654C         80         140         755         352         175         175         B3         1         0         76           657         70         123											21
652PD         75         120         660         276         175         190         B3         1         0         83           652PDS         74         120         660         276         175         190         B3         1         0         83           652PPS         75         133         710         276         175         190         B3         1         0         76           652PS         75         120         660         276         175         190         B3         1         0         76           652PS         75         120         660         276         175         190         B3         1         0         76           654C         80         140         755         352         175         175         B3         1         0         77           657         70         123         610         276         175         190         B7         1         1         23           657C         70         110         505         276         175         190         B7         1         1         23           657NIS         70         110											83
652PDS         74         120         660         276         175         190         B3         1         0         83           652PPS         75         133         710         276         175         190         B3         1         0         78           652PS         75         120         660         276         175         190         B3         1         0         78           654C         80         140         755         352         175         175         B3         1         0         76           657         70         123         610         276         175         190         B7         1         1         23           657C         70         110         505         276         175         190         B7         1         1         23           657CS         65         100         505         276         175         190         B7         1         1         23           657NIS         70         110         610         276         175         190         B3         1         1         36           658AGM         92         160 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>83</td></td<>											83
652PPS         75         133         710         276         175         190         B3         1         0         76           652PS         75         120         660         276         175         190         B3         1         0         78           654C         80         140         755         352         175         175         B3         1         0         70           657         70         123         610         276         175         190         B7         1         1         23           657C         70         110         505         276         175         190         B7         1         1         23           657CS         65         100         505         276         175         190         B7         1         1         23           657NIS         70         110         610         276         175         190         B7         1         1         23           657NIS         70         110         610         276         175         190         B3         1         1         36           658AGM         92         160 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>83</td></td<>											83
652PS         75         120         660         276         175         190         B3         1         0         76           654C         80         140         755         352         175         175         B3         1         0         76           657         70         123         610         276         175         190         B7         1         1         23           657C         70         110         505         276         175         190         B7         1         1         23           657CS         65         100         505         276         175         190         B7         1         1         23           657CS         65         100         505         276         175         190         B7         1         1         23           657CS         65         100         505         276         175         190         B3         1         1         36           658AGM         92         160         900         352         175         190         B3         1         0         10           659PP         75         120         75											78
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662P     75     120     660     276     175     190     B3     1     1     86       662PPS     75     133     710     276     175     190     B3     1     1     86       662PS     75     120     660     276     175     190     B3     1     1     86       662PS     75     120     660     276     175     190     B3     1     1     86									_		100
662PS 75 120 660 276 175 190 B3 1 1 86											86
											86
663C   88   150   760   352   175   190   B3   1   0   24										-	86
											24 96

## **BATTERY SPECIFICATIONS**



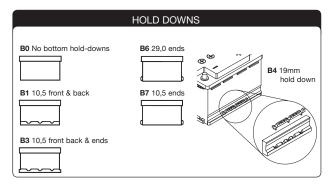
	20 hour	Res.	IEC	D	imensions (m	m)	Hold	Terminal	Layout	Figure
Battery	C <sub>n</sub> (Ah)	C <sub>r,n</sub> (Min)	CCA (A)	L	W	Н	Down			
668AGM	80	140	800	314	175	190	B3	1	0	104
668D	80	140	710	314	175	190	B3	1	0	84
668DS	80	140	710	314	175	190	B3	1	0	84
668P	85	150	760	314	175	190	B3	1	0	79
668PP	90	160	810	314	175	190	B3	1	0	79
669P	84	150	760	314	175	190	B3	1	1	90
669PS	85	150	760	314	175	190	B3	1	1	90
671C	96	180	770	346	174	226	B0	1	1	25
674C	96	180	770	346	174	226	B0	1	0	26
682C	120	225	840	513	188	221	B0	1	4	109
683C	120	225	840	513	188	221	B0	1	3	110
685C	118	200	820	513	188	209	B0	1	3	115
686C	140	256	950	513	188	221	B0	1	3	110
688C	200	350	1340	513	276	241	B0	1	4	113
689C	143	256	950	514	220	221	B0	1	3	112
690C	143	256	950	514	220	221	B0	1	4	111
690CP	160	275	1040	514	220	221	B0	1	4	111
692C	160	275	1040	514	220	221	B0	1	3	112
695CZ	230	400	1350	513	276	241	B0	1	3	114
696C	180	305	1250	514	220	221	B0	1	3	112
696CZ	180	305	1180	514	220	221	B0	1	3	112
698CZ	180	275	1040	514	220	221	B0	1	4	111
NG10	25	45	220	241	173	215	B0	1	1	2
NG11	25	45	220	241	173	200	B0	1	1	43
NG17E	25	45	235	207	175	175	B3	1	0	56
NG19E	25	45	235	207	175	175	B3	1	0	57
NG28E	35	60	330	245	175	175	B3	1	0	60
NG52	45	75	355	276	175	190	B3	1	0	21
SMF65	60	100	480	230	175	220	B0	1	0	-
* SMF100	102	180	710	328	171	239	B0	STUD	CENTRE	92
SMF101	102	180	710	328	171	239	B0	1	CENTRE	93

<sup>\*</sup> Supplied with stainless steel washers and nuts

#### **MARINE & LEISURE BATTERY SPECIFICATIONS**

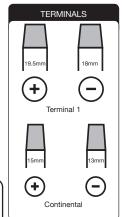
#### SUPPLIED STANDARD WITH GLASS FIBRE MAT SEPARATORS

Battery	20 hour C <sub>n</sub> (Ah)	L	Dimensions (mn	n)   H	Hold Down	Terminal	Layout	Figure
RR0	40	241	173	200	B0	1	1	38
RR1	50	241	173	200	B0	1	1	38
RR2	90	352	175	226	B0	1	0	39
RR3	80	352	175	226	В0	1	0	39



# 





#### Nominal Capacity (C<sub>n</sub>)

The nominal capacity  $(C_{\Pi})$  is the electric charge (in Ah) which a battery can supply with a current

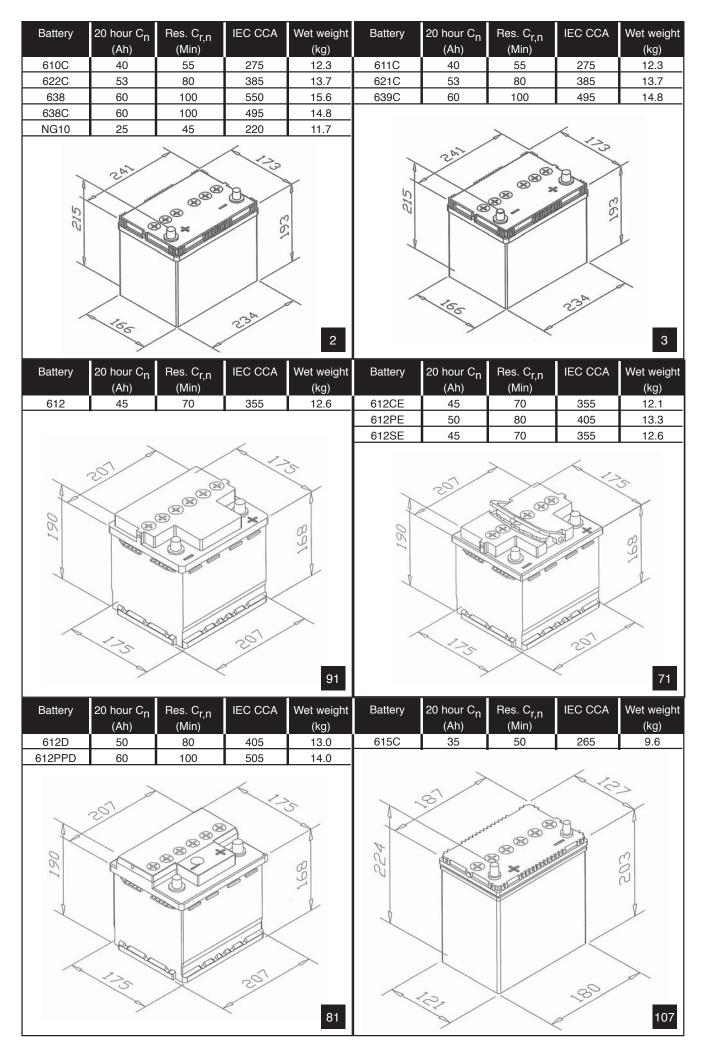
 $\frac{C_{n}}{20}\left(A\right)$  to a final voltage of 10.5 V.

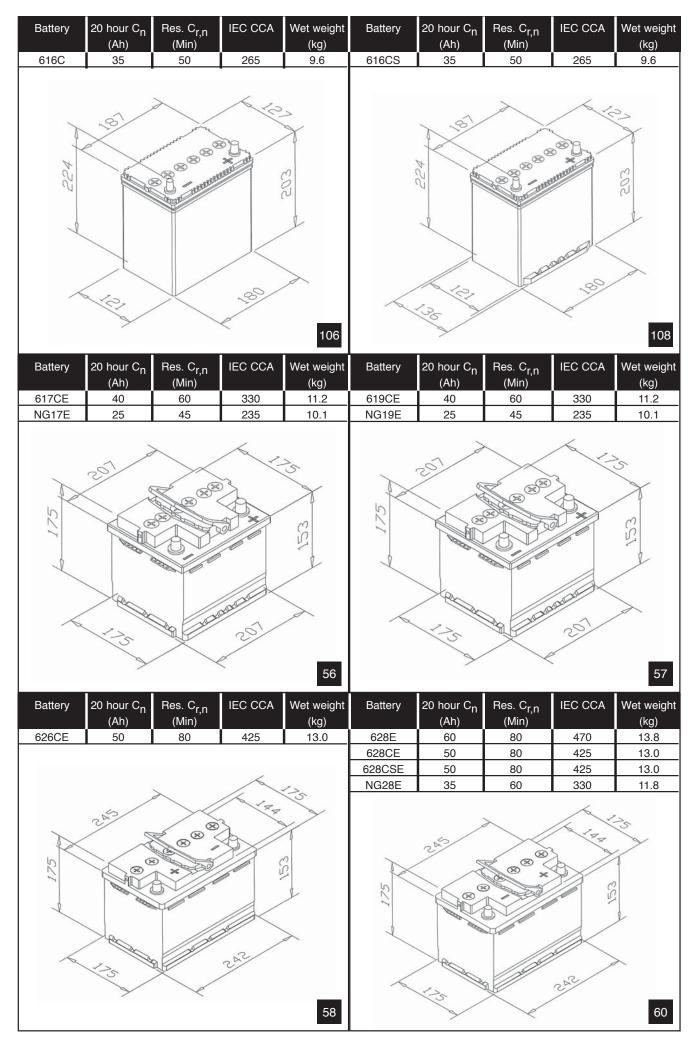
#### Nominal Reserve Capacity (C<sub>r,n</sub>)

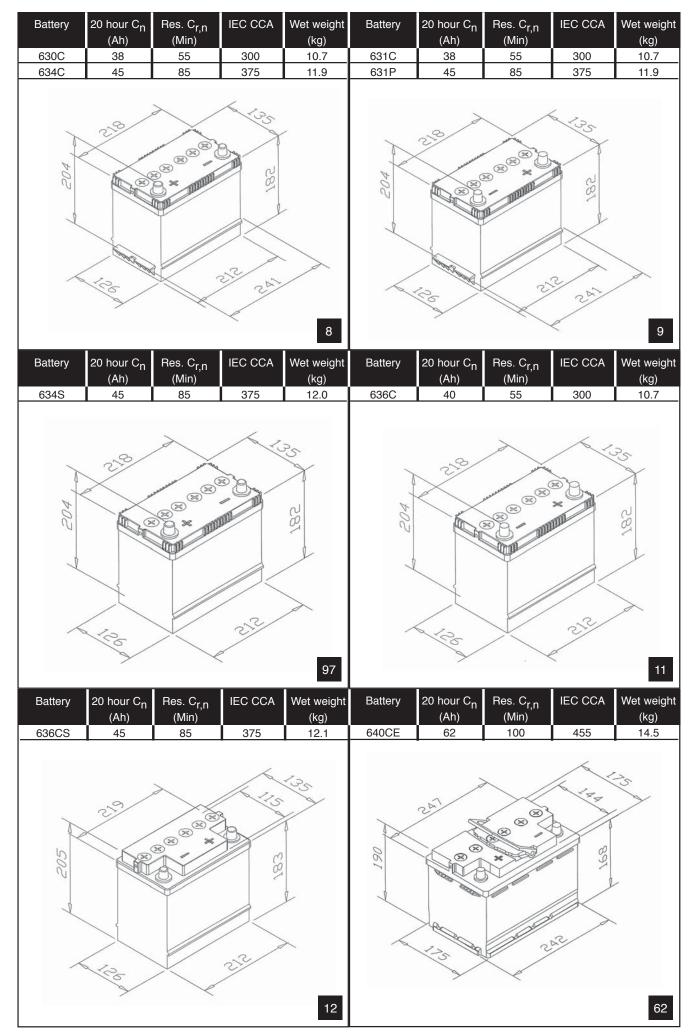
The nominal reserve capacity  $(C_{r,\Pi})$  is the period of time (in minutes) for which a battery can maintain a discharge current of 25 A to a cut-off voltage of 10.5 V.

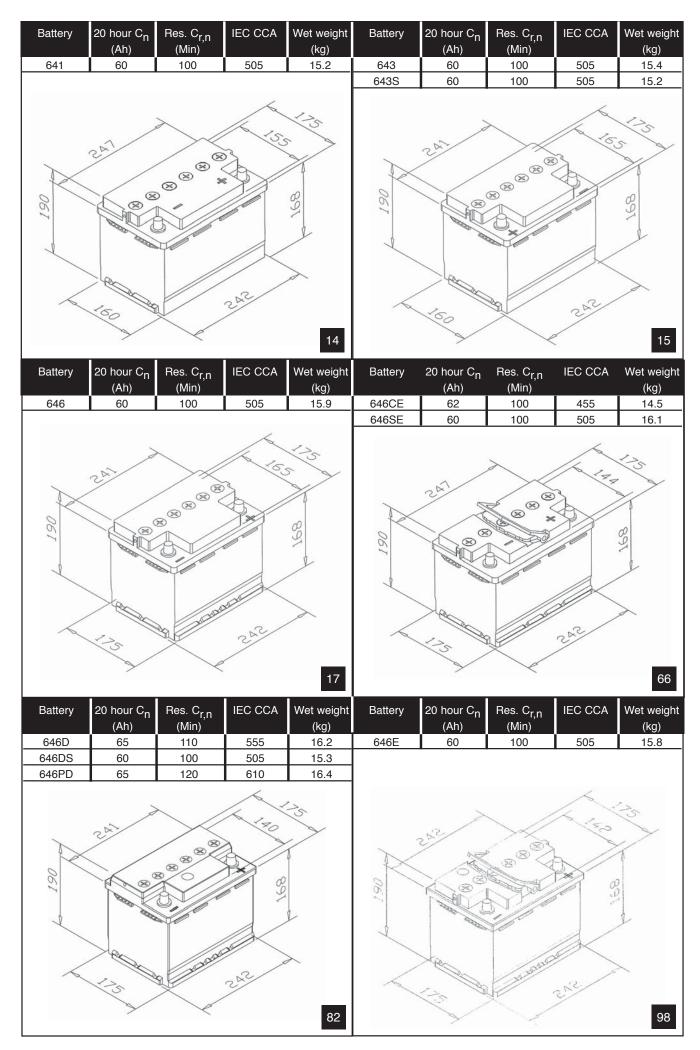
#### **IEC Cranking Performance Test**

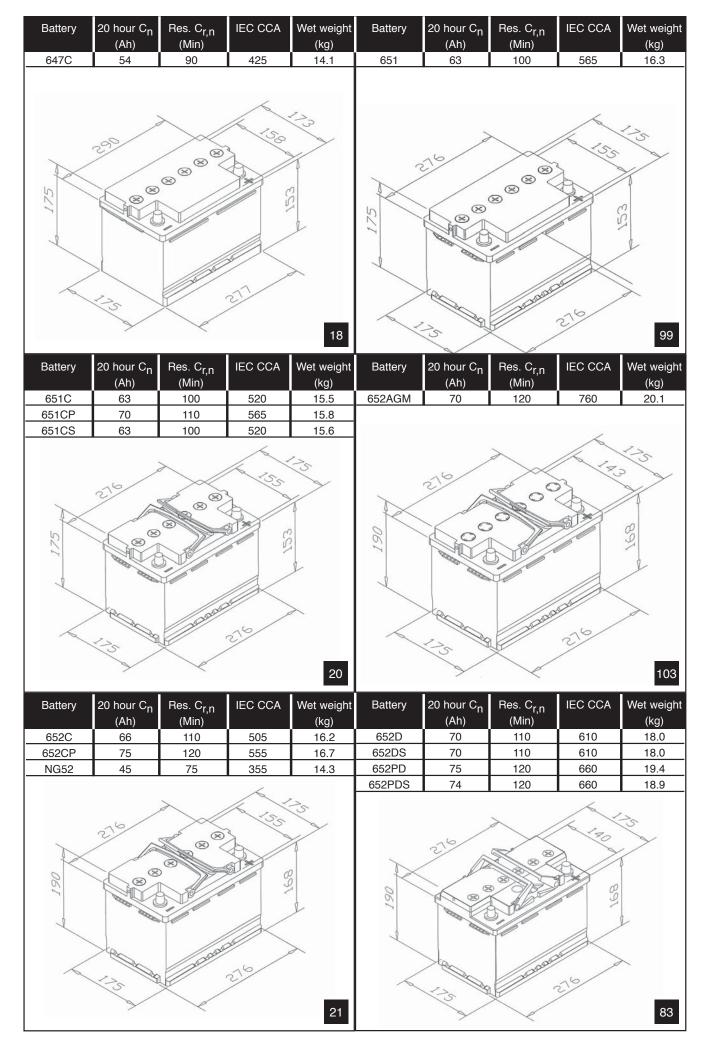
The IEC cranking performance current is defined as the current a battery at a temperature of -18°C can deliver for 10 seconds while maintaining a voltage of greater than or equal to 7.5 V and a voltage of greater than or equal to 7.2 V after 30 seconds.

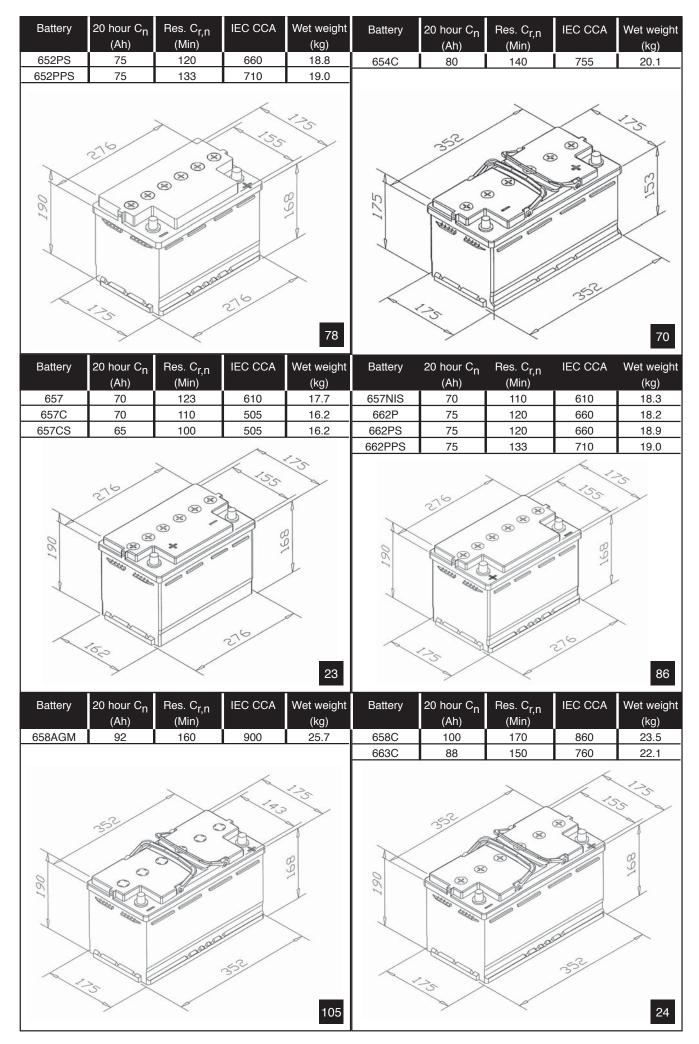


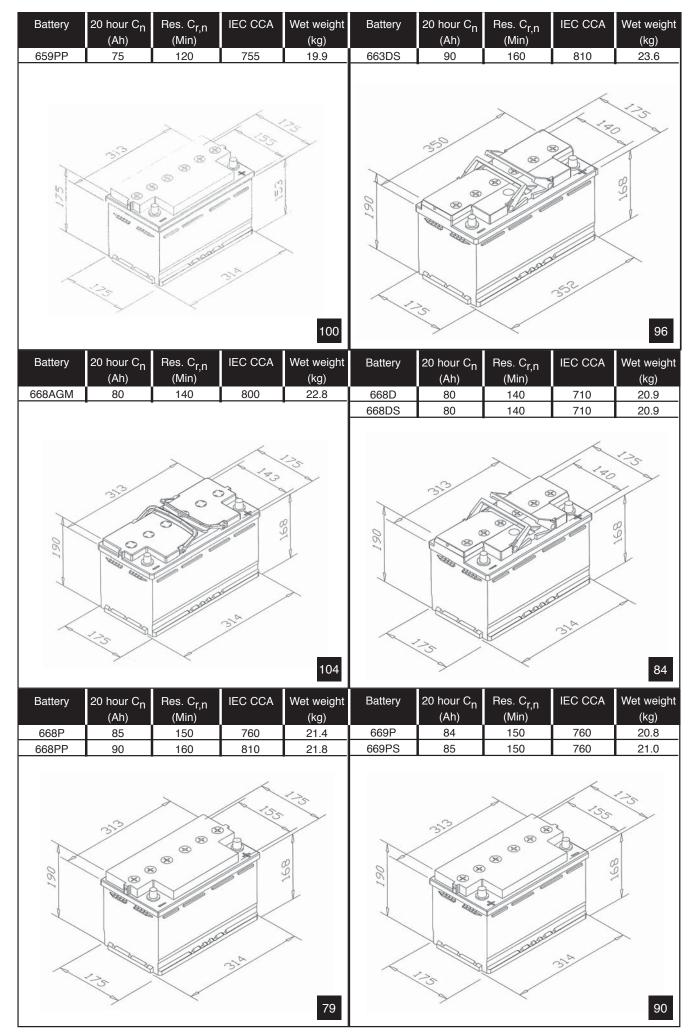


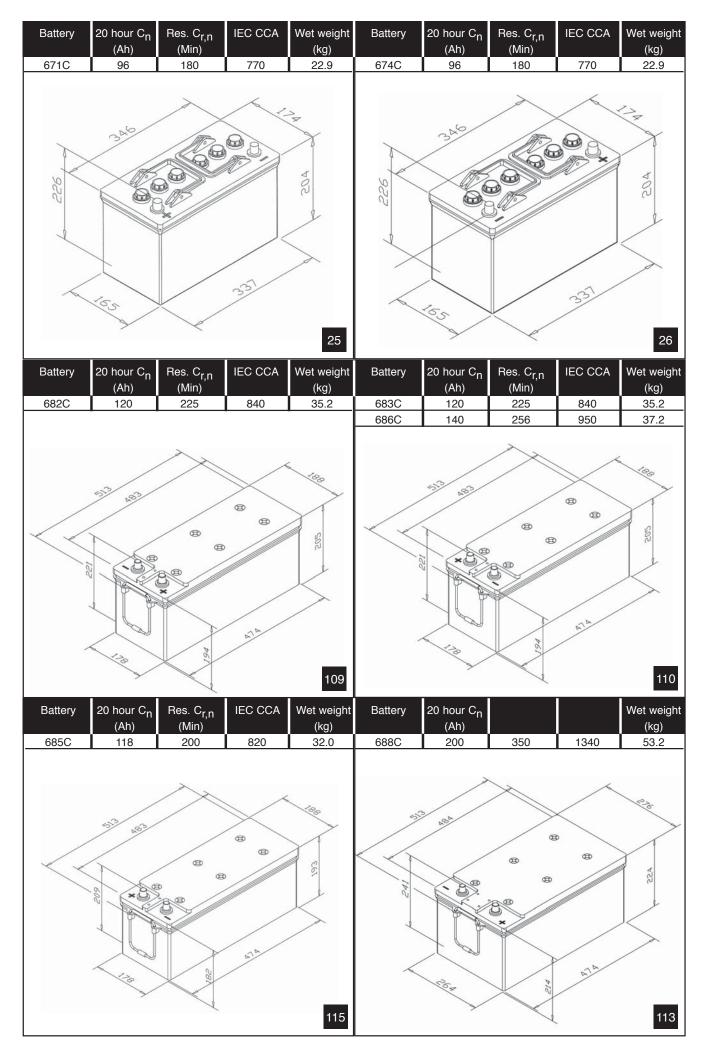


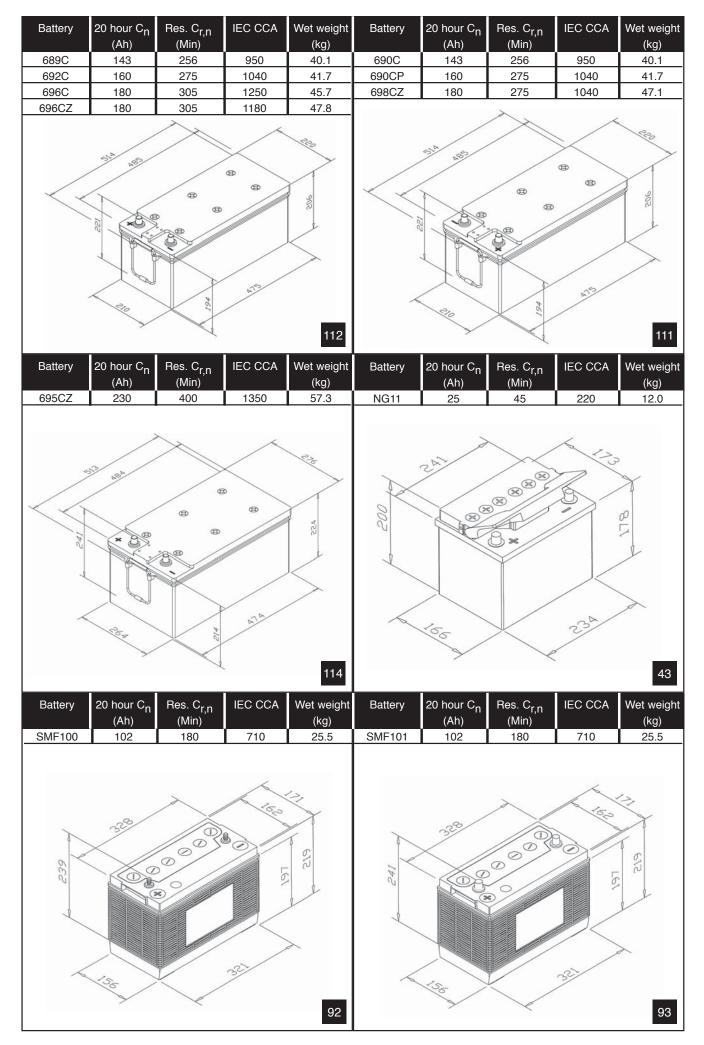












Battery	20 hour C <sub>n</sub> (Ah)	Res. C <sub>r,n</sub> (Min)	IEC CCA	Wet weight (kg)	Battery	20 hour C <sub>n</sub> (Ah)	Res. C <sub>r,n</sub> (Min)	IEC CCA	Wet weight (kg)
RR0	40	55	230	12.9	RR2	90	150	650	22.7
RR1	50	80	323	14.3	RR3	80	140	600	22.1
H 002 4	24	88		178 178	756	539		8	502

NOTES



## **TWIN BATTERY SETUPS**

The practice of fitting an auxiliary battery in a motor vehicle for recreational purposes, is becoming common. It is accordingly of benefit to understand the physical principles involved in using such a battery.

Stated broadly, the objective is to have a second battery (the auxiliary) which will provide energy for the operation of additional electrical loads like fridges and TV sets when the engine is switched off. This auxiliary battery is connected in parallel with the starter battery in order to maintain the system voltage, usually 12V. It has to be used in a manner that will not jeopardize the working of the starter battery. Even with the mass arrival of cell phones, and rapid response teams, failure to start a vehicle in a remote area is definitely an event to be avoided.

A number of methods have been devised for managing this arrangement, and these should be approached with a basic understanding of how alternators behave toward batteries in parallel (connected positive to positive and negative to negative), and how batteries in parallel behave toward each other.

#### The main rules are:

- Batteries in differing states-of-charge, and therefore with differing open-circuit voltages, will rapidly attain the same voltage when connected in parallel; this remains true even when the batteries are charging or discharging. This is so because voltage is the driving force in this situation, and a 40 Ah battery will discharge happily into a 100Ah battery with a lower voltage, until their voltages are equal. Expressed in another way, current will flow as long as a voltage difference exists.
- The rate in amps at which the alternator will charge a battery is determined by three factors, viz, the difference between alternator
  and battery voltage, the internal resistance of the battery, and the temperature of the battery.
- When charging two batteries in parallel, the alternator will be faced with two batteries having the same voltage. Internal resistance
  now becomes the main factor and the charging current will thus be divided between the two batteries roughly in the ratio of their
  respective Ah capacities, the larger current being taken by the bigger battery. This happens simply because the bigger battery has
  a lower internal resistance than a smaller battery of similar design.

The implications of the above rules are two fold:

- A discharged auxiliary battery will draw current from the starter battery if inadvertently connected to it. Should the auxiliary battery
  have been deeply discharged, the voltage of the starter battery may be depressed to a level where it will not start the vehicle (less
  than 12.0V) and this fact must be taken into account when installing a second battery.
- The auxiliary battery is invariably bigger than the starter battery and will have a lower internal resistance. It will therefore receive preferential treatment from the alternator. This is convenient since the starter battery is usually less in need of a charge than the auxiliary battery.

Parallel configuration is in worldwide use, even in installations such as nuclear power stations, and have given excellent service. The only special requirement is that no unnecessary resistance be introduced into the circuit in the form of thin cables or poor electrical connections. As far as the alternator is concerned, the unit fitted to the car will in most instances cope with the two batteries. Even calcium batteries being charged by present-day alternators at 14.4V are being maintained in a satisfactory state-of-charge. Nevertheless, First National Battery recommend an annual charge at a Battery Centre or other auto-electrical workshop at which the driver must insist on the use of a constant-current charger which has no voltage limitations.

When battery-powered winches are to be used, batteries of the recreational type are ideal, as this is an arduous application which cycles the battery to some extent. This battery type serves well as an auxiliary battery because it withstands cycling while at the same time providing the high current for winches.

Management of the parallel arrangement by a simple system, using one or two automotive relays, has been found to work well. This isolates the starter battery when the ignition is switched off. We have not investigated the other methods available and can therefore not offer any comments.

The contribution to this article by CAR magazine is gratefully acknowledged.

## **5 POINT TESTING PLAN**



#### DOES NOT APPLY TO AGM BATTERIES

(1) INITIAL EXAMINATION

PROOF OF PURCHASE, SOUND APPEARANCE, APPROVED APPLICATION, WITHIN WARRANTY PERIOD





YES (PERFORM ROAD TEST)

cell. The cell nearest the positive terminal is

identified as Cell No. 1. Using the Hydrometer

as a pump on the two end cells, check for

discoloured electrolyte.

(2) VOLTMETER READINGS	(3) HIGH RATE VOLTS	(4) HYDROMETER READINGS	(5) DECISION
10 to 11.5	Below 9 (Voltage often rises)	Hi Med Lo	ACCEPT (manufacturing defect)
10 to 11.5	Below 9 (Voltage often rises)	Hi Med Lo	(manufacturing defect)  ACCEPT
0 to 12.6	Below 3 (Voltage normally zero)	Hi Med Lo	(manufacturing defect)
6 - 12.4	Below 9 (Voltage steadily falls)	Hi Med Lo	service abuse
Below 10	Below 3 (Voltage can be zero)	Hi Med Lo	(over-discharge unlikely to recover)
Above 11.5	3 to 9 (Voltage remains stable)	Hi Med Lo	(service abuse)
OPEN CIRCUIT VOLTAGE - Record	HIGH RATE DISCHARGE - Record High	HYDROMETER - Record readings from each	<b>DECISION</b> - Identify the result of the

# **DECISION** - Identify the result of the checks WITH the diagnostic chart steps (2) to (4). The nearest combinations will indicate the correct decision, after taking into account "Additional Information".

#### ADDITIONAL INFORMATION:

open circuit voltage (OCV) readings.

(a) Batteries may be undercharged or overcharged as a result of a malfunction of the vehicle's electrical system. This is not a faulty battery and the vehicle electrics should be checked.

(b) If the open circuit voltage check shows a reading below 10.0 Volts, it may not be capable of being successfully recharged and its further service life is often substantially reduced.

## **BATTERY ADDITIVES**

Rate Discharge (HRD) readings and note

the movement of the needle.

Over many years we, along with battery companies and battery users around the world, have tested a variety of chemicals that are claimed to extend the life of both automotive and industrial batteries by phenomenal amounts These products are also often claimed to be able to rejuvenate batteries that are in very poor condition.

In all scientifically conducted tests there has never been any product that has been able to meet it's claims, In the majority of instances the substance has been a solution of magnesium sulphate (Epsom salts) with some other elements present as accidental impurities. More recently other elements have been systematically added to the base solution, an example of this has been ethylenediamine tetra-acetic acid (EDTA).

The best that can be said for the products tested has been that some of them have been harmless. In some cases, however, the solution has contained chemicals that are considered battery poisons such as copper and manganese.

Despite the above, the suppliers of these products have continued to make extravagant claims. Some have even boasted that the various manufactureres and even state laboratories have tested their product. They have failed to mention that these organisations have concluded that the additive was useless.

Our opinion remains that these products do not have any merit and the addition of them, or for that matter, anything other than approved water, will nulify any warranty.

33



### **WARRANTIES**

#### **Starter Battery**

Metindustrial (Pty) Limited - trading through its division First National Battery ("FNB") warrants to the original purchaser only, for a period of twelve (12) months as from date of purchase, that this battery is free of defects in material and workmanship under normal use and service conditions and in terms of correct application.

This warranty extends to the Republic of South Africa, Botswana, Lesotho, Malawi, Mozambique, Namibia and Swaziland only.

In the event of any defects in material and/or workmanship arising within the said twelve (12) month period, FNB undertakes, in its sole discretion to repair the defect or replace the battery at its own cost and without charge to the purchaser, subject to the following conditions:-

- Any claim in terms of this warranty must be made as soon as the purchaser becomes aware of the defect and which must become apparent within the twelve (12) month warranty term;
- The purchaser must return the defective battery to FNB or its duly authorised agents and exhibit satisfactory proof of purchase of the battery from FNB or its duly authorised agents;
- The warranty on the repaired or replaced battery shall extend from the original date of purchase of the "defective" battery;
- 4. This warranty shall not apply where the battery is used in a vehicle whose specifications requires a battery of a different size / ampere hour capacity or where this battery is fitted below or above the suggested ampere hour capacity (at the 20 hour rate) as specified in FNB'S official Battery Selection Guide or, in the case of original equipment installed by a vehicle manufacturer, not according to their official specified capacity;
- 5. This warranty is void if failure of the battery has resulted from abuse or neglect; improper use / mis-application (including incorrect over or under charging; failure to keep the battery properly charged or maintained; or use in automotive vehicles without properly operating starting or charging systems); use of the battery in continuous shift; overheating; overfilling; tipping over; missing or loose vent caps; use of battery acid or additives; excessive use and abnormal wear and tear during the warranty term (including commercial use); use in a vehicle fitted with additional or non-standard electrical extras; environmental conditions or any other damage arising from, inter alia, accident / collision, fire, explosion, freezing, theft, civil commotion, labour / political unrest or rioting;
- 6. This warranty shall, further, not apply where the battery is otherwise used in applications for which this battery was not designed;
- This warranty is in lieu of any warranties (express or implied) or conditions implied by law, which are hereby specifically excluded;
- 8. FNB and its duly authorised agents exclude all liability for damage, loss or injury howsoever suffered and shall not be held liable for any damages, losses, injury, expenses or costs (whether of a direct, indirect, consequential, incidental or other nature) howsoever suffered and by whomsoever suffered which may arise out of or relate to the use or inability to use this battery or any failure whatsoever to meet this warranty.

#### **Leisure Battery**

Metindustrial (Pty) Limited - trading through its division First National Battery ("FNB") warrants to the original purchaser only, for a period of twelve (12) months as from date of purchase, that this battery is free of defects in material and workmanship under normal use and service and in terms of correct application.

This warranty extends to the Republic of South Africa, Botswana, Lesotho, Malawi, Mozambique, Namibia and Swaziland only.

In the event of any defects in material and/or workmanship arising within the said twelve (12) month period, FNB undertakes, in its sole discretion, to repair the defect or replace the battery at its own cost and without charge to the purchaser subject to the following conditions:-

- Any claim in terms of this warranty must be made as soon as the purchaser becomes aware of the defect and which must become apparent within the twelve (12) month warranty term;
- The purchaser must return the defective battery to FNB or its duly authorised agents and exhibit satisfactory proof of purchase of the battery from FNB or its duly authorised agents;
- 3. The warranty on the repaired or replaced battery will extend from the original date of purchase of the "defective" battery;
- This warranty shall not apply where the battery is used as a vehicle starter battery or in applications of deep cycle use such as in scrubbers, sweepers or golfcarts;
- 5. This warranty is void if failure of the battery has resulted from failure to maintain the battery in a fixed position, abuse or neglect; improper use / mis-application (including applications not provided for); incorrect over or under charging (whether due to a faulty electrical system or charging apparatus or failure to keep the battery properly charged or maintained); use of battery acid or additives; excessive / abnormal wear and tear; overheating; overfilling; environmental conditions or any other damage whatsoever arising from, inter alia, accident / collision / tipping of the craft wherein the battery is housed; fire, explosion, freezing, theft, civil commotion, labour / political unrest or rioting;
- This warranty is in lieu of any warranties (express or implied) or conditions implied by law, which are hereby specifically excluded;
- 7. FNB and its duly authorised agents exclude all liability for damage, loss or injury howsoever suffered (including but not limited to damage or loss suffered as a result of leaked battery acid) and shall not be held liable for any damages, losses, injury, expenses or costs (whether of a direct, indirect, consequential, incidental or other nature) howsoever suffered and by whomsoever suffered which may arise out of or relate to the use or inability to use this battery or any failure to meet this warranty.

## WARRANTIES



#### SMF100/101 Starter Battery

Metindustrial (Pty) Limited - trading through its division First National Battery ("FNB") warrants to the original purchaser only, that this battery will be free of defects in material and /or workmanship, under normal use and service conditions and in terms of correct application, for a period of twelve (12) months as from date of purchase ("warranty term").

This warranty extends to the Republic of South Africa, Botswana, Lesotho, Malawi, Mozambique, Namibia and Swaziland only.

FNB's sole obligation in terms of this warranty shall be, in the event of any defects in material and/or workmanship arising within the warranty term to, in its sole discretion, repair or replace the battery, without charge to the purchaser, within a reasonable time period, subject to the following conditions:-

- Any claim in terms of this warranty must be made as soon as the purchaser becomes aware of the defect and which must become apparent within the warranty term: Failure to notify FNB or its duly authorised agents of any alleged defect, within the warranty term, will render the warranty void;
- The purchaser must return the defective battery to FNB or its duly authorised agents free of charge within the warranty term and exhibit satisfactory proof of purchase of the battery from FNB or its duly authorised agents;
- 3. The warranty on the repaired or replaced battery shall extend from the original date of purchase of the "defective" battery;
- 4. This warranty shall not apply where the battery is used in a vehicle whose specifications requires a battery of a different size / ampere hour capacity or where this battery is fitted below or above the suggested ampere hour capacity (at the 20 hour rate) as specified in FNB'S official Battery Selection Guide or, in the case of original equipment installed by a vehicle manufacturer, not according to their official specified capacity;
- 5. This warranty is void if failure of the battery has resulted from abuse or neglect; improper use / mis-application (including incorrect over or under charging and excessive cycling; failure to keep the battery properly charged or maintained; or use in automotive vehicles without properly operating starting or charging systems); use of the battery in continuous shift; overheating; tipping over; excessive use and abnormal wear and tear during the warranty term (including commercial use): use in a vehicle fitted with additional or non-standard electrical extras; environmental conditions or any other damage arising from, inter alia, accident / collision, fire, explosion, freezing, theft, civil commotion, labour / political unrest or rioting;
- This warranty shall, further, not apply where the battery is otherwise used in applications for which this battery was not designed including solar applications and as a back-up power source;
- 7. This warranty is in lieu of any warranties (express or implied) or conditions implied by law, which are hereby specifically excluded and no warranties, representations or undertakings of whatever nature have been made or given by FNB or on its behalf other than as stated herein:
- 8. FNB and its duly authorised agents exclude ail liability for damage, loss or injury howsoever suffered and shall not be held liable for any damages, losses, injury, expenses or costs (whether of a direct, indirect, consequential, incidental or other nature) howsoever suffered and by whomsoever suffered which may arise out of or relate to the use or inability to use this battery or any failure whatsoever to meet this warranty.

#### **Motorcycle Battery**

Metindustrial (Pty) Limited – trading through its division First National Battery ("FNB") warrants to the original purchaser only, for a period of six (6) months as from date of purchase, that this battery is free of defects in material and workmanship under normal use and service and in terms of correct application.

This warranty extends to the Republic of South Africa, Botswana, Lesotho, Malawi, Mozambique, Namibia and Swaziland only.

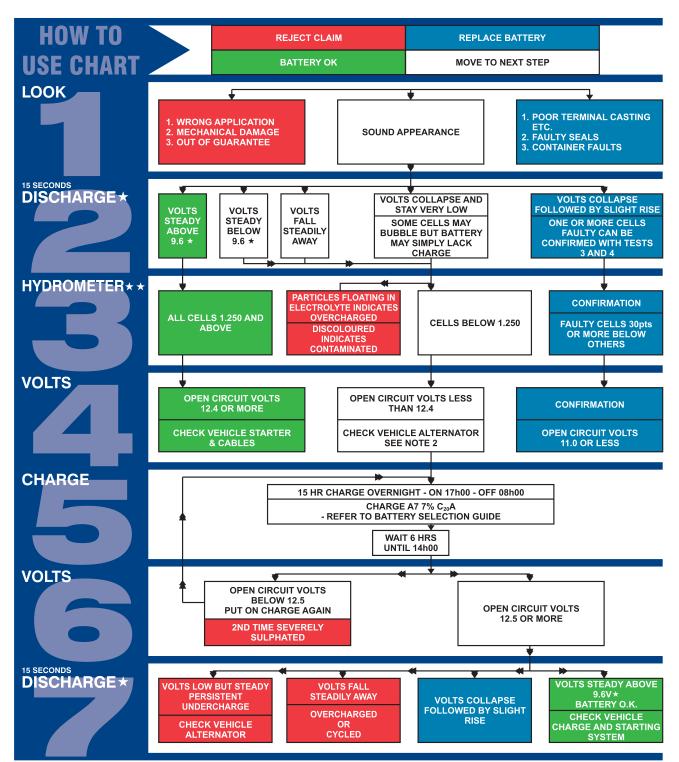
In the event of any defects in material and / or workmanship arising within the said three (3) month period, FNB undertakes, in its sole discretion, to repair the defect or replace the battery at its own cost and without charge to the purchaser subject to the following conditions:

- Any claim in terms of this warranty must be made as soon as the purchaser becomes aware of the defect and which must become apparent within the three (3) month warranty term;
- The purchaser must return the defective battery to FNB or its duly authorised agents and exhibit satisfactory proof of purchase of the battery from FNB or its duly authorised agents;
- 3. The warranty on the repaired or replaced battery will extend from the original date of purchase of the "defective" battery;
- 4. This warranty shall only apply to where the battery is used as a starter battery for a motorcycle and shall not apply where the battery is used in other applications such as in off-road quad bikes jet skis and the like
- 5. This warranty is void if failure of the battery has resulted from failure to maintain the battery in a fixed position, abuse or neglect; improper use / mis-application (including applications not provided for); incorrect over or under charging (whether due to a faulty electrical system or charging apparatus or failure to keep the battery properly charged or maintained); use of battery acid or additives; excessive / abnormal wear and tear; overheating overfilling; environmental conditions or any other damage whatsoever arising from accident / collision / inverting of the battery; fire, explosion, freezing, theft, civil commotion, labour / political unrest or rioting.
- This warranty is in lieu of any warranties (express or implied) or conditions implied by law, which are hereby specifically excluded;
- 7. FNB and its duly authorised agents exclude all liability for damage, loss or injury howsoever suffered (including but not limited to damage or loss suffered as a result or leaked battery acid) and shall not be held liable for any damages, losses, injury, expenses or costs (whether of a direct, indirect, consequential, incidental or other nature) howsoever suffered and by whomsoever suffered which may arise out of or relate to the use or inability to use this battery or any failure to meet this warranty.

35



#### DIAGNOSTIC CHART NOT FOR AGM



- ★ These voltage levels apply to test discharge at cold cranking amps (SABS). If the tester has a 100A/200A switch use 200A for vehicle batteries and 100A for motorcycle types the voltage attained should be between 7,8 and 9,6 Volts depending on the battery's rating
- 1. GENERAL NOTES

The various patterns of movement of the high rate discharge meter needle are most important in deciding the condition of the battery, even more important than the actual readings. Get to know them well from the descriptions shown above.

★ ★ Do not top-up before testing as this will spoil hydrometer readings

#### 2. ALTERNATOR VOLTAGE CHECK:

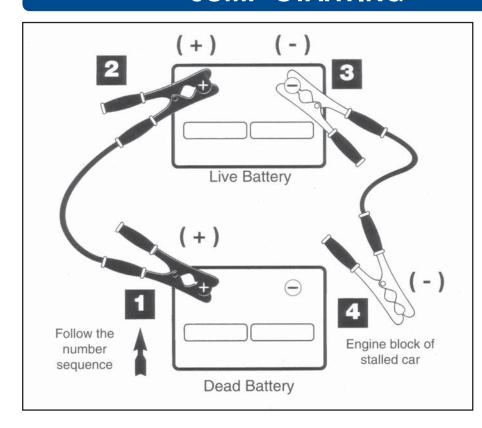
(a) Fit well charged battery. (b) Run Engine until all at working temperature (5-10 minutes from cold). (c) Measure battery voltage when engine speed is equivalent to 50-65 km/h with lights and accessories "off". (d) The alternator should give a voltage at the battery between 14,0 and 14,6 V. Below 14V will lead to undercharge in winter months. Above 14,6 V will lead to overcharge and higher than normal water consumption.

#### 3. SAFETY

SAFETY
(a) Wear eye protections when testing. (b) Do not wear metallic articles which might cause short circuits during testing e.g. watches, bracelets. (c) Keep plenty of water available for drenching any spilled acid. (d) If battery vents are removable blow gently across cell tops to disperse gases before discharge tests. (e) High rate testers which connect to the battery by simple probes are not recommended. (f) Switch off charger before disconnecting battery.

## **JUMP-STARTING**

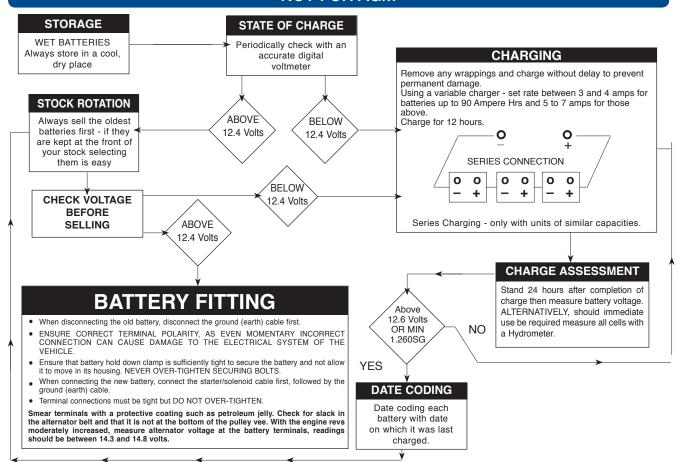




If jumper cables are available and the booster battery is in another car; in both cars, set handbrakes, turn off all switches, place gear selector in Neutral or Park position, make certain cars do not touch, then proceed in this exact sequence -

- Connect the red cable clamp to the positive post of the discharged battery.
- Connect other end of the red cable clamp to the positive post of the live battery.
- 3. Connect the black cable clamp to the negative post of the live battery.
- MAKE FINAL CONNECTION ON ENGINE BLOCK OF STALLED CAR - as far away as possible from battery. Make certain cars do not touch.
- Attemp to start 'dead vehicle' with 'live vehicle' engine OFF. If vehicle has not started in 15 seconds stop procedure and check ignition and fuel systems.
- 6. To remove cables reverse this exact procedure.

## STORAGE, CHARGING & FITTING NOT FOR AGM







Advanced AGM Technology immobilises the acid in the battery, resulting in virtually zero gas emissions and no acid spillage in the case of rupture or accident. This makes the battery **spillproof** and allows you to install this battery in virtually any position.

Advanced AGM Technology delivers an extra high starting current which makes this battery very suitable for use in **diesel vehicles**. Diesel engines have a very high compression ratio which requires **high starting currents**.

Advanced AGM Technology uses a tightly compressed internal construction which makes this battery more vibration resistant. Potholes and rough terrain are less likely to systemactically damage the plates of this battery and shorten the life.

Advanced AGM Technology is especially suitable for deep cycle applications. Designed to withstand ongoing discharging and recharging and offers up to 3 times the deep cycle life of a conventional (fooded) technology battery.

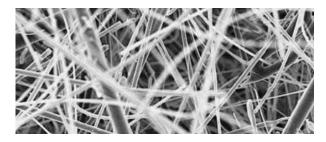
**Vehicle manufacturers** are now selling more and more vehicle with **stop/start capabilities**. Advanced AGM batteries are optimised for stop/start and regenerative braking used in mild hybrid vehicles. To be

**BATTERY SPECIFICATIONS** 

more fuel effcient the engines of these stop/start vehicles switch off automatically every time the vehicle stops in traffc. When the clutch is depressed the engine automatically restarts. This represents the most challenging operating environment for a vehicle battery.

Advanced AGM Technology is specially designed for this new generation of vehicles and will play a major role to ensure a reliable greener environment for all of us. This battery is also recyclable when it has fnally reached the end of its long life. Advanced AGM batteries last longer and therefore require less frequent replacement - saving energy, resources and accompanying emissions during manufacture.

This battery has a nationwide guarantee and is available in the launch range of three battery capacities - 70, 80 and 92 Ah which will meet virtually all the local market requirements for this unique product.



**SEM Glass Matt Separator** 

Туре	C <sub>20</sub> (Ah)	Reserve Capacity (Min)	EN CCA(A)	Length mm	Width mm	Height mm	Hold down	Terminal	Layout	Wet Weight kg
652AGM	70	120	760	276	175	190	ВЗ	1	0	20.2
668AGM	80	140	800	314	175	190	ВЗ	1	0	22.9
658AGM	92	160	900	352	175	190	В3	1	0	25.8

**Terminal 1** 



Layout 0



Hold down B3



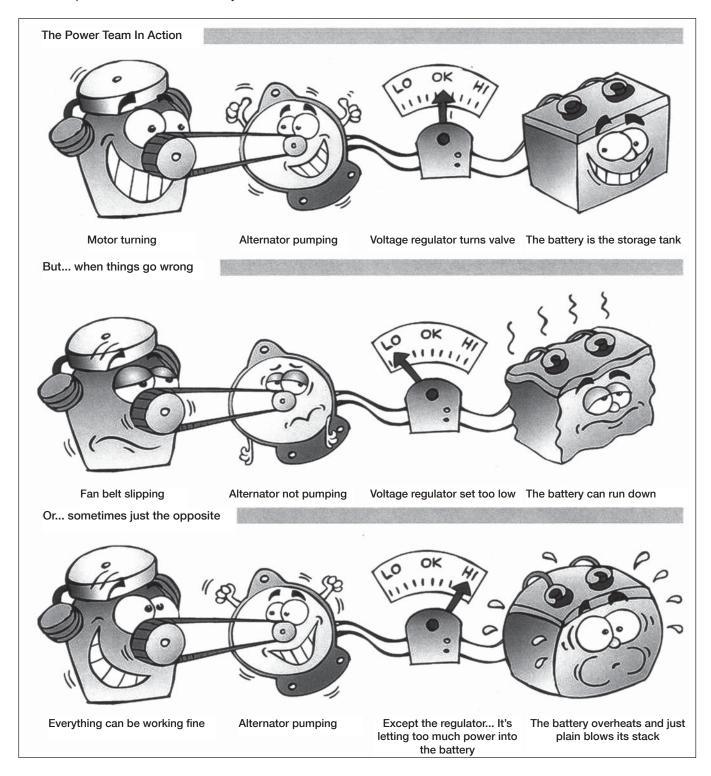
## BACK TO "BATTERY BASICS"



#### THE POWER TEAM

Not every starting problem comes from the battery!

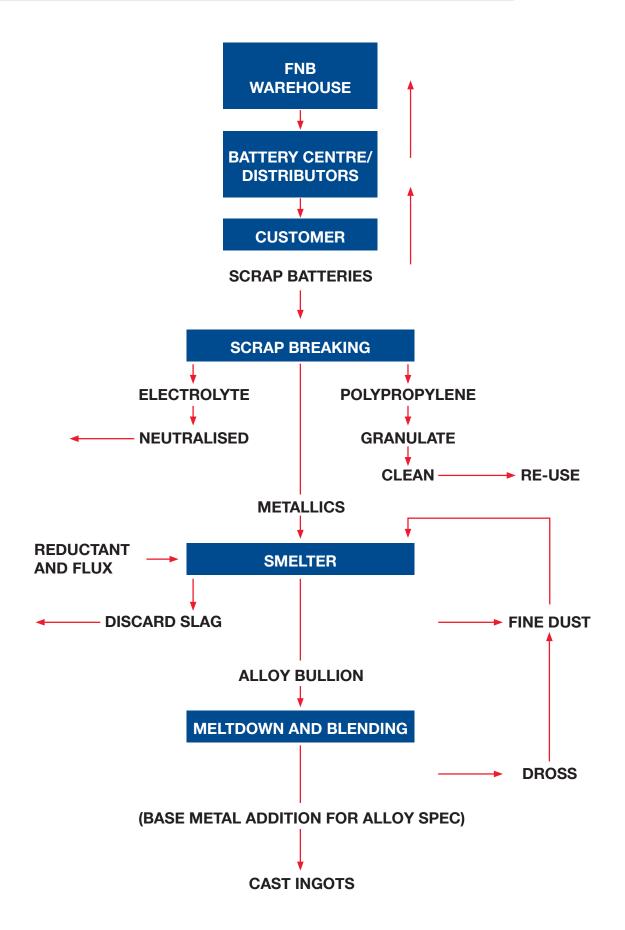
When you experience a starting problem be aware that the battery is only a part of the "team" in the electrical circuit of your motor car. The battery's function is to capture and store the electrical energy produced by the alternator and make this available to the starter motor, and to provide the power for all the other electrical components. If any of them are problematic then the battery will not be able to fulfill it's function.



NOTES	

## PROCESS FLOW - SECONDARY SMELTING







#### A PROUDLY OWNED SUBSIDIARY OF METAIR



## FIRST NATIONAL BATTERY DIVISION OF METINDUSTRIAL (Pty) LTD Reg. No. 1949/031259/07

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