INTRODUCTION TO AUTOMOTIVE STARTER BATTERIES AND CHOOSING THE RIGHT

BATTERY CHARGER

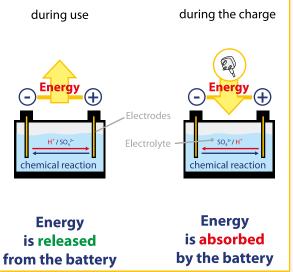


- **2.** How to connect my battery in series?
- (3.) What does my battery need?
- (4.) How to choose a starter or a booster?
- (5.) How to choose a charger?
- 6.) Which GYS model should I choose?
- 7.) Which tester for my battery?
- (8.) What jump cables are adapated to my battery?

1.) HOW DOES A BATTERY WORK?

A battery is a storage tank storing electrical energy under a chemical form that can be rendered (as direct current) immediately depending on the situation.

Energy comes from a chemical reaction between electrodes and electrolyte (liquid or gel form).



<u>The 4 main battery types :</u>

Stationary batteries are designed to deliver low current over a long period *e.g. fire alarm, IT system*

Traction batteries are designed to deliver a medium current over a long period *e.g. forkliftts*

Marine and Leisure batteries are designed to withstand a deep discharge and big number of charge/discharge cycles (up to 1200 cycles). They are used in boats and motorhomes to provide the necessary current for electrical equipment *e.g. fridge*

Their capabilities are important and in general, they can also be used to start the engine **Starter batteries** are designed to deliver a high current over a very short time, to

help start electrical engine e.g. vehicle, generator.

General principle of battery operations

The various battery technologies :

Open batteries (*FLA* : *Flooded Lead Acid*): are lead-acid batteries equipped with a cap that allows the user to add distilled water. They require regular maintenance (checking the liquid level), and do not react well in the cold (frozen electrolytes), they are however cheaper.

Sealed batteries (SLA: Sealed Lead Acid ou VRLA: Valve Regulated Lead Acid): Fully airtight, they recombine gas to prevent its evaporation. They do not require any maitenance and withstand the cold. This techology comprises the following batteries:

- **GEL batteries** (*With a gelified electrolyte*): They're suited for deep discharge and have very good durability. They do not however support fast charge/discharge.

- AGM batteries (Absorbent Glass Mat) are more suited for delivering high currents over short periods (starting) than GEL batteries. they're usually fitted with START&STOP vehicles.

- EFB batteries (Enhanced Flooded Battery) are designed for the needs of START&STOP small vehicles. (cheaper version of the AGM. An AGM battery can replace an EFB, but not vice-versa).



Before taking good care of your battery, you will need to know its basic characteristics. By examining your battery, you will determine these **4 attributes**:

Battery type

2.

The battery type refers to the substance of the electrolyte. It can be gel or liquid, made of Lead / Calcium, Lead / Antimony, etc... Not all chargers can charge every battery type.



Voltage (V)

The voltage represents the electrical potential between two terminals, mostly 6V, 12V or 24V. Your charger needs to fit the voltage of the battery you wish to charge.

Capacity (Ah - Ampere/hour)

This represents the amount of energy stored. The charger will need to be capable of charging a battery of 45Ah capacity. In general, it is the quantity of electricity that the battery can deliver over 20 hours.

Starting current (CCA)

The starting current is expressed in amperes (A). This current determines the starting current at -18°C (ex: 430A).

This current is subject to several standards (SAE, EN, IEC, DIN, JIS) depending on the country (depending on the norm, the starting current will differ).

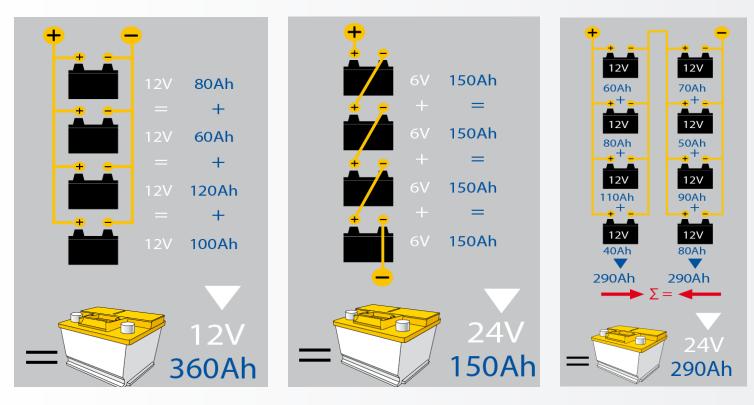
Charge	Lead-acid	AGM/GEL
100 %	12.60V	>12,92V
75 %	12,40 - 12,54V	12,74 - 12,86V
50 %	12,24 - 12,40V	12,54 - 12,66V
25 %	11,88 - 12,18V	12,34 - 12,46V
0 %	<11,88V	<12,34V

"Indicative values that depend on the temperature and the type of technology."

NB: All these elements will vary depending on the temprature and number of uses.

HOW TO CONNECT MY BATTERY IN SERIES ?

It is possible to connect two or more batteries in series to achieve a different voltage and/or capacity.

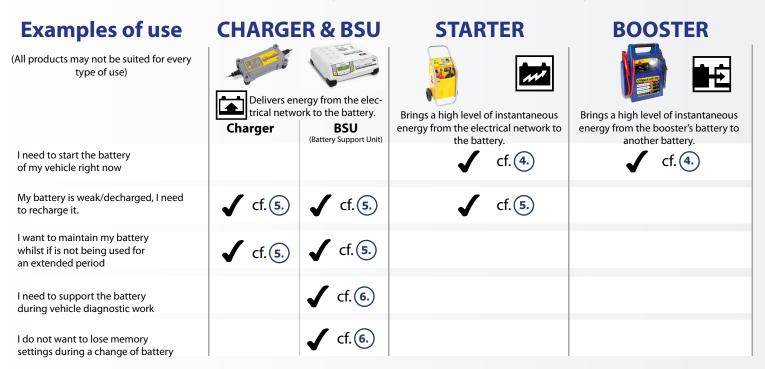


Charging in parallel or in bypass is the most advised method.

Charging in series should only be done with batteries of the same age/capacity.

3.) WHAT DOES MY BATTERY NEED ?

Charger? Starter? Booster? The first thing to do is determine the needs of the battery you're using. Check the situations listed in the table below, and you will be able to decide which product you need.



4.) WHAT DO I NEED TO KNOW TO CHOOSE A STARTER OR A BOOSTER ?

When choosing a starter or booster, you will need to determine the required intensity for a proper start. Starting a vehicle requires a high level of energy, normally delivered by the battery of the vehicle. If the battery is too weak, you will need to bring the energy from either:

- From a STARTER connected to the mains (or a generator)
- From the internal battery of a BOOSTER

Key Values when starting



The starter/booster will need to be able to bring an intensity similar to that of the batteries' specification.

This is represented by the «Start» value, expressed in Ampere (A). **Start (1V/C)** : Intensity that the booster can provide below 6V (for a 12V batter).

Cranking CC: Current obtained when putting the clamps in short-circuit. **Peak**: Current obtained when putting the two terminals are in short-circuit.

ideal : for workshops/homes

ideal : for on-site intervention
idéal : for outside use



Charge your booster !

Using a booster will partially empty the integrated battery. This battery will deteriorate if it is not quickly recharged. You should hence be careful to recharge your booster after each use (24 hours max).

5. WHAT DO I NEED TO KNOW TO CHOOSE A CHARGER ?

SCheck the following table to see which GYS model is designed to charge your type of battery.

Type de batterie					WATTMATIC		
I tau stala	CT/Energy	CA	ТСВ	Artic	Wattmatic/Batium	Gysflash	Gysflash PRO
Liquide	🔶 S	☆	☆ ☆	☆ ☆		☆ ☆ ☆	
Liquide Argent/Calcium	×s	☆	☆	☆ ☆		☆ ☆ ☆	
GEL	×s	×	☆ ☆	☆ ☆		\Leftrightarrow \Leftrightarrow \Leftrightarrow	
AGM/Start-stop	×s	☆	☆ ☆	☆ ☆		\Leftrightarrow \Leftrightarrow \Leftrightarrow	

WHAT DO I NEED TO KNOW WHEN CHOOSNG A CHARGER?



This page will help you decide what features you will require from your charger:

l wa	ant my cha	arge	with monitoring *	without monitoring	to maintain the charge when the battery charge is complete	to give me the best possible charge for my battery	40% to 50% faster than a traditional charge
W s	Fraditional Charge Once at 100%, the charge must be manually stopped to prevent pattery damage	W U U U U U U U U U U U U	✓				
W2	Automatic Charge The charge can be left without supervision, and without risking the deterioration of the pattery.	W 2 16,87 17 17 17 17 17 17 17 17 17 1		1			
WU n	Floating Charge This automatic charge maintains the charge evel once the battery is charged.			✓	1		
	Maintenance Charge Charging curve for winter maintenance, constant charge through maintenance steps			1	1		
WUOU en ch fu	ull Charge VUoU charging curve nsures a full 100% harge and maintains the ull charge thanks to the oating mode.	WU OU 13.80 U 13.80 U 100 000 000 000 000 000 000 000 000 000		√	1	✓	
Th 10 is its	ptimal Charge his curve ensures a full 00% charge, which also faster thanks to s constant current in poost" phase.	W Uo U 14,8V 13,8V 13,8V 13,8V 13,8V 100 100 100 100 100 100 100 100 100 10		√	✓	✓	1
I REGULATED I UOU FAST CHARGE	Itra-fast charge his technology ensures a buch faster charge .g. 5h instead of 8h), hile retaining other ptimal advantages.	I Uo U 4 Color 1489 4 Color 1489 4 Color 1489 1389 109 109 109 109 109 109 109 10		\checkmark	✓	\checkmark	1
8 STEP TO Th	igh-tech charge otal load control of high t he curve in 8 steps, thank hads with total autonomy	s to its technologies		√	✓	√	1

*: Traditional chargers require supervision, as they will continue to provide energy to the battery even when it is charged. This would deteriorate your battery.



5.

SOS Recovery for sulfated batteries

Over time and use a battery is likely to get 'sulfated'. This will reduce the effectiveness of the battery, its ability to hold charge and thus its capability to start the vehicle.

The GYS SOS Recovery program is a special 24h charge that delivers a specific current to 'break' the sulfate thus 'healing' the battery, and recovering its performance level so it can be fully charged once again.



The IP Protection indicates the ability of your machine to resist external stress from liquid or solid elements.

IP 65: protection again water splash



Microprocessor control

Chargers which are microprocessor controlled have a much more accurate charging curve and more advanced features.



Traction battery charge

Special charge for traction batteries (fork-lift trucks, cleaning machines)

6. WHICH GYS MODEL SHOULD I CHOOSE ?

BATTERY CHA	RGER	V	Curve		Average I (EN60335)	SOS RECOVERY	MICRO PROCESSOR CONTROL	94	5 1 2	e	T	5 	Kg
	Energy 123	12		1	2 A	-	-	8 >	30Ah			Starting	1.3
	Energy 124	12		1	3 A	-	-		10 > 45A	h		capacity	2.2
	Energy 126	12	W	1	4 A	-	-			15 > 60Ah			2.2
	СТ 160	12 - 24		2	7 - 9 A (12V) 3 - 5 A (24V)	-	-			25 > 160Ah (12V) 15 > 90Ah (24V)	3.9
	CT 210	12 - 24		2	8 - 12 (12V) 4 - 6 A (24V)	-	-			35 > 21	0Ah (12V) 20 > 100A	ıh (24V)	5.2

GYS

CA 150	12 - 24		2	8 - 10A (12V) 7 - 9A (24V)	-	-	35 > 150Ah	6
CA 360	12 -24	W Z	3	7-15-25A (12V) 7-14-22 (24V)	-	-	40 > 350h	14

TCB 60	12		2	2 - 4 A	-	-	15 > 60Ah	2.7
ТСВ 90	12	WU	2	2 - 5,5 A	-	-	15 > 90Ah	3.4
TCB120	12		2	3,5 - 7 A	-	-	30 > 120Ah	3.2

Artic 800	IP.65 PROTECTION PROTECTION		1	0.8 A	-	-	1.6 > 25Ah Maintenance: 1.6 > 80Ah 0.3
Artic 1500	12 PROTECTION	REGULATED	2	1.5 A	-	-	charge : 3 > 40Ah Maintenance : 3 > 100Ah 0.7
Artic 4000	IP.65 6-12	FAST CHARGE	2	4A (6V) 1-4A (12V)	-	-	charge : 8 > 70Ah (6V) Maintenance : 8 > 130Ah (6V) 1.3 2 > 130Ah (12V) 2 > 130Ah (12V) 1.3
Artic 8000			2	2 - 8 A	-	-	Charge: 4 > 160Ah Maintenance: 4 > 240Ah

	Wattmatic 100	6 - 12		2	3 - 5 A	-	-	15 > 100Ah	3.8
WATTMATIC 180	Wattmatic 140	6 - 12	WUoU	2	5 - 9 A BOOST	-	-	20 > 150Ah	4.8
	Wattmatic 170	6 - 12		2	6.5 - 10 A BOOST	-	-	25 > 180Ah	5

	Batium 7/12	6 - 12		2	3 - 7 A	-	•	15> 130Ah	4.8
60	Batium 7/24	6 - 12 - 24		2	3 - 7 A	-	•	15> 130Ah	5.7
BATUM ZIZ	Batium 15/12	6-12		3	7 - 10 - 15 A	•	•	35> 225Ah	5.9
	Batium 15/24	6 - 12 - 24		3	7 - 10 - 15 A	•	•	35> 225Ah	8.5
	Batium 25/24	6 - 12 - 24		3	7 - 15 - 25 A	•	•	35> 350Ah	13.4

	Gysflash 1.12	12		2	1 A	•	•	on board : Maintenance : 2 > 100Ah 2 > 32Ah	0.85
Con Manual C	Gysflash 4.12	12		2	0.8 - 4 A	•	•	on board : 1.2 > 70Ah Maintenance : 1.2 > 125Ah	0.9
	Gysflash 6.12	12		2	0.8 - 6 A	•	•	on board : 1.2 > 125Ah Maintenance : 1.2 > 170Ah	1.06
	Gysflash 30.12 HF	12		Ajustable	30 A	•	•	10 > 400Ah	3.8
	Gysflash 30.24 HF	6 - 12 - 24	8 STEP	Ajustable	30 A	•	•	10 > 400Ah	3.8
	Gysflash 50.12 HF _{FV}	12		Ajustable	50 A	•	•	10 > 500Ah	6
	Gysflash 50.24 HF	6 - 12 - 24		Ajustable	50 A	•	•	10 > 600Ah	6
	Gysflash 100.12 HF	12		Ajustable	100 A	•	•	20 > 1200Ah	6.1
	Gysflash 102.12 HF	12		Ajustable	100 A	•	•	20 > 1200Ah	8.2

6. WHICH GYS MODEL SHOULD I CHOOSE ?

<u> </u>									Starter batte 50 Ah ►	• • •	•		150 Ah 🕨 🕨	200 Ah	
CHARG	ER			CHARGE		K	a 😽	SOS				∎∏∖∕A			<u>8</u>
STARTE	R	v	Co	Reg	I Moye (EN6033	n	peak		€ ⇒ -∍=		5		• <u>~</u> 0&		Kg
	Start 200	12		2	11-18 A	80	140	-	instant boos 35 > 40 > 80 40Ah					tarting apacity	8.6
2	Start 300	12 -24		2	10-23 A (12 8-17 A (24)	v) /) 120	180	-	instant b 35 > 50Ah 50 :	000st > 90Ah				recharge 10 mn)	13.8
	Neostart 320	12 -24	W	3	25 A	160	270	-	instant 35 > 60Ah	pre-ch 60 > 12					15.6
	Neostart 420	12 -24		3	45 A	300	420	-	instant 35 > 80Ah			-charge • 160Ah			20.5
	Neostart 620	12 -24		3	60 A	360	650	-		stant 100Ah			pre-charge 00 > 200Ah		24
—								1							
	Start UP 80	12	Wo	2	9-17 A	50	-	-			charge 45 > 170A	h			4.4
11s	Gystart 1224 T	12 -24		electronic	10-60 A	780	1200	-		inst 60 > 2				pré- charge 200 > 300A	54.5
	Startium 330E	12 -24		4	5-25A (12		270 (12V)	1		charge					15
				L	5-20A (24 5-40A (12		210 (24V) 390 (12V)	•	50 > 60Ah 50 > insta			pre-char	ge		
	Startium 480E	12 -24		4	5-30 (24) 5-45A (12		290 (24V) 550 (12V)	•	50 > 10 insta			50 > 160	Ah pre-charge		26
	Startium 680E	12 -24	IWUoU	4	5-35A (24	V) 270 (24V)	380 (24V) 720 (12V)	•	50 > 1 6	50Ah			50 > 220Ah		30
IAO STARTISM	Startium 980E	12 -24		4	5-50A (12 5-35A (24		560 (24V)	•	50 >	stant 220Ah			pre-char 50 > 250		36
DULISTATION	Diag Startium 60-12	12		4	5-60 A	_	440	•	inst 50 > 1				pre-charge 50 > 220Ah		34
	Diag Startium 60-24	6 - 12 - 24		4	5-60 A	300 (12V) 280 (24V)	430 (12V) 410 (24V)	•	inst 50 > 1				pre-charge 50 > 220Al		34
			Integrated	battery cha	rae][]					
BOOST (Plastic /	'ERS metal casing)	V		ource 230V		Ś⊷ ≪ A peak 1	(1 V/C 2V 2) 4V		Alim. Fusible	Kg		Power Supply 12V	*	Internal battery
	Gyspack One	12		-		1000 3	300			-	5.8	-	-	-	12Ah
	Gyspack auto/400	12		12V DC (0.5A)	1250 4	180			-	7	-	•	-	18Ah
	Gyspack Air	12		12V DC (0.5A)	1250 4	180		• •	12V	10	•	•	•	18Ah
	Gyspack Pro	12		12V DC (0.5A)	1750 6	500		•	12V	8.9	-	•	•	22Ah
	Gyspack 750	12	REGULATED	12V / 2A pc (0 -	5A)	2500	750	_		121/	14	_			26Ab

GY

	Gyspack 750		I REGULATED	12V / 2A DC (0.5A)	2500	750	-	•	•	12V	14	-	•	•	26Ah
	Startpack Truck	12 - 24	FAST CHARGE	12V / 2A DC (0.5A)	3200 (12V) 1600 (24V)	750	650	•	-	12V	16	-	•	•	2x22Ah
	Gyspack 650	12		230V (3A)	1800	640	-	•	•	15	13	-	•	•	16Ah
	Gyspack 810	12		230V (3A)	3100	830	-	•	•	15	16.6	-	•	•	30Ah
AN AN ANALY	Startpack 12.24	12 - 24		230V	3600	900	700	•	•	20	23.5	-	-	•	2x16Ah
E mid	Startpack Pro _{12.24}	12 - 24	WUOU	230V	6200	1300	1200	•	•	20	45.5	-	-	•	2x30Ah
	Startpack Pro	12-24		230 V	8500	1600	1400	•	•	-	71	-	-	•	2x50Ah
	Energy Station	12 - 24		230V		nds on batte ot included	ries	-	•	2 x 30	36	-	-	•	no included

LITHIUM BOOSTERS (Plastic casing)		LITHIUM					<u></u>	- ₽			POWER SUPPLY			×-		
		CAPACITY PER CELL	FULL CHARGE	1V/C	Cranking CC	START	CABLE	SMART CABLE	INPUT	OUTPUT			¥	MICRO USB Type B	LIGHT / MODES	kg
	Nomad Power 10	4 Ah 44 Wh	5 h	200 A	400 A	12 V PETROL & DIESEL	12 V 1 A	1	12 V - 1 A 5 V - 1 A	5 V - 2 A 19 V - 3.5 A	1	_	1	1	1	0.41
	Nomad Power 15	5 Ah 55.5 Wh	5 h	300 A	600 A	12 V PETROL & DIESEL	12 V 1 A	1	14 V - 1 A	5 V - 4 A 12 V - 12 A 19 V - 3.5 A	1	1	2	—	1	0.48
	Nomad Power 20	6 Ah 66.6 Wh	6 h	350 A	700 A	12 V PETROL & DIESEL	12 V 1 A	1	14 V - 1 A	5 V - 2.1 A 5 V - 1 A 12 V - 10 A 19 V - 3.5 A	1	1	2	_	1	0.68
	Nomad Power PRO 45	4.5 Ah 49.95 Wh	4.5 h	200 A	400 A	12 V PETROL & DIESEL	12 V 1 A	1	12 V - 1 A	5 V - 2 A	1	_	1	—	1	0.82
	Nomad Power PRO 90	9 Ah 99.9 Wh	9 h	400 A	800 A	12 V PETROL & DIESEL	12 V 1 A	1	12 V - 1 A	5 V - 2 A 12 V - 3.5 A	1	1	1	—	1	1.25

BOOSTERS (metal casing)		CTART	START	Farad	⊕ INPUT CHARGE						
		START CURRENT	¢		¥	Ū Charging time	N	© Charging time	MICRO USB Type B	Ö Charging time	kg
S	Startronic 400	300 A	12V PETROL & DIESEL	5 x 350	12V	30 s	12V/10A	2 mn	5V/2A	15 min	0.4
	Startronic 600	600 A	12V PETROL & DIESEL	5 x 500	12V	45 s	12V/10A	3 mn	5V/2A	20 min	1.42
	Startronic 800	800 A	12V PETROL & DIESEL	5 x 800	12V	60 s	12V/10A	4 mn	5V/2A	40 min	1.86

7.) WHICH TESTER FOR MY BATTERY ?

This page will help you decide what features you will require from your tester:

	Tradi	tional	Electronic								
	TBP 100	TBP 500	NBT 100	NBT 200	DBT 300	RT 003	BTW 300	BT 551	BT 2010		
Visual					Dre-	Pre-					
	6-12V battery	6-12V battery	12V battery	12V battery	12V battery	6-12V battery	6-12V battery	6-12V battery	6-12V battery		
Application	12V starting circuit	12V starting circuit	- 12V starting circuit	- 12V starting circuit	12V starting circuit - 12V charging	12V-24V starting circuit - 12V-24V charging	12V-24V starting circuit - 12V-24V charging	12V-24V starting circuit - 12V-24V charging	12V-24V starting circuit - 12V-24V charging		
	- 12V charging circuit	- 12V charging circuit	- 12V charging circuit	- 12V charging circuit	circuit - Ondulation 12V	circuit - Ondulation 12-24V	circuit - Ondulation 12-24V	circuit - Ondulation 12-24V	circuit - Ondulation 12-24V		
Amperes- hour	20-100Ah	10-160Ah	20-150Ah	20-150Ah	4-150Ah	7-230Ah	7-230Ah	7-230Ah	7-230Ah		
Operating range	-	-	SAE : 200-1200A DIN : 110-670A IEC : 130-790A EN : 180-1125A CA : 240-1440A	SAE : 200-1200A DIN : 110-670A IEC : 130-790A EN : 180-1254A CA : 240-1440A	SAE : 40-1200A DIN : 20-670A IEC : 25-790A EN : 35-1125A CA : 70-1440A	SAE : 40-2000A DIN : 25-1300A IEC : 30-1500A EN : 40-1200A JIS : japonaise	SAE : 40-2000A DIN : 25-1300A IEC : 30-1500A EN : 40-1200A JIS : japonaise	SAE : 40-2000A DIN : 25-1300A IEC : 30-1500A EN : 40-1200A JIS : japonaise	SAE : 40-3000A DIN : 25-1685A IEC : 30-1985A EN : 40-2830A JIS : japonaise		
Battery type	VRLA/GEL/ AGM/SLI	VRLA/GEL/AGM/ SLI	VRLA/GEL/AGM/ SLI	VRLA/GEL/AGM/ SLI	VRLA/GEL/AGM/ SLI/ SPIRAL	VRLA/GEL/AGM/ SLI/ SPIRAL/EFB	VRLA/GEL/AGM/ SLI/ SPIRAL	VRLA/GEL/AGM/ SLI/ SPIRAL	VRLA/GEL/AGM/ SLI/ SPIRAL/EFB/ Liquid/Sealed		
Start-Stop	-	-	-	-	-	•	-	•	•		
CCA display	-	•	•	•	•	•	•	•	•		
Voltmeter	•	•	•	•	•	•	•	•	•		
Integrated printer	-	-	-	-	-	-	Thermal	Thermal	Thermal		
Display	Analog	Analog	LCD	LCD	Backlit LCD	Backlit LCD	Backlit LCD	Backlit LCD	Backlit LCD		
Languages	Universal	Universal	English	English	English	French English German Spanish Italian Portuguese Japanese	Universal	French English German Spanish Italian Portuguese Japanese	French English German Spanish Italian Portuguese Japanese		
Logiciel	-	-	-	-	-	-	-	-	•		
Cables length	0.30 m	1 m	0.50 m	0.50m	0.50 m	1.75 m	0.75 m	0.75 m	1.70 m		
Dimensions	160x80x300 mm	270x260x130 mm	120x70x150 mm	120x70x150 mm	120x79x22.7 mm	190x50x115 mm	110x40x195 mm	110x40x195 mm	275x135x80 mm		
Weight	1 500 g	8 000 g	250 g	250 g	218 g	800 g	420 g	420 g	420 g		
Market	Particulier	Particulier	Particulier	Particulier	Professionnel - Particulier	Professionnel - Particulier	Professionnel	Professionnel	Professionnel		

It is important to know a few values to obtain a reliable test :

• The battery type : SLI / VRLA / AGM / EFB / GEL

• The standard: SAE, EN, IEC, DIN and JIS (EN : Europe, DIN :Germany, IEC : international or SAE : USA).

• The battery capacity : Maximum quantity of current delivered by the battery over 20 hours (expressed in Ampere-hour (Ah)).



Jump cables are used to start a vehicle with the help of another vehicle.

The + and - terminals must be connected to each other (WARNING the negative terminal must always be connected last)

The table below describes all the characteristics of the different jump cables.

Range	Starting power	Clamp type	Cable length	Cable sec- tion	Section material	Integrated LED	Anti-arc Protection	DIN72553
PRO	200 A	Insulated steel	2.8 m	10 mm ²	ů Cu	-	-	-
	320 A	Insulated steel	3 m	16 mm ²	ů Cu	-	-	-
	500 A	Insulated steel	3.5 m	25 mm²	ů Cu	-	-	-
	700 A	Insulated steel	4.5 m	35 mm²	ů Cu	-	-	-
	1000 A	Insulated steel	4.5 m	50 mm²	ů Cu	-	-	-
	320 A	Non-insulated brass	3 m	16 mm ²	ů Cu	-	-	-
	500 A	Non-insulated brass	3 m	25 mm²	ů Cu	-	-	-
	700 A	Non-insulated brass	4.5 m	35 mm²	ů Cu	-	-	-
	1000 A	Non-insulated brass	4.5 m	50 mm²	Ø Cu	-	-	-
	1000 A	Non-insulated brass	5.1 m	50 mm²	Ø Cu	-	-	-
SUPER PRO	700 A	Insulated steel	4.5 m	35 mm ²	Ø Cu	-	-	-
	1000 A	Insulated steel	5 m	50 mm²	Ø Cu	-		-

The clamps

They can be:

- Insulated or non-insulated (prohibited in Germany by the standard DIN 72553)
- In steel or in brass (better conductivity)

The cable

There are different lengths, sections and materials :

• ØCCA : Aluminium coated with a thin copper layer, the indicated section corresponds to the aluminium section.

• ≈ØCu : Aluminium coated with a thin copper layer, the indicated section corresponds to the copper section.

• ØCu: 100% copper section

Questions ?

Contact our export team

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