AUTOMOTIVE BATTERIES & ACCESSORIES

2017
2018

DYNAC BATTERIES

LANDPORT EUROPE

LANDPORT EUROPE

WELKOM BIJ LANDPORT EUROPE

Landport was founded in 1993, and since then we have become an European battery specialist. We offer an extensive range of batteries and battery-related products, such as chargers and accessories, which offers a solution for virtually every application. Our batteries are roughly divided into three groups: automotive batteries, motorcycle batteries and VRLA batteries. Landport is part of the Louwman Group which includes the Dutch importers of Toyota, Lexus and Suzuki passengers cars. Our customers are manufacturers, importers, wholesalers, wholesale organizations and chain stores, which we serve from our central warehouse and office in Raamsdonksveer. Currently, Landport is successfully doing business in 30 European countries. Our enthusiastic, professional team is always ready to provide excellent service.

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ACCESSORIES

DYNAC BATTERIES

LAY-OUT/TERMINAL/HOLD-DOWN

Lay-out

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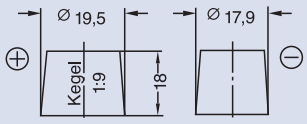
Terminal



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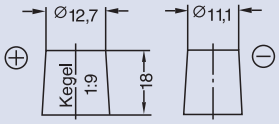

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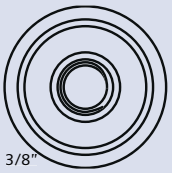

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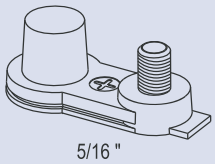
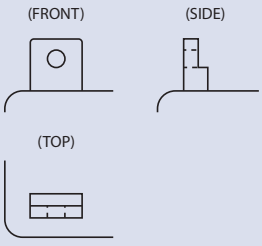
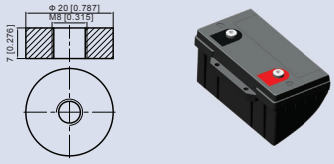


DUAL



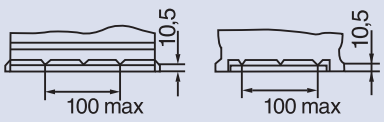
B



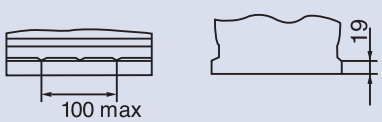
T11

Hold-down

B1



B3



B4

LEGENDA

Calcium/Calcium technology

Silver/Calcium technology

Maintenance free battery

Designed for vehicles with basic start-stop function

Designed for vehicles with advanced start-stop function

Environmentally friendly design

2x longer cycle life than conventional battery

3x longer cycle life than conventional battery

Battery recharging through regenerative braking

Fleece protection

Vibration resistant

Vibration resistant meeting V3 standard

Mountable in positions up to 55°

Cycle resistant

Deep discharge up to 50%

Deep discharge up to 80%

2.9 mm thick plates

PREMIUM & ULTRA BATTERIES

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Article Number	Voltage (V)	Capacity (Ah/20hr)	CCA (EN)	Length (mm)	Width (mm)	Height (mm)	Total Height (mm)	Layout	Terminal	Hold-down
PREMIUM										
LMFV 53226	12	32	270	178	135	204	225	0	1	B1
LMFV 53520	12	35	300	187	127	200	220	0	3	-
LMFV 53522	12	35	300	187	127	200	220	1	3	-
LMFV 53587	12	35	300	187	127	200	220	0	3	B1
LMFV 54059	12	40	300	175	175	190	190	0	1	B3
LMFV 54459L	12	44	360	207	175	175	175	0	1	B3/B4
LMFV 54464	12	44	360	210	175	190	190	1	1	B3/B4
LMFV 54519	12	45	360	242	175	175	175	0	1	B3/B4
LMFV 54523	12	45	350	236	127	200	220	0	1	-
LMFV 54524	12	45	350	236	127	200	220	1	1	-
LMFV 54551	12	45	350	236	127	200	220	1	3	-
LMFV 54577	12	45	350	220	135	204	225	0	1	B1
LMFV 54579	12	45	350	220	135	204	225	1	1	B1
LMFV 54584	12	45	350	234	127	200	220	0	3	-
LMFV 55041	12	50	390	200	170	200	220	0	1	-
LMFV 55042	12	50	390	200	170	200	220	1	1	-
LMFV 55067	12	50	420	207	175	190	190	0	1	B3/B4
LMFV 55559	12	55	420	242	175	190	190	0	1	B3/B4
LMFV 55559L	12	55	420	242	175	175	175	0	1	B3/B4
LMFV 55565L	12	55	420	242	175	175	175	1	1	B3/B4
LMFV 56010	12	55	500	238	180	182	182	1	21	-
LMFV 56062	12	60	450	230	171	200	220	0	1	B1
LMFV 56063	12	60	450	230	171	200	220	1	1	B1
LMFV 56068	12	60	450	230	171	200	220	0	1	-
LMFV 56069	12	60	450	230	171	200	220	1	1	-
LMFV 56077	12	60	600	242	175	175	175	0	1	B3/B4
LMFV 56219	12	62	510	242	175	190	190	0	1	B3/B4
LMFV 56221	12	62	510	242	175	190	190	1	1	B3/B4
LMFV 56420	12	64	640	278	175	175	175	0	1	B3/B4
LMFV 57010	12	65	540	268	180	182	182	1	21	-
LMFV 57024	12	70	560	266	174	200	225	1	1	B1
LMFV 57029	12	70	560	266	174	200	225	0	1	B1
LMFV 57219L	12	72	680	275	175	175	175	1	1	B3/B4
LMFV 57412	12	74	680	278	175	190	190	0	1	B3/B4
LMFV 57412L	12	74	680	278	175	175	175	0	1	B3/B4
LMFV 58035	12	80	720	310	175	190	190	0	1	B3/B4
LMFV 58211	12	82	720	310	175	175	175	0	1	B3/B4
LMFV 58213	12	82	720	315	175	175	175	1	1	B3/B4
LMFV 58515	12	85	760	353	175	175	175	0	1	B3/B4
LMFV 58821	12	88	680	350	175	190	190	1	1	B3/B4
LMFV 58827	12	88	680	353	175	190	190	0	1	B3/B4
LMFV 60032	12	100	720	302	172	200	219	0	1	B1
LMFV 60033	12	100	720	302	172	200	219	1	1	B1
LMFV 60038	12	100	850	353	175	190	190	0	1	B3/B4
LMFV 60800	12	100	790	330	172	218	242	19	1	-
LMFV 61042	12	110	950	393	175	190	190	0	1	B3
ULTRA +30%										
ULTRA 1	12	45	440	207	175	175	175	0	1	B3/B4
ULTRA 2	12	60	600	242	175	175	175	0	1	B3/B4
ULTRA 3	12	74	760	276	175	175	175	0	1	B3/B4
ULTRA 5	12	92	860	353	175	190	190	0	1	B3/B4

START-STOP BATTERIES

2X CYCLE LIFE

3X CYCLE LIFE

LANDPORT EUROPE

Article Number		Voltage (V)	Capacity (Ah/20hr)	CCA (EN)	Length (mm)	Width (mm)	Height (mm)	Total Height (mm)	Layout	Terminal	Hold-down
ENHANCED FLOODED BATTERY (EFB)											
EFB 540503038	NEW!	12	40	380	196	127	200	220	0	3	-
EFB 560500056		12	60	560	242	174	190	190	0	1	B3
EFB 565500065		12	65	650	277	174	175	175	0	1	B3
EFB 565501061	NEW!	12	65	610	230	172	200	220	0	1	B1
EFB 568501067	NEW!	12	68	670	257	172	200	220	0	1	B1
EFB 570500065		12	70	650	277	174	190	190	0	1	B3
EFB 580500073		12	80	730	315	174	190	190	0	1	B3
EFB 610500095		12	110	950	398	174	190	190	0	1	B3
ABSORBENT GLASS MAT (AGM)											
AGM 545913034	NEW!	12	45	340	236	125	200	224	1	3	-
AGM 560901068		12	60	680	241	175	190	190	0	1	B3
AGM 570901076		12	70	760	278	175	190	190	0	1	B3
AGM 575901069	NEW!	12	75	690	260	172	200	220	0	1	B1
AGM 575911069	NEW!	12	75	690	260	172	200	220	1	1	B1
AGM 580901080		12	80	800	314	175	190	190	0	1	B3
AGM 595901085		12	95	850	353	175	190	190	0	1	B3

FOR BATTERY APPLICATION LIST, PLEASE VISIT **WWW.LANDPORTBV.COM** OR **WWW.ACCUVIKS.BE**

PROFESSIONAL BATTERIES

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Article Number	Voltage (V)	Capacity (Ah/20hr)	CCA (EN)	Length (mm)	Width (mm)	Height (mm)	Total Height (mm)	Layout	Terminal	Hold-down
HEAVY DUTY (HD)										
ACLPV HD60013N	12	110	640	286	260	206	226	2	1	-
ACLPV HD60026N	12	100	780	404	173	207	226	0	1	-
ACLPV HD60035N	12	100	780	404	173	207	226	1	1	-
ACLPV HD60527N	12	105	680	345	175	210	230	1	1	-
ACLPV HD60528N	12	105	680	345	175	210	230	0	1	-
ACLPV HD60530N	12	105	680	345	175	210	230	0	1	B1
ACLPV HD62034N	12	120	680	513	189	200	220	3	1	-
ACLPV HD62512N	12	125	720	345	175	285	285	0	1	-
ACLPV HD62514N	12	125	720	345	175	285	285	1	1	-
ACLPV HD63527N	12	135	760	360	253	212	232	0	1	-
ACLPV HD64020N	12	140	760	513	189	200	220	3	1	-
ACLPV HD64317N	12	143	950	513	223	203	223	3	1	-
ACLPV HD68034N	12	180	1000	513	223	203	223	3	1	-
ACLPV HD73011N	12	220	1150	518	276	222	242	3	1	-
SUPER HEAVY DUTY (SHD)										
ACLPV SHD62034N	12	120	680	513	189	195	223	3	1	-
ACLPV SHD63013N	12	130	680	514	218	210	210	3	1	-
ACLPV SHD63539N	12	135	1000	514	175	210	210	3	1	B3
ACLPV SHD64020N	12	140	760	513	189	195	223	3	1	-
ACLPV SHD68034N	12	180	1000	513	223	195	223	3	1	-
ACLPV SHD68089N	12	180	1000	514	218	190	210	3	1	B3
ACLPV SHD73011N	12	230	1150	518	274	216	242	3	1	-
SEALED MAINTENANCE FREE (SMF)										
LMFV 64020SMF	12	140	760	513	189	200	220	3	1	-
LMFV 68034SMF	12	180	1000	513	223	203	223	3	1	-
LMFV 73011SMF	12	230	1150	518	276	222	242	3	1	-
ENHANCED FLOODED BATTERY (EFB)										
EFB 725500125 NEW!	12	225	1250	514	276	222	242	3	1	-

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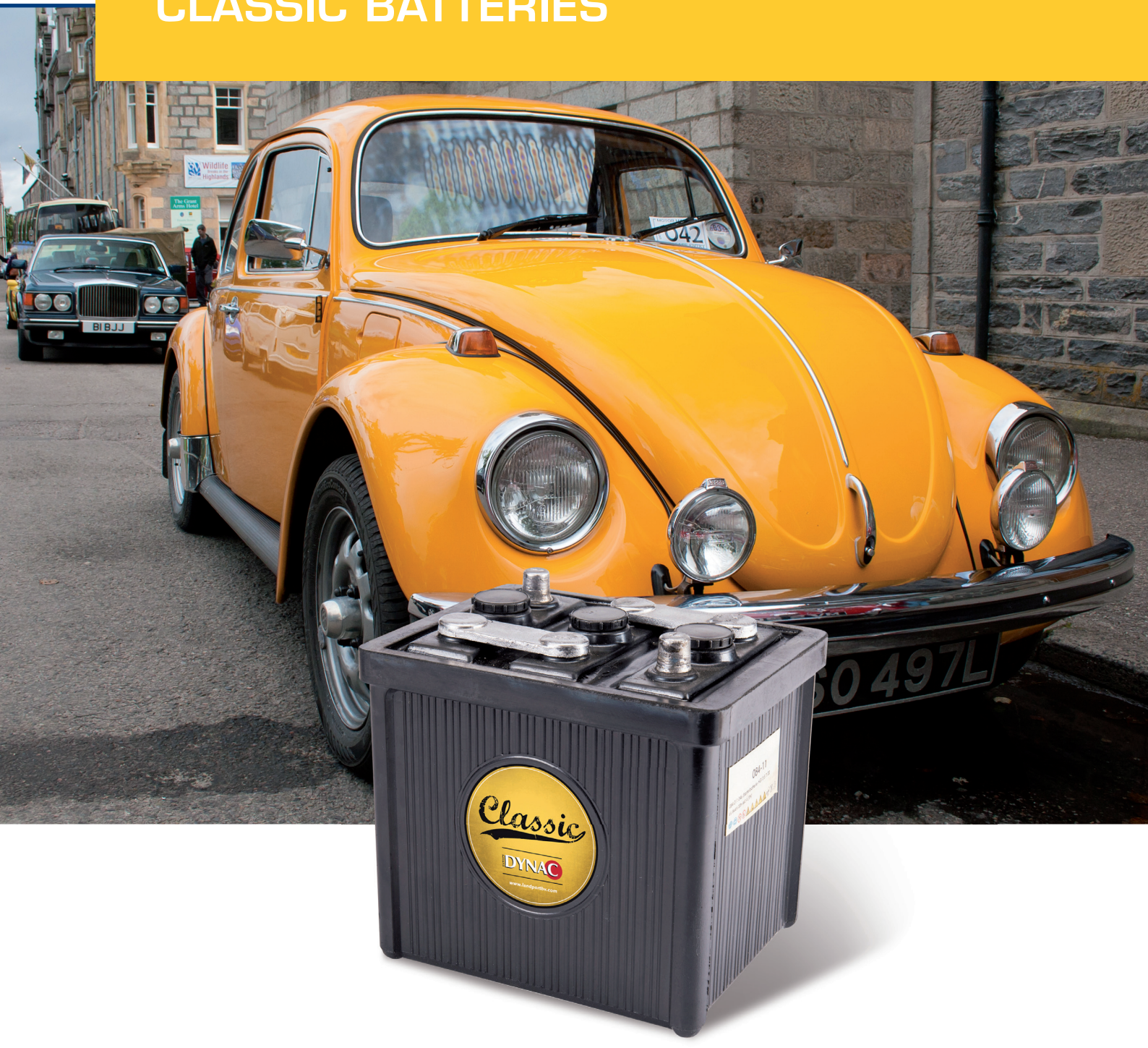
CLASSIC BATTERIES



LANDPORT EUROPE

Article Number	Voltage (V)	Capacity (Ah/20hr)	CCA (EN)	Length (mm)	Width (mm)	Height (mm)	Total Height (mm)	Layout	Terminal	Hold-down
CLASSIC 6V										
ACLPV 06612HRN*	6	66	360	186	175	166	188	2	1	-
ACLPV 07715HRN*	6	77	490	215	170	166	191	2	1	-
ACLPV 08411HRN*	6	84	460	225	173	195	220	2	1	-
ACLPV 10011HRN*	6	100	520	225	173	195	220	2	1	-
ACLPV 11213HRN*	6	112	610	503	98	193	225	2	1	-
ACLPV 14023N	6	140	900	257	175	216	235	2	1	B1
ACLPV 16022N	6	165	900	328	171	211	233	2	1	-
ACLPV 22013N*	6	220	1000	403	175	216	235	2	1	B1
CLASSIC 12V										
ACLPV 57016HRN*	12	70	450	490	108	195	229	1	1	-

* This battery is also available withoud acid.

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MARINE BATTERIES

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START & LIGHT CYCLIC

Article Number	Voltage (V)	Capacity (Ah/20hr)	CCA (EN)	Length (mm)	Width (mm)	Height (mm)	Total Height (mm)	Layout	Terminal	Hold-down
LMFM 62034	12	120	680	511	188	195	217	3	1	-
LMFM 64020	12	140	760	511	188	195	217	3	1	-
LMFM 66514	12	165	900	511	222	195	217	3	1	-
LMFM 68034	12	180	1000	511	222	195	217	3	1	-
LMFM 70027	12	200	1050	516	274	216	238	3	1	-
LMFM 72511	12	225	1150	516	274	216	238	3	1	-

(SEMI-)TRACTION BATTERIES

LANDPORT EUROPE

Article Number	Voltage (V)	Capacity (Ah/20hr)	Capacity (Ah/5hr)	CCA (EN)	Length (mm)	Width (mm)	Height (mm)	Total Height (mm)	Layout	Terminal	Hold down
WET CHARGED											
STV 95406N	12	50	40	-	210	175	190	190	0	1	B3
STV 96002N	12	125	100	-	345	175	285	285	0	1	-
STV 96051N	12	130	105	-	513	189	193	223	3	1	B1
STV 96351N	12	180	135	-	513	223	193	223	3	1	-
STV 96801N	12	230	180	-	518	273	217	242	3	1	-
SEALED MAINTENANCE FREE (SMF)											
STV 95502SMF	12	60	50	-	242	175	190	190	0	1	B3
STV 95602SMF	12	75	60	-	278	175	190	190	0	1	B3
STV 95752SMF	12	90	75	-	353	175	190	190	0	1	B3
STV 95804SMF	12	105	85	-	345	175	230	230	0	1	-
STV 24DC	12	80	-	680	257	172	200	220	1	Dual	B1
STV 27DC	12	90	-	700	302	172	200	220	1	Dual	B1
STV 31DC	12	105	-	750	330	172	218	242	19	Dual	-
ABSORBENT GLASS MAT (AGM)											
AGM ST50	12	65*	52	-	242	175	190	190	0	1	B3
AGM ST60	12	80*	63	-	278	175	190	190	0	1	B3
AGM ST80	12	90*	80	-	353	175	190	190	0	1	B3
AGM ST105	12	105*	80	-	345	175	210	230	0	1	B3
AGM ST130	12	130*	110	-	513	189	203	223	3	1	-
AGM ST180	12	180*	130	-	513	223	203	223	3	1	-
AGM ST200	12	200*	150	-	518	274	222	242	3	1	-
AGM ST220	12	220*	175	-	518	274	222	242	3	1	-
TRACTION											
DC TR190	12	200	152	-	513	223	193	223	3	1	-
DC TR220	12	220	167	-	518	273	217	242	3	1	-

*Capacity (Ah/100hr)

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DEEP CYCLE BATTERIES

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Article Number	Voltage (V)	Capacity (Ah/20hr)	Capacity (Ah/5hr)	Length (mm)	Width (mm)	Height (mm)	Total Height (mm)	Layout	Terminal	Holddown
DEEP CYCLE										
DC US2200	6	232	181	260	181	286	286	2	Dual	-
DC US 305	6	310	261	302	181	371	371	2	Dual	-
DC L16	6	385	297	302	181	425	425	2	Dual	-
DC US 8VGC	8	170	138	260	181	286	286	1	1	-
DC 27 TM	12	105	89	320	165	203	233	1	Dual	-
DC US12VXC2	12	155	122	333	179	289	289	1	1	-
DEEP CYCLE AGM										
DC GF6210	6	213	185	260	180	252	274	2	Dual	-
DC DTA6245	6	245	221	243	187,5	275	275	2	T11	-
DEEP CYCLE TUBULAR										
TB 6PZS 195	6	250	195	245	190	285	285	2	1	-
TB 4PZS 110	12	158	117	345	170	285	285	0	1	-

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GEL BATTERIES

LANDPORT EUROPE

Article Number	Voltage (V)	Capacity (Ah/20hr)	Capacity (Ah/5hr)	Length (mm)	Width (mm)	Height (mm)	Total Height (mm)	Layout	Terminal	Holddown
GEL										
GB 180/6	6	180	160	244	190	275	275	1	1	-
GB 016	12	16	14	181	76	167	167	0	B	-
GB 019	12	19	16	185	80	170	170	0	B	-
GB 025	12	24	20	176	167	126	126	0	B	-
GB 030	12	30	25	197	132	180	180	1	B	-
GB 040S	12	40	33	210	175	175	175	0	1	B4
GB 060	12	60	51	278	175	190	190	0	1	-
GB 080	12	80	65	353	175	190	190	0	1	B3
GB 085	12	85	72	330	171	236	236	1	1	-
GB 110	12	115	94	286	269	230	230	2	1	-
GB 120	12	120	110	513	189	223	223	3	1	-
GB 120S	12	125	105	345	175	290	290	0	1	-
GB 140	12	140	120	513	223	223	223	3	1	-
GB 210	12	210	160	518	276	242	242	3	1	-

CHARGERS, BOOSTERS & TESTERS

LANDPORT EUROPE

Article Number		Description	Volt	Amp	
PC SPI2		Landport Charger/Maintainer Automatic charger for lead-acid batteries up to 25 Ah 3x faster: multi-stage charging for added precision, safety and battery life. Powered by Shumacher	6/12 V	2,0 A	
PC SPI3		Landport Charger/Maintainer Automatic charger for lead-acid and LITHIUM LIFEPO4 batteries up to 50 Ah 3x faster: multi-stage charging for added precision, safety and battery life. Powered by Schumacher	12 V	3,0 A	
PS SC10	NEW!	SC Power Premium Charger - Maintainer Automatic charger for all lead acid batteries (conventional, gel, AGM) up to 60Ah	6/12 V	1,0 A	
PS SC38	NEW!	SC Power Premium Charger - Maintainer Automatic charger for all lead acid batteries up to 120Ah and 12V lithium batteries (LiPO and LiFePO4)	6/12 V	0,8/3,8 A	
PS SC70	NEW!	SC Power Premium Charger - Maintainer Automatic charger for all lead acid batteries up to 240Ah and charging programs especially for start-stop EFB/AGM (OBDII cable included)	12 V	1,8/7,0 A	
PS SC120	NEW!	SC Power Premium Charger - Maintainer Automatic charger for all lead acid batteries up to 480Ah and charging programs especially for start-stop EFB/AGM (OBDII cable included)	12 V	3,8/12,0 A	
PG GYSTECH 750		Efficiently, compact and light Automatic charger for all types up to 20Ah	6/12 V	0,75 A	
PG GYSTECH 3800		Powerful, compact and light Automatic charger for all types from 1,2 Ah to 60 Ah	12 V	0,8/3,8 A	
PG GYSTECH 7000		Competitive, space saving and light Automatic charger for all types from 12V: 14 Ah to 130 Ah and 24V: 14 Ah to 60 Ah	12/24 V	7,0/3,5 A	

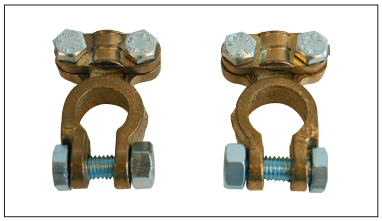
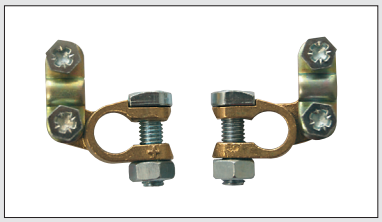
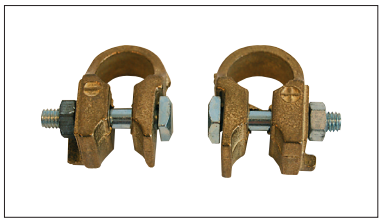
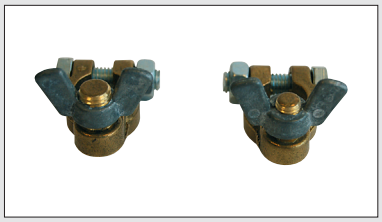
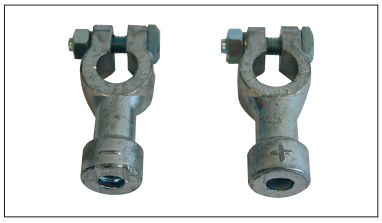
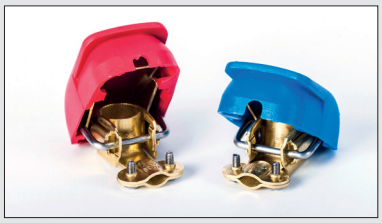
Article Number	Description	Volt	Amp	
PG GYSFLASH 4A	Powerful, compact, light and water proof. Automatic charger for all types from 1,2 to 70 Ah	12V	0,8/4A	
PG GYSFLASH 7A	Powerful, compact, light and water proof (IP 65) Automatic charger for all types from 1,2 Ah to 130 Ah	12 V	0,8/7 A	
PG BATIUM 7-12 PG BATIUM 7-24	GYS Charger Batium serie guarantees maximum effectiveness and security. Automatic charger for all types from 15 Ah to 130 Ah	6/12 V 6/12/24 V	3/7 A 3/7 A	
PG BATIUM 15-12 PG BATIUM 15-24	GYS Charger Batium serie guarantees maximum effectiveness and security. Automatic charger for all types from 35 Ah to 225 Ah	6/12 V 6/12/24 V	7/10/15 A 7/10/15 A	
PG BATIUM 25-24	GYS Charger Automatic charger for all types from 35 Ah to 350 Ah. Also suitable for Deep Cycle batteries from 35 to 180 Ah	6/12/24 V	7/15/25 A	
LBC 500 serie (on request)	Xenteq Chargers LBC 500 serie Chargers available from 12V 10A to 24V 5A			
ProMax 200 serie (on request)	Xenteq Chargers ProMax 200 serie Chargers available from 12V 15-100A and 24V 10-70A			
TBC 600 serie (on request)	Xenteq Chargers TBC 600 serie Cahrgers available form 12V 15-50A and 24V 10-40A			

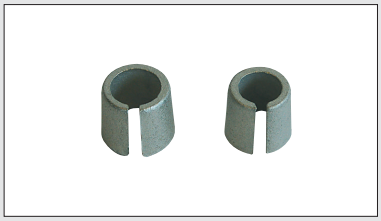
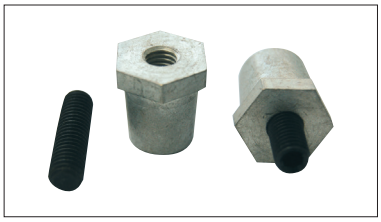
Article Number	Description	Volt	Amp	
PG GYSPACK AUTO	GYS 12V portable booster pack Ideal for car emergency boost.	12 V	1250 A	
PG GYSPACK PRO	GYS 12V portable booster pack Instantaneously starts cars, camper vans and vans. Also 12V DC power supply including LED light.	12 V	1750 A	
PG GYSPACK TRUCK	GYS 12/24V portable boost pack Instantaneously starts cars, camper vans, vans and trucks. Also 12V DC power supply including LED light.	12/24 V	3200 A 1600 A	
STARTPACK PRO 12.24 (on request)	GYS 12/24V high performance booster Delivers exceptional power on 12V or 24V to start a wide range of vehicles including trucks and buses.	12/24 V	6200 A 3100 A	
PG GYSPACK OBD	GYS Memory Saver Saves the internal memory of your car when it is necessary to disconnect the battery. Compact, protable and easy to use.	12 V		
PM MDX-335P	Midtronics battery tester 335 + printer For battery types lead acid, gel and AGM	12 V		
PM MDX-545P	Midtronics battery tester 545 + printer For battery types lead acid, gel, AGM and EFB	12 V		
PM MDX-655P ST-ST (on request)	Midtronics battery tester 655 start-stop + printer For battery types lead acid, gel, AGM and EFB	6/12 V		

ACCESSORIES

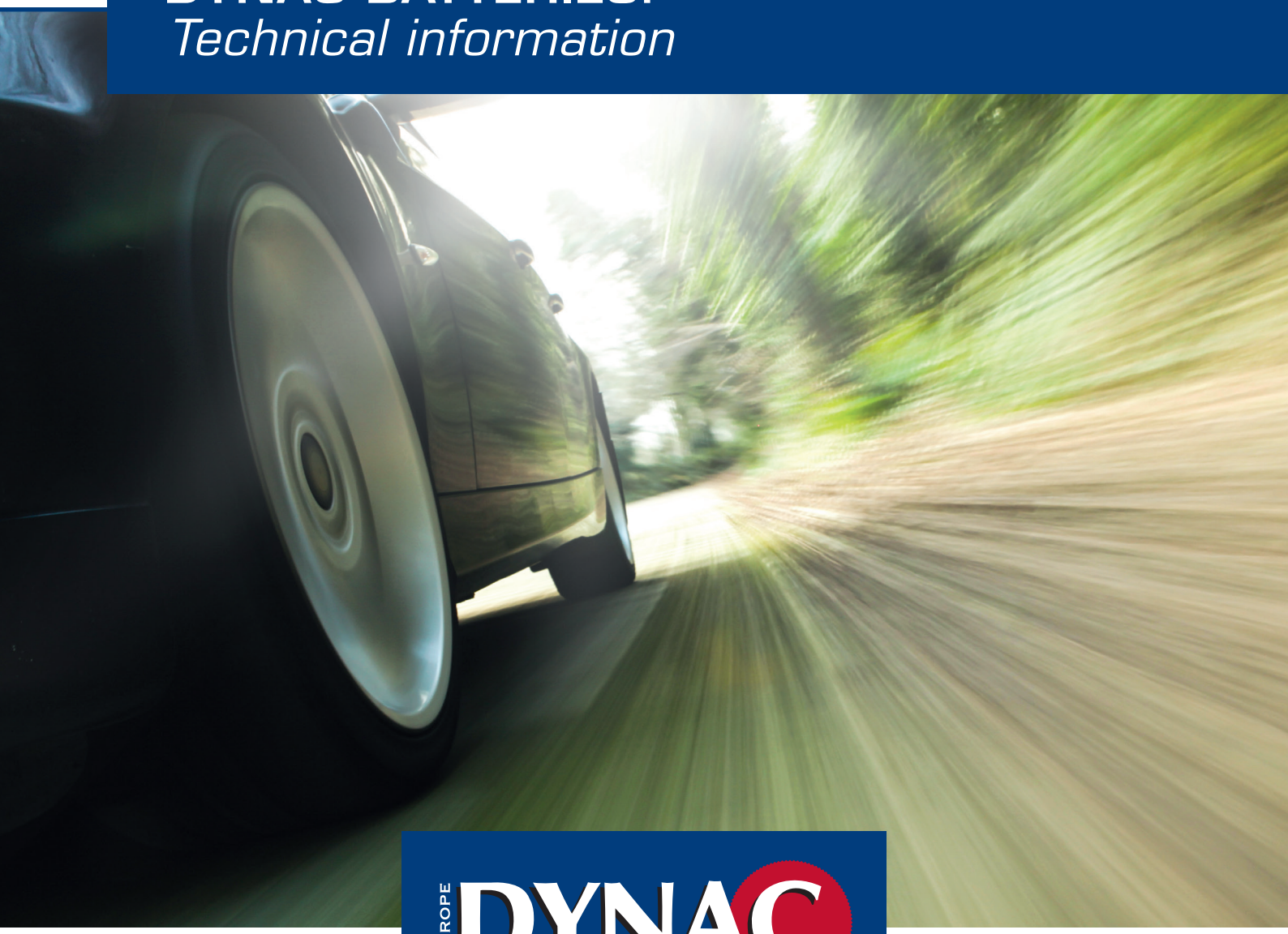
EUROPE DYNAC BATTERIES

LANDPORT EUROPE

Article Number	Description	
BALV POOLPOS	Clamp for standard battery terminal (+)	
BALV POOLNEG	Clamp for standard battery terminal (-)	
BALV TPOS	Clamp for standard battery terminal (+)	
BALV TNEG	Clamp for standard battery terminal (-)	
BALV JAPPOS	Clamp for Japanese battery terminal (+)	
BALV JAPNEG	Clamp for Japanese battery terminal (-)	
BALV FORDPOS	Ford adaptor clamp (+)	
BALV FORDNEG	Ford adaptor clamp (-)	
BALV MANPOS	Heavy Duty clamp for stand terminal (+)	
BALV MANNEG	Heavy Duty clamp for stand terminal (-)	
BALV USAPOS	USA adaptor clamp (+)	
BALV USANEG	USA adaptor clamp (-)	
BALV QUICK SET	Terminal connector Quick set	

Article Number	Description	
BALV 100003	Terminal Japanse-standard adaptor set (3>1)	
BALV M6-STANDARD	M6-standard adaptor set for M6 insert	
BALV M8-STANDARD	M8-standard adaptor set for M8 insert	
BALV 3/8 STANDARD	3/8-standard adaptor set for 3/8 insert	
BALV 100002	Butterfly nut M8	
BALV 100002U	Butterfly nut 3/8	
BALV 100005	Ventilation plugs and tube	
BALV 100005F	Ventilation tube	
BALV GEFO	Acid gravity tester	
BALV 100001	Sulphuric Acid 37% 1 ltr Sulphuric Acid 37% 5 ltr (on request)	
BALV 100001A	Lip for acid bottle 1 ltr	
BALV WATER5	Deminaralised water 5 ltr	

DYNAC BATTERIES:
Technical information



EUROPE DYNAC BATTERIES

LANDPORT EUROPE

ASSEMBLY, MAINTENANCE AND TESTING

Important - caution

The oxyhydrogen gas contained in the battery is highly explosive. Always make sure that the charger is switched off before connecting or disconnecting the battery: one tiny spark is enough to cause an explosion that could permanently damage the face and eyes. In the event of an accident, in which acid splashes into the eyes or onto bare skin, rinse immediately using plenty of water.

If acid splashes into the eyes – contact your doctor.

Assembly in the car

Cars with alternators have the negative connected to the earth. This may vary with older models (see the car manual for assembly). Clean the terminal posts and base plate with warm water. Always assemble the conductor cable first, and the earth wires later. This will prevent short-circuiting caused by the use of tools (which may cause slight damage). Only use good quality tools. After assembly, grease the cable clamps and terminal posts with clean, petroleum jelly or approved grease. The battery should be screwed down well, but should not be overly tightened.

NB! When changing the battery or carrying out repairs which require the battery to be disconnected from the car, we instruct you to provide an alternative power supply for the car, e.g. by using an "external" battery. If you do not do this the electronics in the car may be destroyed in the worst case.

Maintanance

A battery is a vital element of the electrical system. Normally, the system itself will keep the battery charged. In the case of continual short journeys and heavy power usage additional charging may be required, particularly during the cold-weather season. Top up with distilled or chemically purified water only. Never use acid or special additives. If a relatively new battery needs to be topped up regularly this may indicate that the battery is overloaded. In such cases the electrical installation should be inspected and the defect repaired. Avoid chemical or other types of products that promise "miraculous" changes to old or worn batteries.

Testing

If there is any doubt that the battery is no longer working satisfactorily it should be tested. The most simple and best means of testing a battery and its state-of-charge is to use a hydrometer. The measurement of the specific gravity in each cell will determine how the battery should be treated further.
If the battery is discharged, it will need to be recharged before proceeding with the following check (see the battery test table).
If a relatively new battery is discharged and the user has left on the lights, radio, etc., it will need to be recharged. If the car has not been driven sufficiently during the wintertime and there has been substantial power usage, the battery will need to be recharged.
This assumes that the regulator/dynamo is functioning satisfactorily. In the case of continually low specific gravity, the most probable cause is discharge. If, on the other hand, no reasonable explanation can be found as to why the battery is discharged, the cause should be sought outside the battery. In such cases, both the starter motor and the dynamo should be checked. Many motorists are under the impression that the dynamo charges sufficiently and only the built-in indicator is not lit up. This is no absolute guarantee for sufficient charging current, as that the indicator light can go out at 1-2 Amps, without this being sufficient enough to charge the battery.
The charging current should therefore be checked regularly. Measured across the terminal posts, the charging voltage of the vehicle should read 14.2 – 14.4 volts for temperatures above 25°C and for high engine turnover (approximately 2000 revs).

NB! If the reading is lower this means that the battery does not charge fully while driving and will need to be charged by an external battery, which will often depend on the amount of charging voltage for the required level.

Be aware that for normal driving it will take approximately 20 minutes for the power that will be used for a good cold start to be replaced (recharged). It is a fact that most of the damage to batteries is caused by a lack of charging. For this reason, all those who are involved with batteries should be aware of the importance of correct charging.

The effect of the cold

Most people have experienced on at least one occasion that the capacity of a battery is reduced in cold weather. The effect of the cold on the starting capacity is indicated in the table below:

A fully charged battery that is loaded at:	
+25°C gives	100% capacity
0°C gives	65% capacity
-18°C gives	40% capacity

At –18°C the starting capacity is therefore reduced by 60%. The reason for this is that the resistance in the battery rises, and that the chemical process goes more slowly. At the same time, the reduced effectiveness of the battery places higher demands on starting the motor during the winter as motor oil becomes more viscous during low temperatures. When we know that at –18°C a battery only operates at 40% of the starting capacity, it is easy to understand why starting problems arise during even lower temperatures. It is therefore important to keep the battery fully charged.

The freezing point of electrolytes for the following range of concentrations is:

The freezing point of electrolytes for the following range of concentrations is:	
1.100 freezes at	-7°C
1.150 freezes at	-15°C
1.200 freezes at	-26°C
1.250 freezes at	-52°C
1.280 freezes at	-68°C

Self-discharge

When a battery is unused during long-term parking or storage, minor discharge will take place. The amount of self-discharge varies with the temperature and the age of the battery. Self-discharge decreases by 50% for every 10°C reduction in temperature. That is to say that a battery that can be stored for 4 months at +20°C can be stored at 0°C for approximately 9 months at the same rate of energy loss. Apart from self-discharge there are often a number of circumstances that continually deplete the battery of power.

Activating dry-charged batteries

The plates in a dry-charged battery are specially treated to give them a longer service life. Before the battery can be used, it is filled with acid before being left for 30 minutes. For topping up with acid the temperature of the acid and the battery should be +20°C. As a rule, is it not necessary to charge a dry-charged battery before use, although it can be advantageous to take the time to do so. If activation takes place at a temperature lower than +15°C or if the battery needs to be stored for more than 12 hours after being topped up with acid, the battery should be charged for two hours up to 1/10 of its capacity (until there is a continual emission of gasses in the collective cells).

- Dry-charged batteries can be stored in dry air with a constant temperature, preferably no longer than two years.
- During production as well as transport, the battery should not be accessible for damp.
- When topping up with acid, the acid and battery should be at least +15°C , preferably approximately +20°C.

We therefore instruct you to use the following method when activating:
1. Top up the thinned sulphuric acid (specific gravity of 1.28 at 20°C) for all cells until 5mm above the separator, or until the indicated level.
2. Allow the battery to stand for 30 minutes, depending on the temperature.
3. If possible charge the battery again. This will confirm that the battery is in good working order if, after a brief period, there is a continual emission of gases in the collective cells.
If the battery is assembled using the incorrect polarity in an installation that uses an alternator, this will cause substantial damage.

NB! Always check that the voltage and polarity is correct before using the battery.

SPECIFIC GRAVITY AND CHARGING

Temperature increase:	
2°C	Battery is perfect
5°C	Battery is slightly drained
10°C	Battery is drained
15°C	Battery is heavily drained

The greater the increase in temperature, the more important it is that the battery is recharged as quickly as possible. A long journey with the car in which the battery is fitted will give a good charge if the load charge is 14.2 volts at +25°C. In the winter, an additional 0.3 volts is required for every 10 degrees reduction in temperature, or in other words: at –10°C the load charge should be 15.15 volts. This means that cars that are only used for short journeys or in traffic and have no motor heating or repeated cold starts require external chargers in very cold periods. Raising the specific gravity of a dry-charged battery that has "become slightly drained" during storage will require 2 to 3 times more charging time than a normally charged battery with the same specific gravity. The battery is fully charged when the specific gravity is 1.28.

Measurement
The most simple manner of measuring the specific gravity is to use a hydrometer. When using a hydrometer, sufficient electrolytes must be sucked into the syringe, so that the float floats freely. The specific gravity can then easily be read from the scale on the float.
In order to record a correct acid measurement the electrolytes should be mixed well. After topping up with distilled or chemically purified water, the water should first be given the opportunity to mix with the rest of the electrolyte mixture before measurement takes place. Avoid spilling any acid. Acid is highly corrosive and acid splashed in the eyes or on bare skin is harmful. Acid can destroy clothing, wood, metal and varnish. The table below shows the corresponding ratios between acid and the state-of-charge of the battery in percentages.

The specific gravity of elektrolytes:	Battery state-of-charge +25°C:	Battery state-of-charge -18°C:
1.280	100%	100%
1.240	75%	50%
1.200	50%	Weak
1.160	25%	-
1.120	0%	-

Temperature correction
The float scale on the hydrometer is normally based on a temperature (acid) of +25°C. For higher or lower temperatures the result read should be corrected as the specific gravity varies with temperature. It is extremely important to pay attention to this during the wintertime.
For every 10°C below +25°C 0.007 is subtracted from the scale and for every 10°C above +25°C 0.007 is added. The table below shows: 1. The acid temperature, 2. The measured specific gravity, 3. The corrected specific gravity. The table shows that the gravity of electrolytes measured at 1.240 for an acid temperature of –18°C is actually 1.208. This means that the battery has a state-of-charge of 50% instead of 75% that was shown by the initial measurement. Maintenance-free batteries cannot be measured using these methods as they have no removable caps. The following method is used for these batteries: The Open Circuit Voltage of the battery is used to find the average specific gravity. The Open Circuit Voltage is measured with a digital voltmeter after the battery has been disconnected (i.e. with no recharging or discharging) for a minimum period of 6 – 8 hours.

Open Circuit Voltage (at +25°C) = (specific gravity + 0.84) x the number of cells
Specific gravity (at +25°C) = (Open Circuit Voltage: number of cells) – 0.84

Example:
Measured voltage = 12.65 volts, number of cells is 6, average specific gravity: (12.65 : 6) – 0.84 = 1.27 g/cm3.

1. Acid temperature:	2. Measured specific gravity g/cm3:			3. Corrected specific gravity g/cm3:		
°C	A	B	C	A	B	C
-30°C	1,28	1,24	1,20	1,241	1,201	1,161
-20°C	-	-	-	1,248	1,208	1,168
-10°C	-	-	-	1,255	1,215	1,175
0°C	-	-	-	1,262	1,222	1,182
10°C	-	-	-	1,270	1,230	1,190
15°C	-	-	-	1,273	1,233	1,190
20°C	-	-	-	1,276	1,236	1,196
25°C	-	-	-	1,280	1,240	1,200
30°C	-	-	-	1,284	1,244	1,204
35°C	-	-	-	1,287	1,247	1,207

USES

The starter battery
When identifying which starter battery to purchase, the following should be taken into consideration:
- The space reserved for the battery
- The type of battery terminal used
- The desired starting capacity and reserve capacity/total amp hours (Ah)

Although the external measurements of the battery are often given by car and machinery manufacturers, the internal structure is determined by the battery manufacturers. Batteries with the same external measurements often have differing internal structures. The structure depends on the technical- and climate-related requirements that the battery should satisfy. For starting batteries, the total surface area of the plates is of great importance.
The plate surface area depends on the plate size and number of plates in the battery. It is important to be clear about this, and for starting purposes we instruct people to choose batteries with the largest possible surface area.

Leisure batteries
Leisure batteries refers to lead accumulators that are specially constructed for less discharge over a longer period of time. In this structure a relationship is employed between positive and negative active materials that differs from a

battery that has been primarily manufactured for starting purposes.
These type of batteries are often referred to as deep cycle batteries and are used for leisure purposes in caravans, boats, campers and as starter batteries in boats. Leisure batteries are also recommended for use with solar panels.

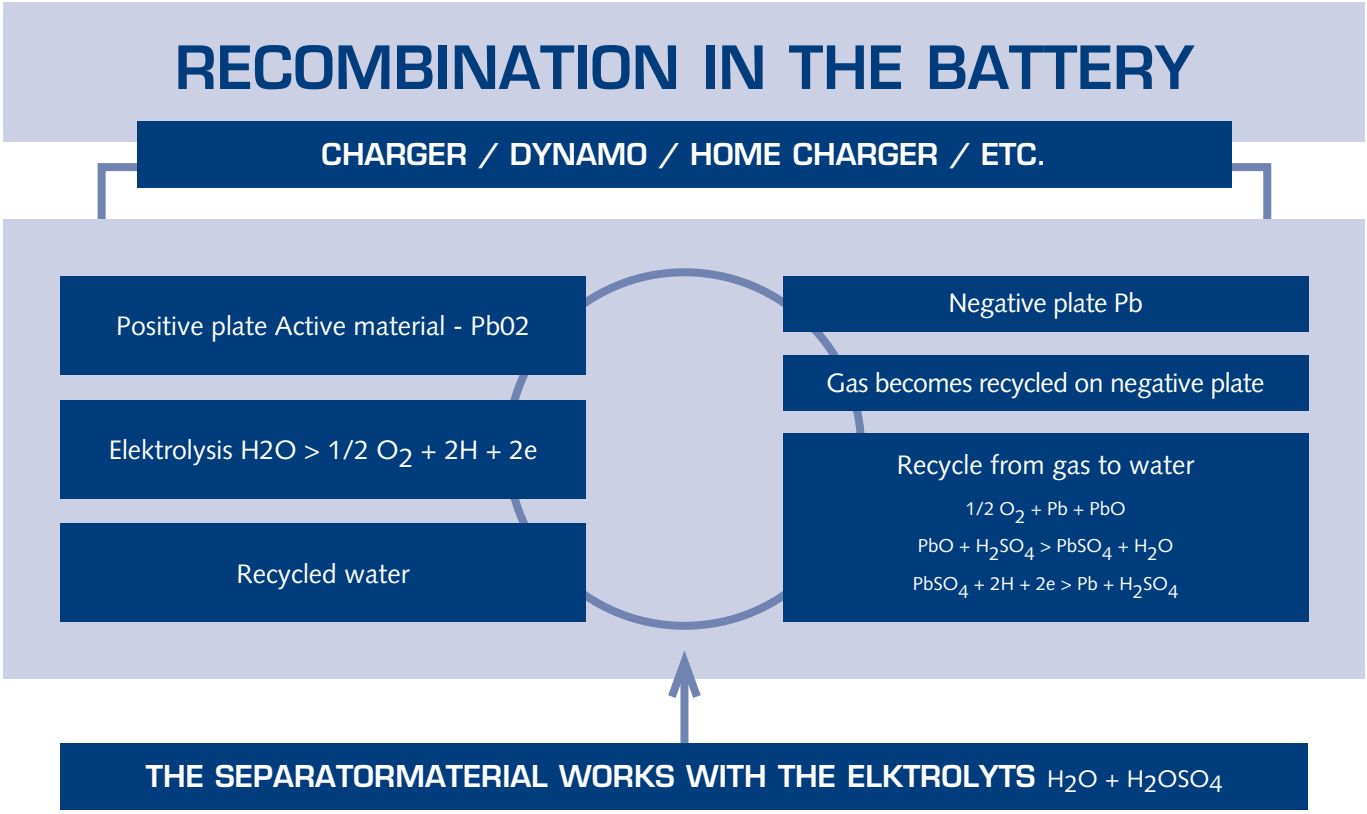
Heavy Duty
The special strengthening in the plate groups provides extremely good additional resistance to damage to the battery that may result from extreme vibration. HD batteries are a range of batteries that are especially suited for use where repeated and heavy-duty battery discharge is experienced. Examples are buses, trucks, delivery vans used for short distances and various types of marine vessels. For the latter of these examples, batteries are rarely or never used for starting motors in extremely low temperatures. Separators with fibreglass fill are used in Heavy Duty batteries.

Recombination batteries
Just as for ordinary batteries, various structures and other methods of use are possible here. Batteries for stationary, starting and continual use have practically all the normal features but do not use water on the negative plate, in other words: the gas is recycled. The gas emission is transformed into water, which is where the name "recombination" originates from. During use, additional pressure is released via a valve, resulting in the name "valve-regulated". Both names refer to the same process. NB! Recombination batteries should not be opened.

Advantages
- No topping up with water.
- Completely leakage free.

Disadvantages
- Increased risk of dehydration during overloading/high temperatures; not possible to top up water.
- State-of-charge check is more difficult to carry out; use of hydrometer not possible.

As a consideration, the measurement will be more correct when using more advanced equipment.



BATTERY-TEST TABLE

Test result	Course	Solution
1. The specific gravity of the electrolytes is higher than 1.32 but constant in all cells.	The battery is probably overfilled with strong acid or level regulated with acid	Specific gravity adjustment. Charge the battery. Extract part of the electrolytes from each cell, and replace with distilled water. Recharge and check the specific gravity. Repeat this process until the specific gravity reaches 1.280 for a fully-charged battery.
2. The specific gravity is constant in all cells, but lower than 1.210.	a) The battery is partially charged. The dynamo has a charging voltage that is too low	Charge the battery with a normal voltage. Stop when the specific gravity reaches 1.28, there is equal gas emission from all cells and the specific gravity remains unchanged two hours after recharging.
	b) Bad contact between the terminal screw and the battery terminal posts.	Unscrew the terminal screw and clean the contact surfaces of the terminal screw and battery terminal posts. Attach the terminal screw to the battery and screw on properly. Measure the load voltage across the + and – terminal posts of the battery at approximately 2000 cycles. Repair any defects in the dynamo.
3. The specific gravity varies from cell to cell by more than 25 points (0.025).	a) A worn battery.	Adjust the specific gravity to 1.400 to avoid the necessity of replacing part of the electrolytes with acid. After charging with 0.5 A for each positive plate and in minimum 48-hour period, maximum 96 hours, the specific gravity should be checked. If it has significantly dropped and/or is uneven from cell to cell, the battery should be exchanged.
	b) Not enough charge.	Charge the battery with a charging current that increases in strength by 5% of the 20-hour capacity. A 60Ah battery should be charged with a 3A charger (the charging current should be 3A). NB! Make sure that a part of the chargers give less Amperes than the indication for that model suggests.
4. The specific gravity is so low that it cannot be read on the hydrometer.	a) The electrolytes have been too strongly diluted during water level regulation.	The battery should be well charged and the specific gravity adjusted to 1.280 (see point 3).
	b) Absolute discharge.	Allow the battery to charge. Charge until the specific gravity is stable, between 1.280 and 1.300.
	c) Has had undesirable discharge owing to lights or radio, for example.	Charge the battery.
	d) Break in contact between battery and dynamo.	Repair the fault.
	e) Dynamo failure.	Contact an authorized garage.
5. No electrolytes, dry battery.	a) Battery is badly maintained or poorly topped up.	Top up to correct electrolytes level (approx. 5 – 10mm above the plate groups) with distilled water. Charge the battery slowly at a low amperage.
	b) Battery has tipped over, electrolytes have drained away.	Fill the battery with acid with a specific gravity of 1.240 until the correct level. Charge the battery well, and adjust the specific gravity after charging.
	c) Breakage in the battery case.	A new battery is necessary.
6. Battery is not receiving any charging current. By a sulphated battery we mean that the sulphur obtained during charging has crystallized. A sulphated battery is extremely difficult to charge. Therefore, try charging a battery for longer and if necessary use a higher voltage (up to 24 Volts) for several minutes, until the battery starts to receive the charging current. Leave the battery on an electronically-regulated charger until the current remains stable for 2-3 hours. NB! The battery should never remain connected when using the above mentioned voltage level during charging.	a) The battery is heavily sulphated.	A new battery is necessary.
	b) Bad contact between terminal screw and battery terminal posts.	See point 2b
	c) Dynamo failure.	Read off from an induction ampere meter, call in a car electrician.
	d) Breakage in the wiring between dynamo and battery or earth.	New cable, new earthling, check earth contact.
	e) Battery is worn.	A new battery is necessary.

BATTERY-TEST TABLE

Test result	Course	Solution
7. The charged battery discharges after a short storage period.	a) Short-circuiting between the plates.	A new battery is necessary.
	b) Breakage in wiring.	See point 6d
	c) Battery is worn.	A new battery is necessary.
8. The battery is unable to sustain self starter current.	a) Battery is discharged.	Charge the battery.
	b) Battery is relatively topped up (only the parts of the plates that are covered with electrolytes are working).	See point 5a. If this does not help, the parts of the plates that were above the electrolytes level were heavily sulphated and this is not removable.
	c) The battery is heavily sulphated.	A new battery is necessary.
	d) Bad contact between terminal screws and terminal posts.	See point 2b.
	e) Short-circuiting in the battery.	A new battery is necessary.
	f) Dynamo failure.	See point 6c.
	g) Breakage in wiring.	See point 6d.
	h) Reduced battery effect, discharged battery.	Charge battery, check charge system.
	i) Battery is defective.	A new battery is necessary.
9. Plates under the battery are wet and attacked by acid.	a) Hole in battery case.	A new battery is necessary.
	b) Electrolytes level is too high.	Adjust the level to the correct height, approximately 5 – 10mm above the plate groups. Dry the battery tops and wash the plates with soda solution to neutralize the acid.
10. Battery continues to warm up and “boil”.	a) Battery exposed to overcharging.	Voltage regulator should be adjusted or changed.
	b) Battery topped up with acid instead of distilled water. Acid concentration too strong.	Adjust the specific gravity of the electrolytes as in point 3a.
11. The lights flicker or go out.	a) Breakage in wiring network.	See point 6d.
	b) Loose terminal clamps.	See point 2b.
	c) Bad contact.	See point 2b.

LANDPORT EUROPE

DISCLAIMER

Users are cautioned that the information in this book was the most current information provided to us at the time of publication. The information is subjected to change without notice. Users should use the most current edition of the Landport Motorcycle Battery Replacement Information Book. Landport expressly denies any responsibility for the accuracy provided to us. While we have made every effort to accurately catalogue the replacement battery information contained in this book, Landport denies any liability for damages as a consequence of using the information in this book. Users should also attempt to obtain replacement battery information from the o.e. manufacturer's user manual or service department for their specific application.

All orders are being agreed and executed with our general sales- and delivery conditions, as registered at the chamber of commerce, under number 18050673.

GENERAL TERMS & CONDITIONS OF DELIVERY AND PAYMENT OF LANDPORT B.V.

GENERAL

1.1 Landport's General Terms and Conditions apply to all deliveries of goods and the provision of services by Landport to the Customer.

1.2 Additions or changes to these General Terms and Conditions shall only be binding if they have been confirmed by us in writing. Any conditions of the Customer shall not apply.

OFFERS

2.1 Our offers are without obligation, unless an offer explicitly states otherwise.

2.2 We are only bound after we have accepted an order in writing or by e-mail, or after we have actually carried out an assignment.

PRICE

3.1 The prices referred to in catalogues, price lists and the like are without obligation and can be changed by us. At the customer's request we shall confirm in writing the prices that apply at any particular point in time.

3.2 Our offer shall state whether the sales price offered therein is without obligation or binding.

3.3 The sales prices referred to in our offers always exclude VAT.

3.4 The offer shall also state which taxes, entitlements, excises and levies imposed by the government are not included in the sales prices.

3.5 Changes in the taxes, etc. referred to in 3.3 and 3.4 shall be charged on to the customer, in which case the Customer shall not be entitled to cancel the purchase or order.

3.6 Changes in factory or importer's prices, in exchange rates, etc. shall also be charged on to the Customer, in which case the Customer shall be entitled to cancel the purchase or order without charge, by reporting such to us in writing within one week after we have informed the Customer of the change.

DELIVERIES

4.1 Delivery deadlines issued by us are determined to the best of our ability on the basis of the data known at the time the agreement was entered into.

4.2 We are not bound by delivery deadlines which cannot be met, nor are we liable for the resulting loss or damage, unless the exceeding of the delivery deadline can be attributed to intent or gross negligence on our part.

4.3 In the event of inordinate exceeding of the delivery deadline, we shall consult with the Customer. If said consultations do not lead to the result desired by the Customer and ourselves, the Customer and we shall be entitled to cancel the agreement without charge.

4.4 We shall have fulfilled our obligation to deliver by offering the goods once to the Customer, in accordance with that stated on the matter in the offer or agreement. The customer shall in that case be obliged to take receipt of the goods.

4.5 In the event of non-receipt, we shall put the goods into storage at the expense and risk of the Customer. In such cases, our warehouse shall apply as the delivery destination and the invoice for the delivered goods, plus a storage surcharge of 15%, as a notification of storage. We shall charge the Customer for all the costs of retention and storage, plus a 25% surcharge.

4.6 The risk related to the goods shall pass to the Customer at the moment of delivery.

4.7 Complaints relating to deficiencies which are discernible upon delivery or after inspection must be communicated to us as soon as possible in writing and, in any event, no later than five working days after delivery.

OWNERSHIP

5.1 Our ownership of the goods passes to the Customer after the latter has fulfilled all payment obligations vis-à-vis us.

5.2 The Customer is not entitled to alienate or encumber the goods or transfer them in any other way to the control of third parties as long as ownership has not been transferred, unless such occurs with our explicit, prior permission. We are entitled to attach conditions to said permission.

PAYMENT

6.1 Payment shall be made in cash (which also includes transfers to our bank or Giro account) upon delivery, unless agreed otherwise in writing.

6.2 In the event of non-payment or late payment, the Customer shall be legally in default, without a notice of default having to be given. The Customer shall then owe us interest from the due date of the invoice which shall be equal to the statutory interest rate, increased by 3% each year. In addition, we are entitled to pass on the claim for collection, whereby the Customer shall owe us all the costs incurred during collection. The level of these costs is set at 15% of the invoice amount, with a minimum applying of € 100,= such without prejudice to the interest referred to in the second sentence of this section and without prejudice to any legal costs owed.

GUARANTEE & LIABILITY

7.1 We shall not provide any other guarantee with regard to the goods than that issued by our supplier. These guarantee conditions are to be issued to the Customer upon delivery of the goods or are available for perusal at our premises and shall be sent to the Customer on request.

7.2 If the supplier's guarantee conditions are judged by a court not to be binding, the present General Terms and Conditions of Landport shall exclusively apply.

7.3 Our guarantee obligation covers the replacement or repair of goods to the best of our ability during the guarantee period which exhibit manufacturing or material defects, in so far as we can recover the costs of replacement or repair from our supplier.

7.4 If the Customer wishes to appeal to our guarantee obligations, it shall act in accordance with our instructions as regards the making available to us of the faulty products.

7.5 This guarantee lapses in the event of defects to the goods which are the consequence of wear and tear, incompetent use, a lack of care, any damage inducing event which occurs after delivery or any change made by the Customer or third parties.

7.6 Our liability is explicitly limited to that referred to in the above sections of this article. We are not liable for any loss or damage, no matter on what account such has occurred, including all direct and indirect loss or damage, such as consequential loss or damage or trading loss. In the event of us being liable, this shall, at all times, be limited to the amount or amounts for which we are insured.

ANNULMENT

We are entitled to annul the agreement with immediate effect without having to issue a notice of default and without judicial intervention and without being liable for any compensation, if the Customer fails to fulfil any obligation arising from the agreement, or fails to do so on time, if the Customer is declared bankrupt, is granted a (provisional) suspension of payments, if its business is liquidated or if the Customer loses the disposal of its property. All our claims are to be immediately due and payable.

APPLICABLE LAW AND DISPUTES

Dutch law applies to all agreements which are subject to these terms and conditions. Unless the law imperatively designates a different court, all disputes shall be exclusively settled by the competent court in 's-Hertogenbosch.

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EUROPE DYNAC BATTERIES

LANDPORT B.V.
RAMGATSEWEG 63 I 4941 VN RAAMSDONKSVEER - THE NETHERLANDS
PHONE: +31 (0) 162 58 14 00 I FAX: +31 (0) 162 58 14 01
E-MAIL: INFO@LANDPORTBV.COM I WWW.LANDPORTBV.COM

ACCU VIKS B.V.B.A.
FILLIERSDREEF 65 I B-9800 DEINZE - BELGIUM
PHONE: +32 (0)9 386 78 58 I FAX: +32 (0)9 386 58 16
E-MAIL: INFO@ACCUVIKS.BE I WWW.ACCUVIKS.BE