



# ***THE DRIVING FORCE BEHIND START-STOP.***

***INNOVATIVE START-STOP BATTERIES FROM VARTA.***



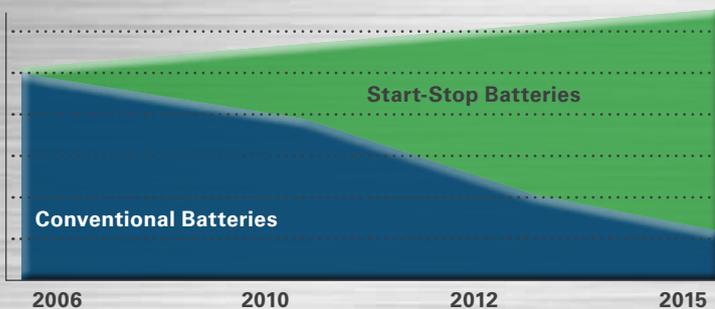
**VARTA**

BY JOHNSON CONTROLS

[www.varta-startstop.com](http://www.varta-startstop.com)

# A NEW ERA IN BATTERY TECHNOLOGY.

VEHICLE PARC DEVELOPMENT



# 70%

THERE ARE ALREADY AROUND 2.8 MILLION VEHICLES EQUIPPED WITH START-STOP TECHNOLOGY ON OUR ROADS, A NUMBER EXPECTED TO RISE TO 30 MILLION BY 2015. THIS MEANS THAT BY 2015, 70% OF NEW VEHICLES WILL FEATURE START-STOP TECHNOLOGY.

Everyone's talking about protecting our climate and reducing CO<sub>2</sub> emissions – topics that present the car industry with enormous challenges. From 2012, new EU regulations will not only reduce maximum levels of vehicle CO<sub>2</sub> emissions across Europe to 130 g/km, but will also increase the demands on vehicle batteries. That's because meeting this target is going to take more than just improved engine management – innovative battery technologies are absolutely key.

This makes the issue of hybrid technology more relevant than ever before. Car manufacturers use the term "hybrid" to emphasise the eco-friendly characteristics of their vehicles. There are various types of hybrid technology such as micro hybrid (Start-Stop), mild hybrid and full hybrid. Of these, Start-Stop is set to become the most important. Start-Stop vehicles are forecast to represent 70% of all vehicles produced in Europe by 2015.

The car industry uses the term "micro hybrid", amongst others, to describe Start-Stop technology.

So it makes perfect sense to be prepared for the future today – with VARTA Start-Stop and Start-Stop Plus batteries from Johnson Controls.





**START-STOP TECHNOLOGY  
HELPS THE ENVIRONMENT.**



### **GEARED FOR THE FUTURE WITH JOHNSON CONTROLS.**

As market leader, Johnson Controls is significantly involved in the development of a whole host of future technologies, from AGM through to lithium-ion technology – with the sole aim of providing car manufacturers with advanced batteries that help reduce CO<sub>2</sub> emissions and fuel consumption, and protect the environment as much as possible. Johnson Controls has been working closely with

leading companies in this field for a number of years, including a joint venture with Saft. Johnson Controls-Saft is a leading global supplier of advanced hybrid battery systems: providing the lithium-ion battery systems for vehicles such as the Mercedes S-Class HYBRID and the BMW ActiveHybrid 7. The company Johnson Controls also provides the aftermarket with the latest technological developments

through the supply of VARTA products. In this way, Johnson Controls helps its clients to save energy, reduce pollution and fuel consumption, and recycle more.



# CAR MANUFACTURERS' FUTURE TECHNOLOGIES AT A GLANCE.

## INTERNAL COMBUSTION ENGINE

Conventional vehicles without Start-Stop features.

### Technology focus:

- Includes biofuels, natural gas and diesel technologies
- Market shift to smaller vehicles and more efficient engines
- Weight reduction and improved aerodynamics

### Battery requirements:

- Primary battery function is engine starting
- **Battery technology:**  
Predominately traditional lead-acid technology

## START-STOP

With Start-Stop vehicles, the engine is switched off during short stops – for instance at traffic lights – in order to save fuel and to reduce CO<sub>2</sub> emissions by 5–10%.

### Technology focus:

- Responding to CO<sub>2</sub> reduction targets set by EU
- Allows engine to be shut off instead of idling while the vehicle is stopped
- Nearly all vehicle manufacturers launching Start-Stop platforms in Europe

### Battery requirements:

- Battery is required to start engine more frequently and provide energy for device support whilst in “stop” mode
- Battery is integrated within a sophisticated energy and battery management system
- **Battery technology:**  
Absorbent Glass Mat (AGM) and Enhanced Flooded Battery (EFB)

## MILD AND FULL HYBRID VEHICLES

Alongside Start-Stop technology, an electric motor can be used that assists the internal combustion engine, for example on acceleration. Full hybrid is used in particular in luxury vehicles and SUVs as well as in markets without diesel technology in order to save fuel.

### Technology focus:

- Significant reduction in both fuel consumption and CO<sub>2</sub>-emissions
- Mild hybrid engine is always running, the battery is there to support the powertrain (engine) and devices during stop phases
- Full hybrid combustion and electric engines can operate independently

### Battery requirements:

- Battery becomes part of powertrain supporting the engine
- **Battery technology:**  
nickel-metal hydride or lithium-ion

Johnson Controls are the leading original-equipment supplier in this sector.



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Johnson Controls-Saft are the first manufacturer of lithium-ion batteries to the automotive manufacturers and supply batteries for the Mercedes Benz S-class hybrid and BMW ActiveHybrid 7.



# TOP PERFORMANCE – WHATEVER THE APPLICATION.

VARTA Start-Stop Plus batteries are designed to meet the highest energy requirements, i.e. in vehicles such as taxis and ambulances. For short journeys, journeys with frequent stops or high consumption whilst the

vehicle is stationary, VARTA Start-Stop Plus batteries deliver constant power, maximum energy supply and optimum starting performance.



## THE ADVANTAGES AT A GLANCE:

- OE specifications for high performance and luxury vehicles
- Specially designed for extreme power demands
- Extra long service life
- Totally maintenance-free
- Spill and leak-proof



## PERFECT FOR:

- Police/emergency vehicles
- Taxis
- High-end luxury cars
- High-performance cars
- Executive class vehicles with high equipment levels
- Start-Stop vehicles
- Hybrid vehicles (12V)

# ***VARTA. THE DRIVING FORCE BEHIND START-STOP.***

Whatever the future of Start-Stop vehicles brings, you'll be able to rely on VARTA. 80% of car manufacturers already place their trust in VARTA, and with good

reason. That's because they know that only VARTA possesses the knowledge and technological expertise to prepare their cars for the future of motoring.



# ***SUPPLIER OF 80% OF ALL BATTERIES FITTED TO NEW START-STOP VEHICLES.***

In close partnership with leading vehicle manufacturers like Audi, BMW, Ford, Mercedes-Benz, Volvo and VW, VARTA has developed innovative battery solutions to

support Start-Stop systems. That's why at VARTA, we have years of experience of working with leading manufacturers.

## **OE CONTRACTS AT A GLANCE**

- **AUDI e**
- **BMW EfficientDynamics**
- **FORD ECOnetic**
- **GM ecoFLEX**
- **HYUNDAI Blue Drive**
- **KIA EcoDynamics**
- **Land Rover E**
- **Mercedes-Benz BlueEFFICIENCY**
- **MINI MINIMALISM**
- **SEAT Ecomotive**
- **SMART micro hybrid drive**
- **Volvo DRiVe**
- **VW BlueMotion**



**VARTA. The driving force behind Start-Stop.**

# THE VARTA START-STOP PLUS AND VARTA START-STOP BATTERY RANGE.



**VARTA START-STOP PLUS  
WITH AGM TECHNOLOGY**

**VARTA Start-Stop Plus**

VARTA code	Short code	Capacity (C20)	CCA (EN)	Layout	Terminal	Dimensions (mm)			Hold-down	Weight (kg)	UK references
						Length	Width	Height			
560 901 068	D52	60	680	0	1	242	175	190	B13	17.7	027AGM
570 901 076	E39	70	760	0	1	278	175	190	B13	20.4	096AGM
580 901 080	F21	80	800	0	1	315	175	190	B13	22.5	115AGM
595 901 085	G14	95	850	0	1	353	175	190	B13	26.4	019AGM
605 901 095	H15	105	950	0	1	393	175	190	B13	29.2	020AGM

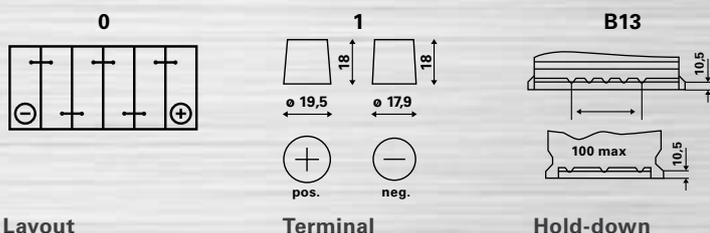


**VARTA START-STOP  
WITH EFB TECHNOLOGY**

**VARTA Start-Stop**

VARTA code	Short code	Capacity (C20)	CCA (EN)	Layout	Terminal	Dimensions (mm)			Hold-down	Weight (kg)	UK references
						Length	Width	Height			
560 500 056	D53	60	560	0	1	242	175	190	B13	16.5	027EFB
565 500 065	D54	65	650	0	1	278	175	175	B13	18.4	100EFB
570 500 065	E45	70	650	0	1	278	175	190	B13	18.9	096EFB
575 500 073	E46	75	730	0	1	315	175	175	B13	20.7	110EFB
580 500 073	F22	80	730	0	1	315	175	190	B13	21.3	115EFB

## TECHNICAL INFORMATION:



**Layout**

**Terminal**

**Hold-down**

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