



# THE BATTERY EXPERTS

Powered by  **VARTA**<sup>®</sup>

**ANDY COOK**  
Technical Sales Manager





# Battery technology.

**What technicians  
need to know today  
and for the future.**



**56** MANUFACTURING, RECYCLING & DISTRIBUTION CENTERS WORLDWIDE

**153M** BATTERIES SOLD IN 2019

**\$8.5B** REVENUE IN FY19 WITH A HISTORY OF GROWTH

**16,000** TEAM MEMBERS

SERVING CUSTOMERS IN

**150+** COUNTRIES

**16** R&D PARTNERSHIPS

**6** R&D FACILITIES



**1 IN 3 CARS**

IN THE WORLD IS POWERED BY OUR BATTERIES



WORLD'S BEST EXAMPLE OF A CIRCULAR ECONOMY

UP TO

**99%**

OF THE MATERIALS IN OUR BATTERIES CAN BE RECOVERED, RECYCLED AND REMADE

BY USING RECYCLED RAW MATERIALS

**90%**

LOWER ENERGY AND GREENHOUSE GAS EMISSIONS

**8K**

BATTERIES RECYCLED GLOBALLY, EVERY HOUR, EVERY DAY IN OUR NETWORK

- GLOBAL HEADQUARTERS
- REGIONAL HEADQUARTERS

MILWAUKEE, USA

HANNOVER, GERMANY

MONTERREY, MEXICO

SHANGHAI, CHINA

**130+** YEAR TRADITION OF INNOVATION AND GROWTH

**25%** ORIGINAL EQUIPMENT

**75%** AFTERMARKET

THE BROADEST AND MOST EFFICIENT PORTFOLIO OF BATTERIES

STANDARD LEAD-ACID

ADVANCED LEAD-ACID

LITHIUM-ION

BRANDS INCLUDE VARTA®, OPTIMA®, MAC®, DELKOR®, LTH® AND HELIAR®, AS WELL AS PRIVATE LABEL BATTERIES





3

FACTS



1 IN 3

Batteries manufactured by Clarios



VARTA® is Europe's largest OE supplier with

**6 OUT OF 10**

newly manufactured cars in all segments with a  
VARTA® battery.



**7 OUT  
OF 10**

newly manufactured AGM Start Stop  
vehicles in Europe come with a VARTA®



# VARTA Timeline.





# ▶ VARTA TIMELINE



We made our first battery in 1887 and we had maintenance free batteries by 1983. VARTA was first to market with AGM batteries in 2003 and by 2009 we were fitted to 80% of vehicles with AGM Start-Stop technology.



# BATTERY CONSTRUCTION



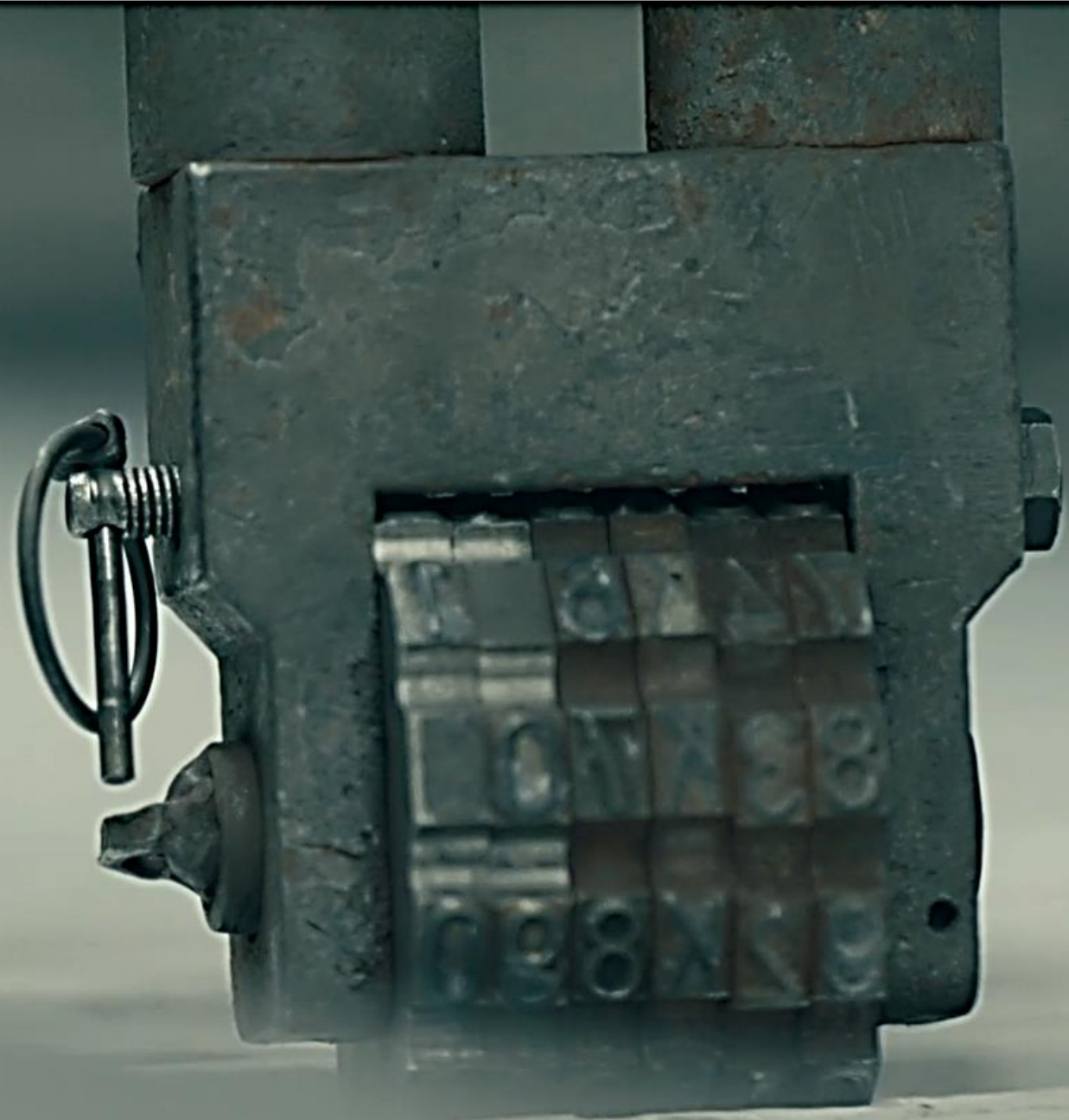






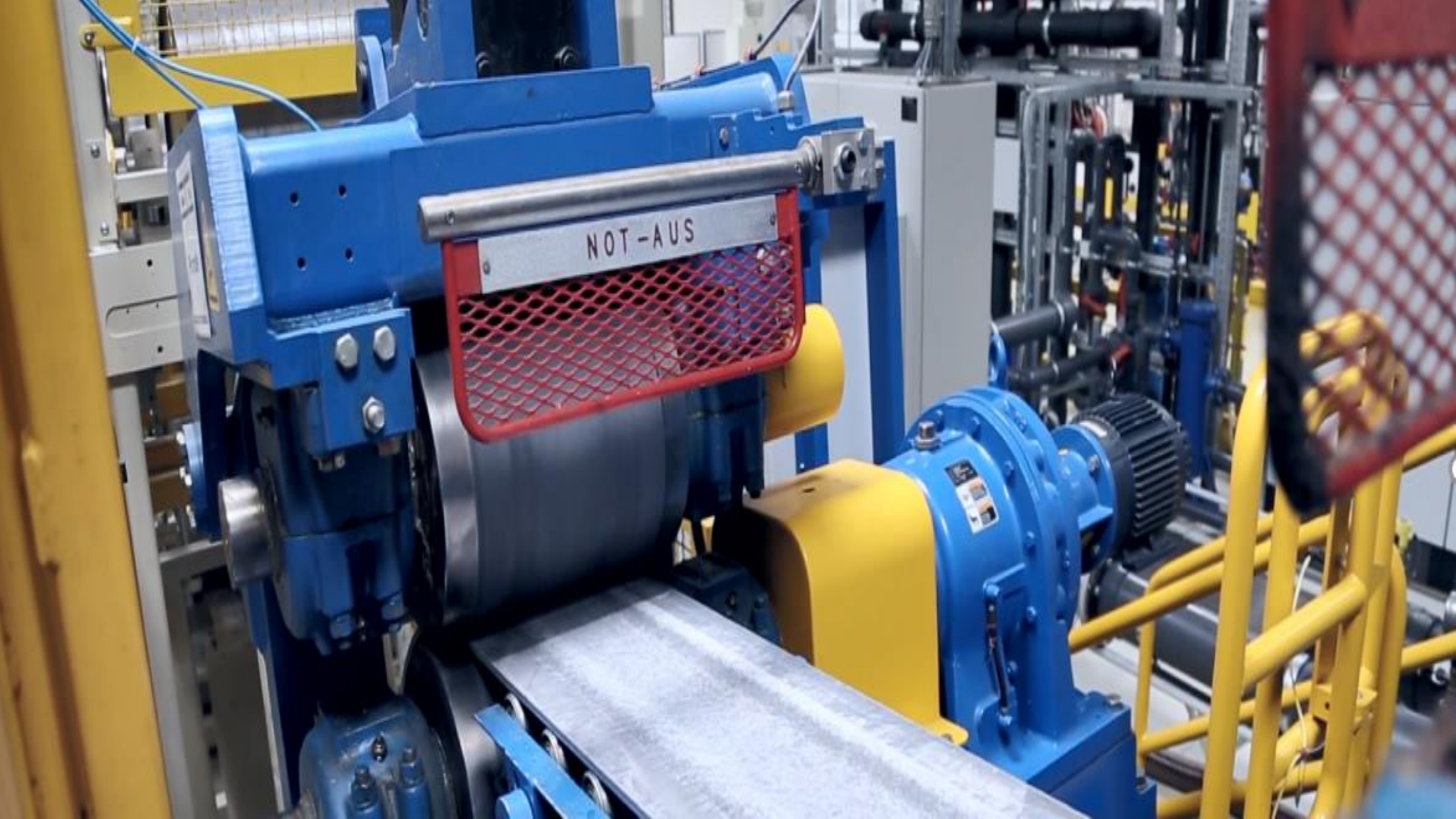








NOT-AUS





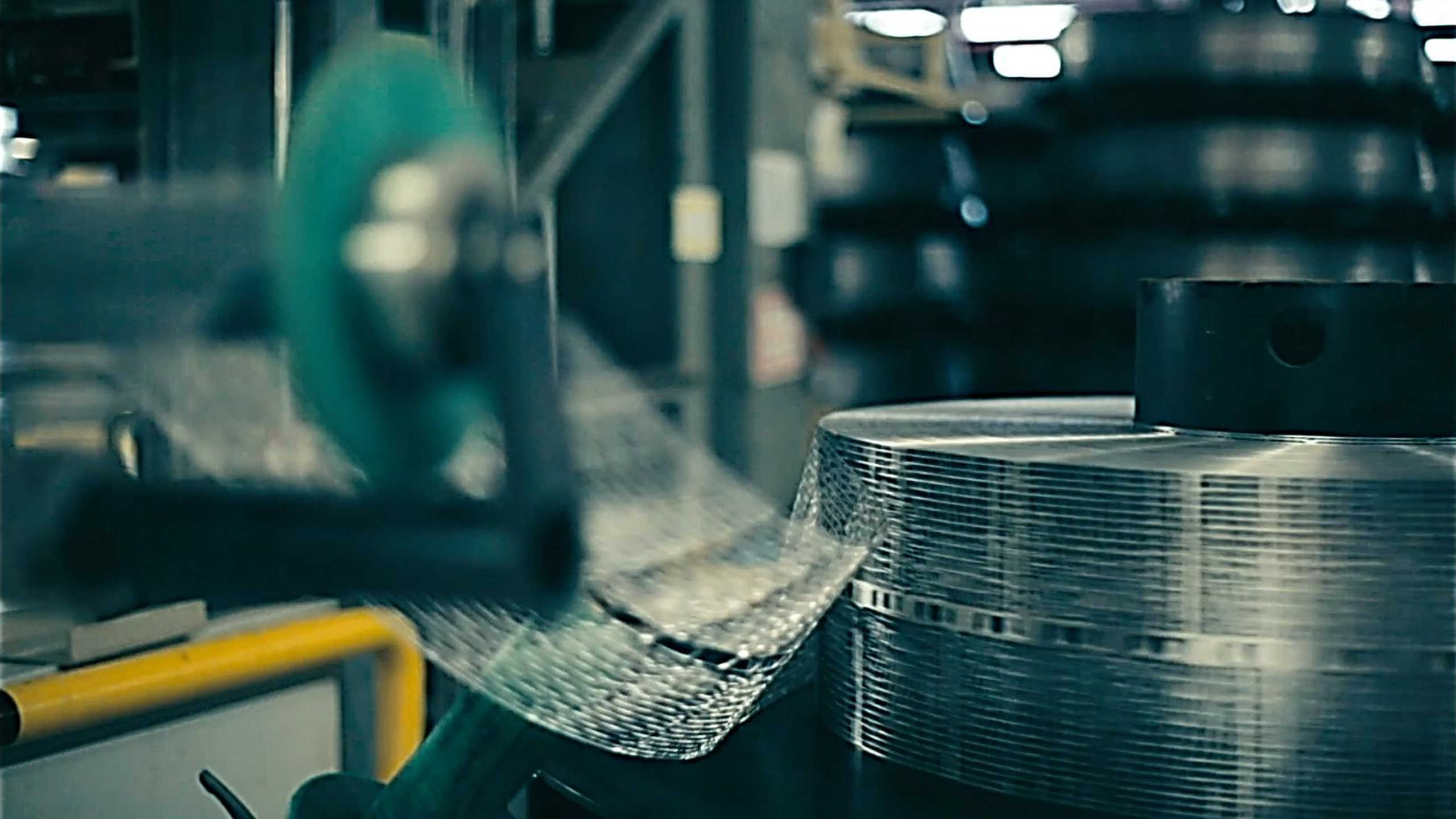






DIVERSE WRAFFAGE



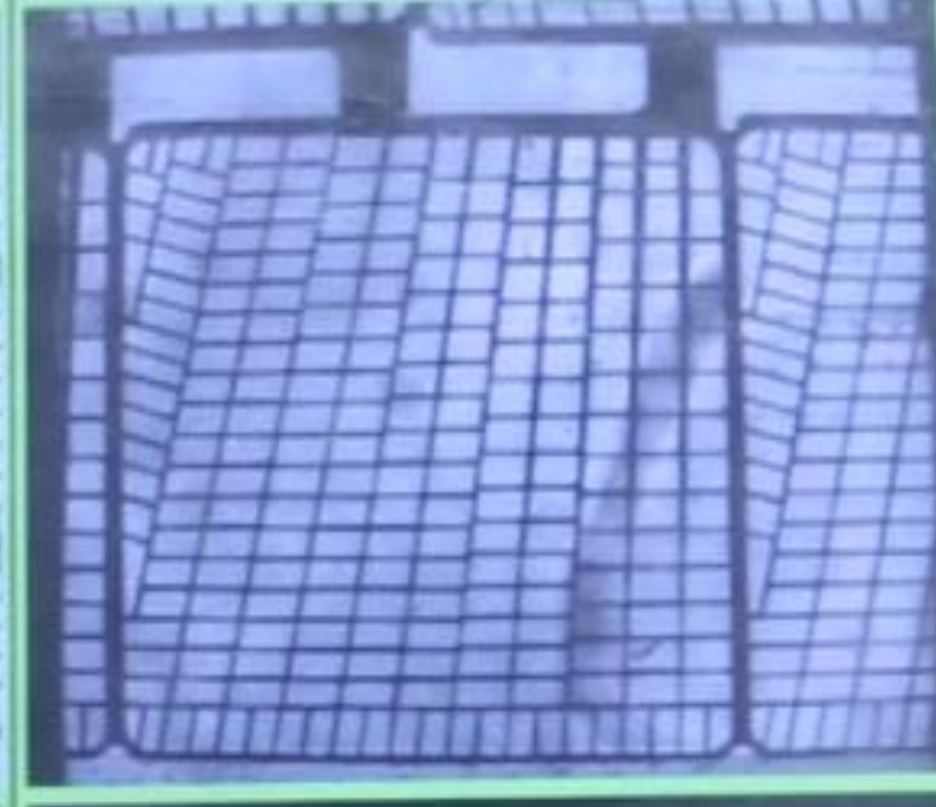
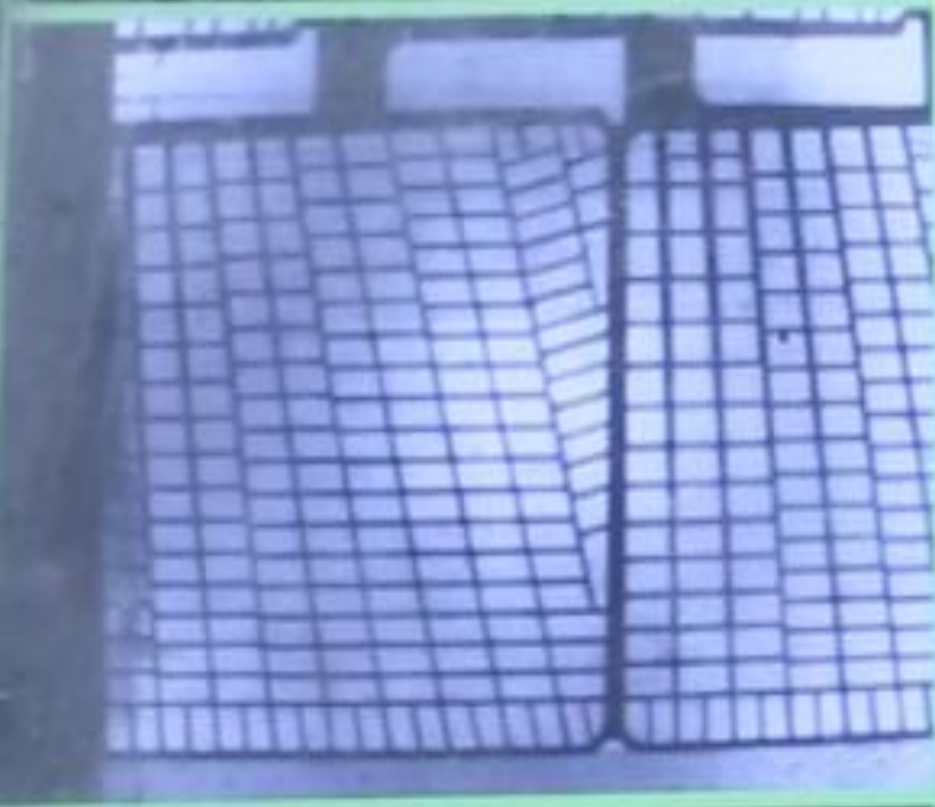




Bedienerseite\_Linie\_2




Bedienerseite\_Linie\_2




### Alle Sensoren

Zum Anzeigen  
des Sensors Bild  
berühren

Offline  Online

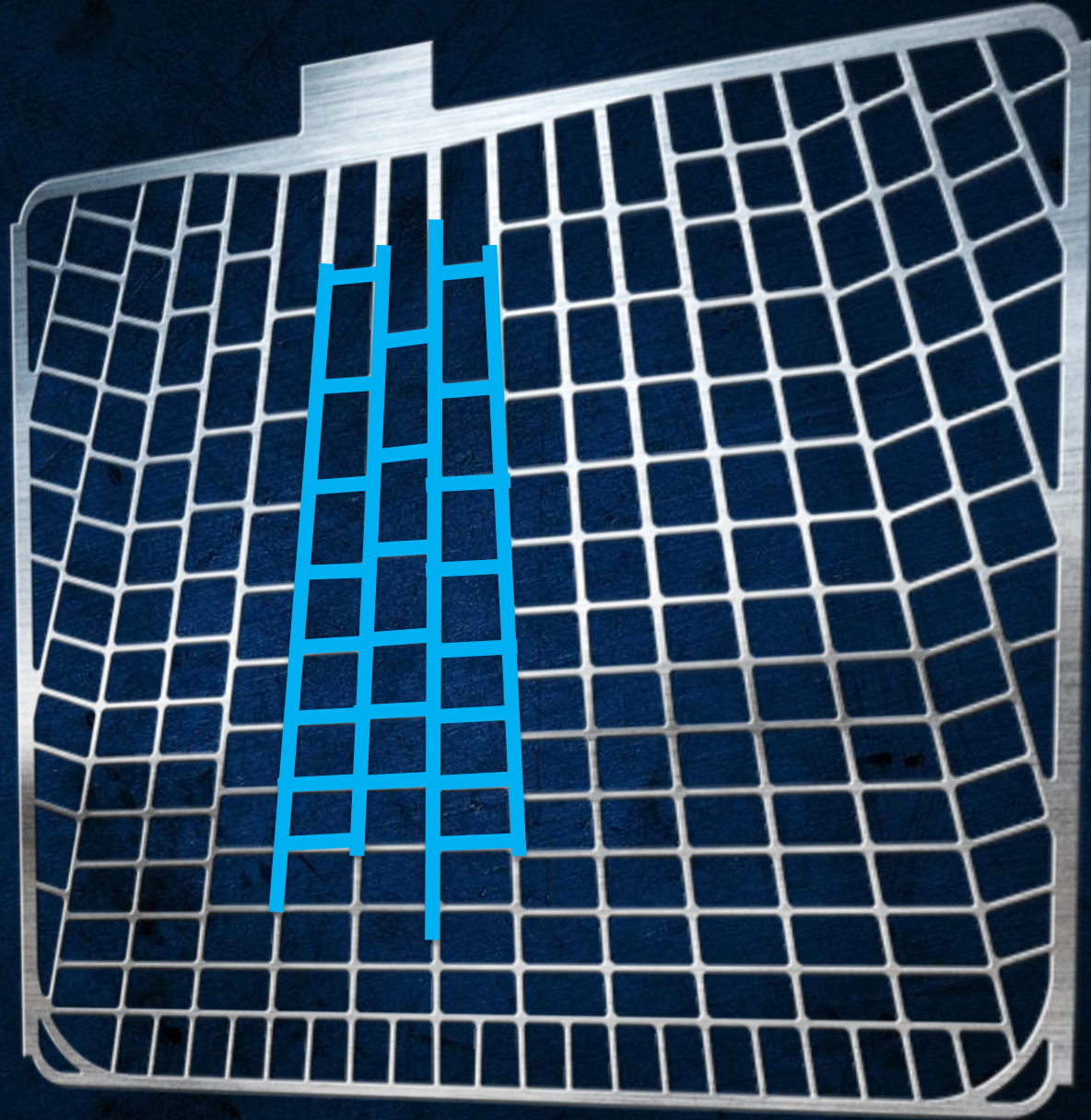
Bild  
anpassen 

Trigger 





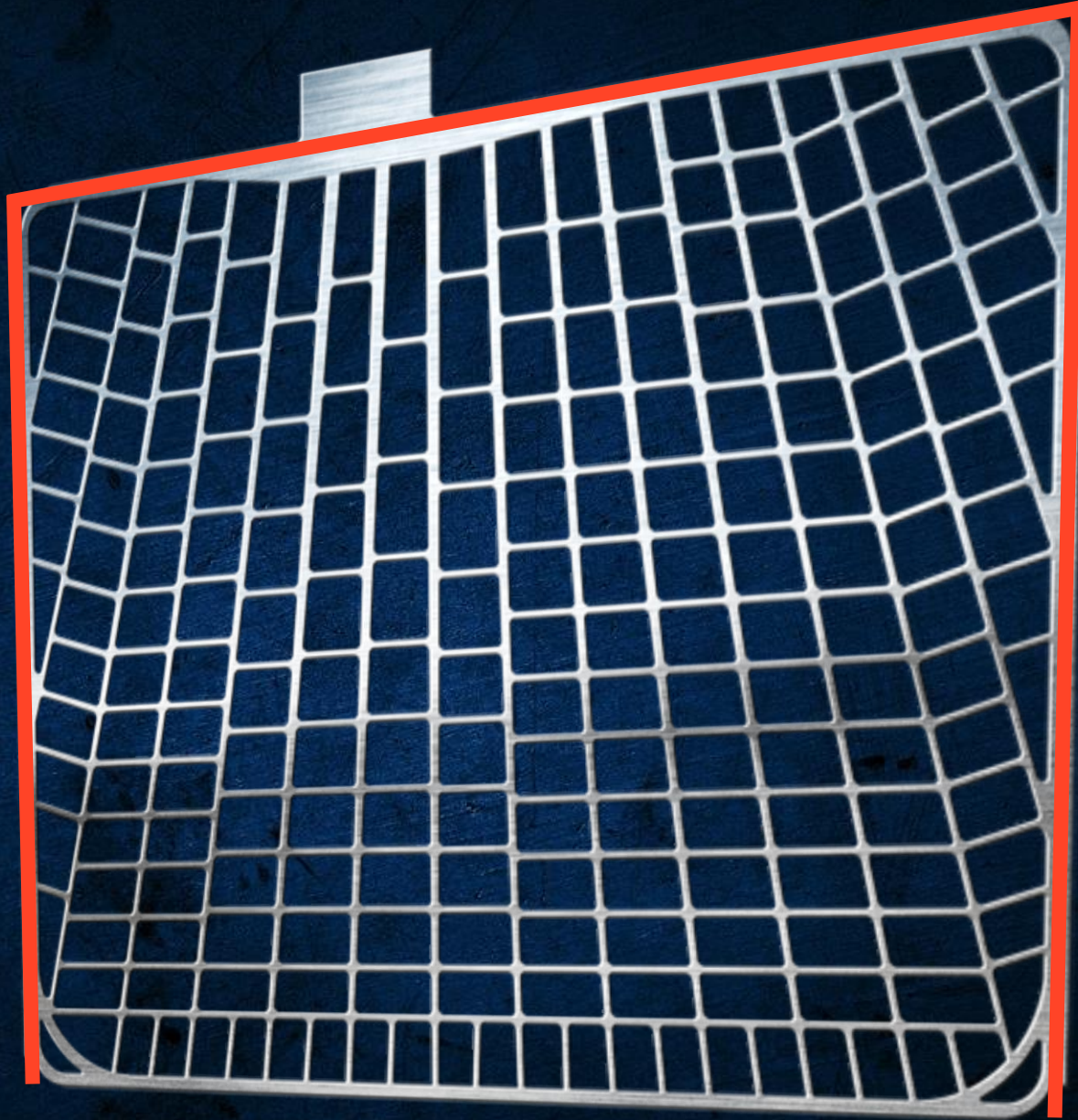








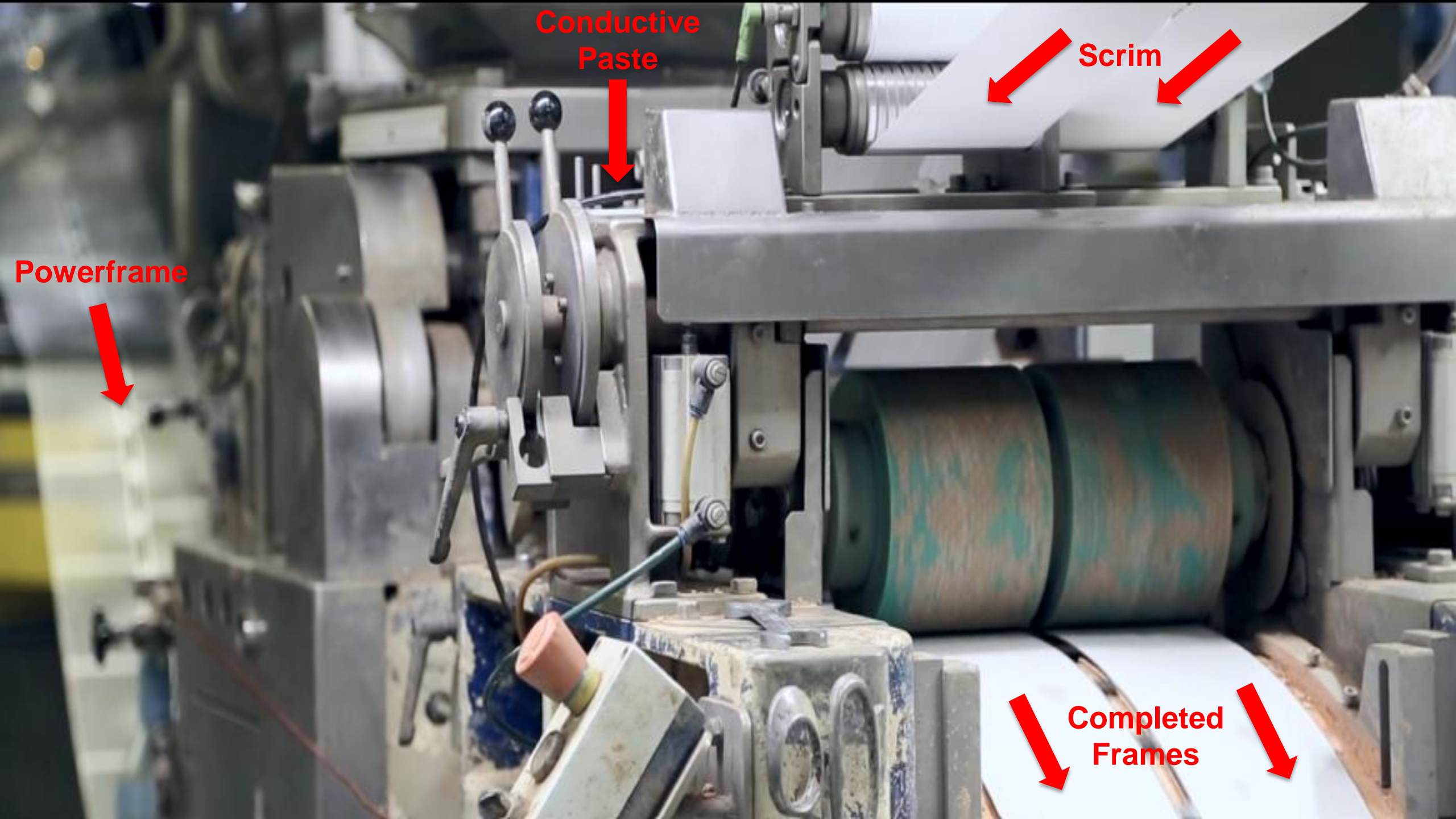












Conductive  
Paste

Scrim

Powerframe

Completed  
Frames

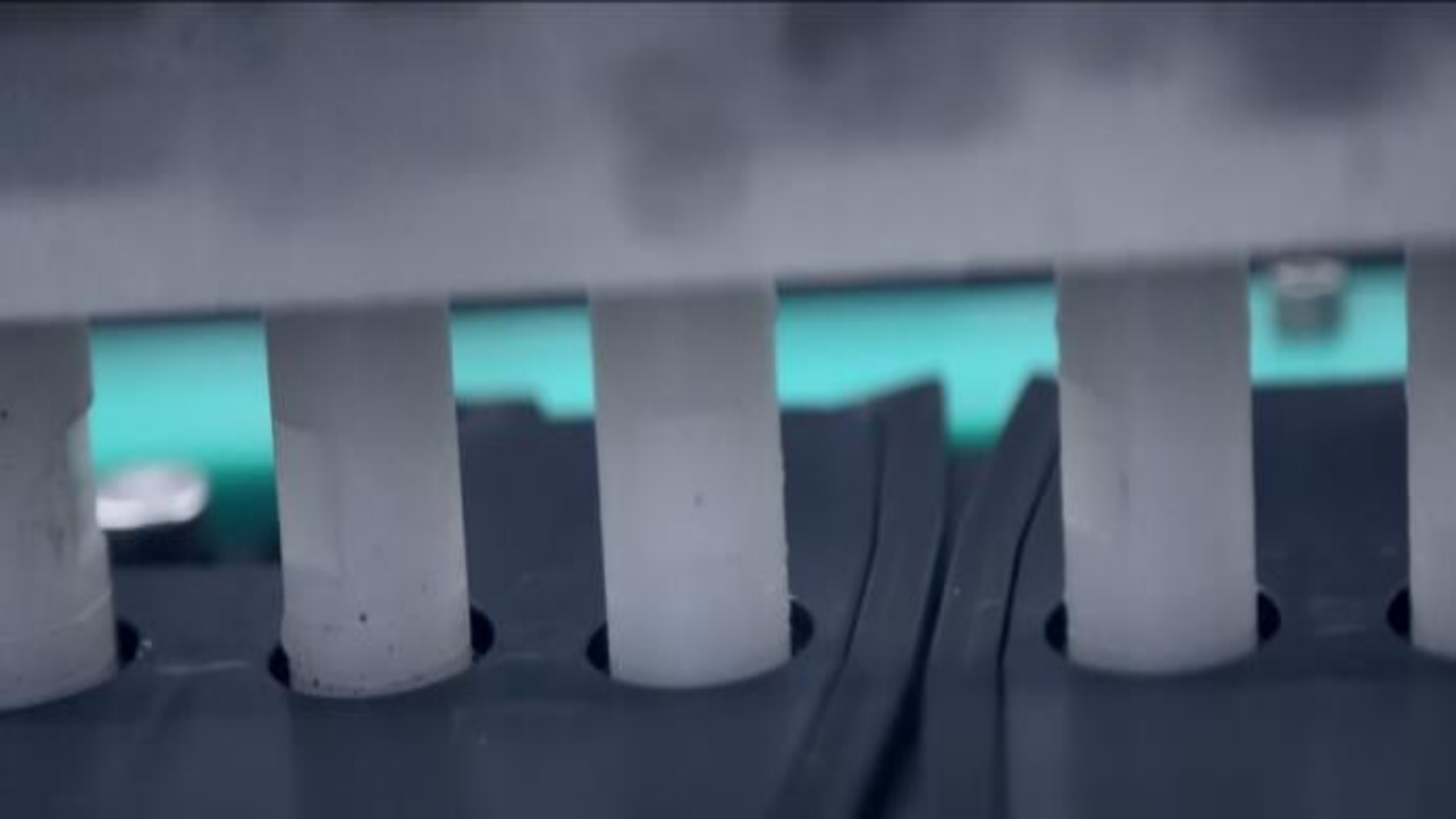


















 **VARTA®**  
瓦尔塔蓄电池



瓦尔塔动力

T2-A  
2V 90Ah (8)  
  

 **VARTA**  
START STOP READY







**VARTA**



**F17** 12V 80Ah 740A<sub>en</sub>  
580 406 074 213 2

**BLUE**  
Dynamic

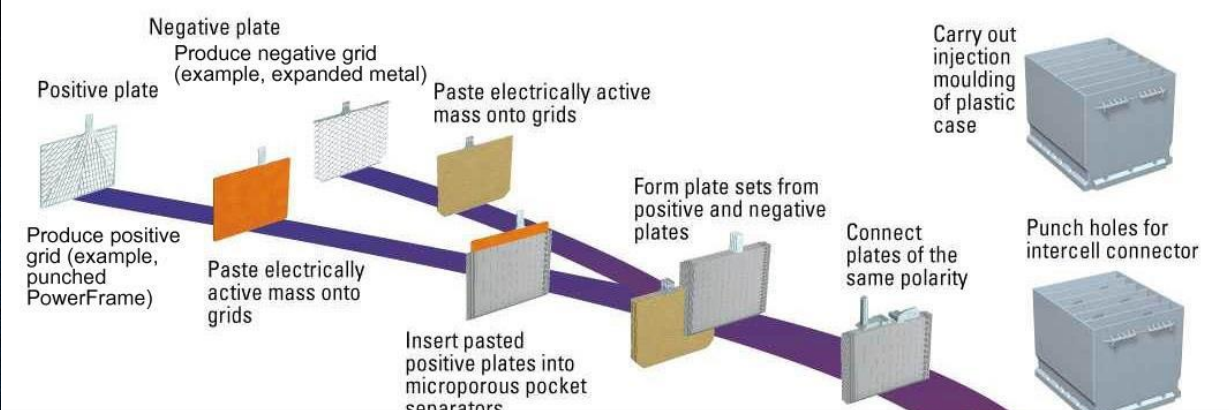
Warta  
Group





It all starts with  **VARTA**<sup>®</sup>





Negative / Positive plates meet the conductive paste and scrim and brought together to form a plate set.

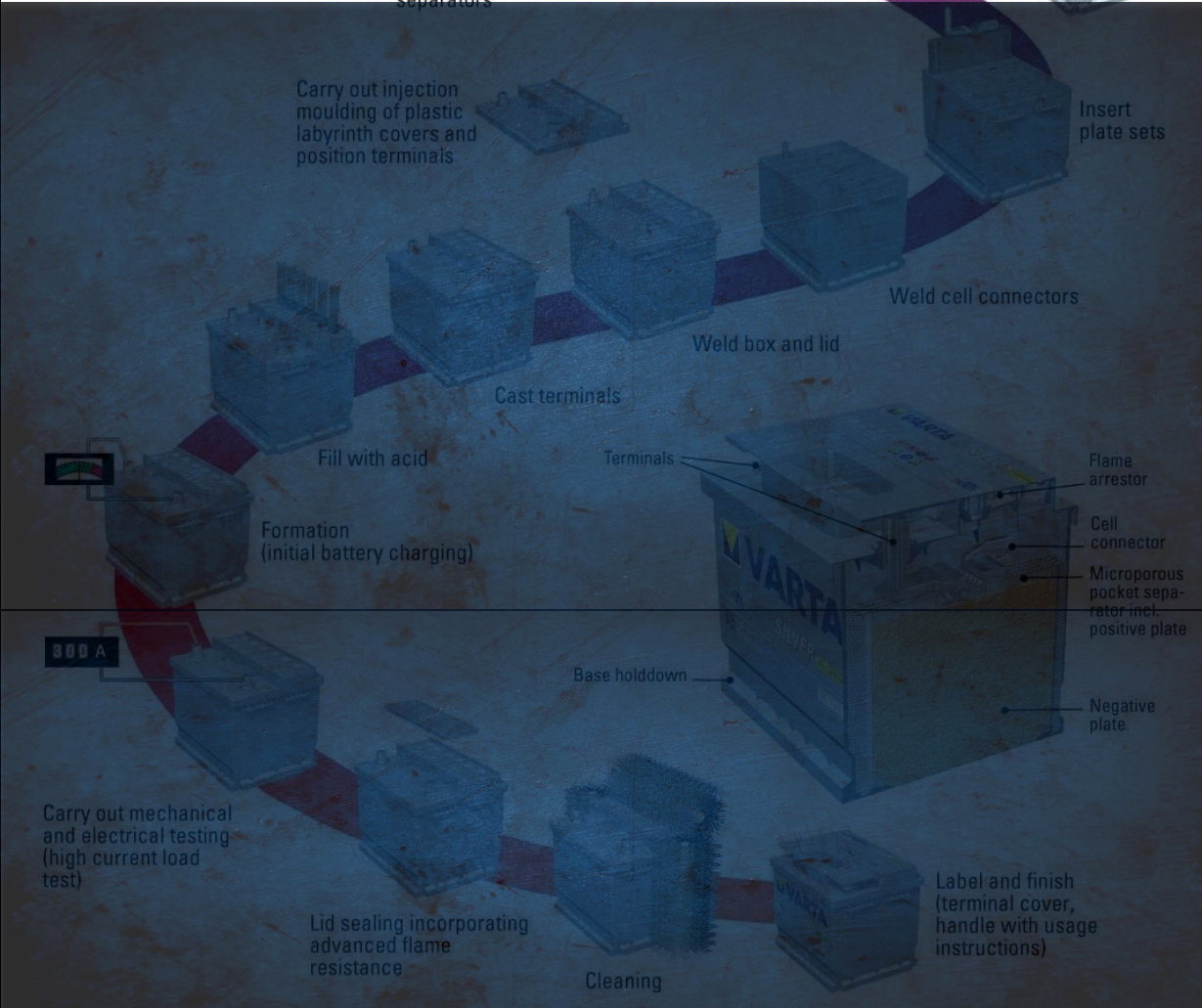


Plate set placed into the battery to create a cell, the lid is bonded onto the case, filled with electrolyte and formation charging takes place.

Battery inspection, load testing process, lid finally sealed, clean and relevant origin label fitted.

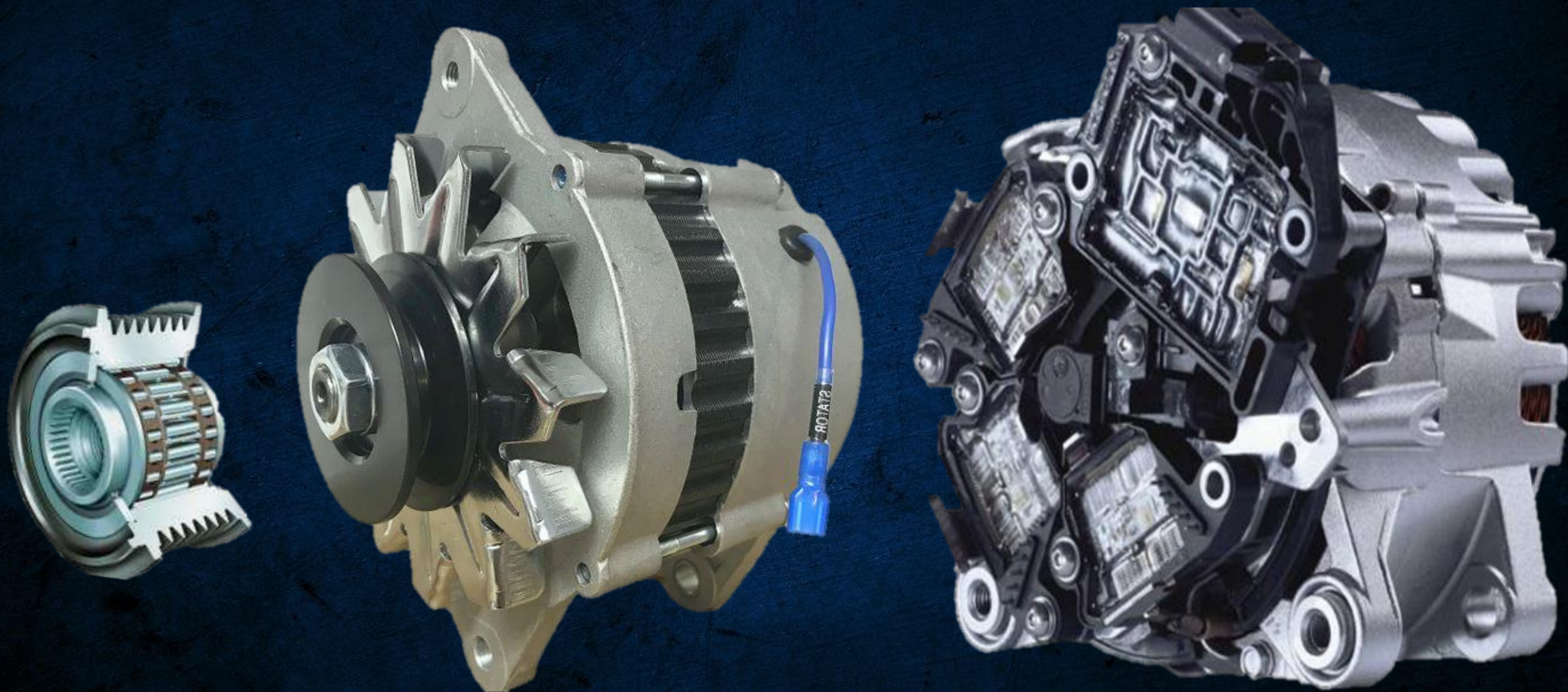


# ALTERNATOR TECHNOLOGICAL ADVANCEMENTS





# ALTERNATOR TECHNOLOGICAL ADVANCEMENTS





# INTELLIGENT BATTERY SENSOR (IBS)



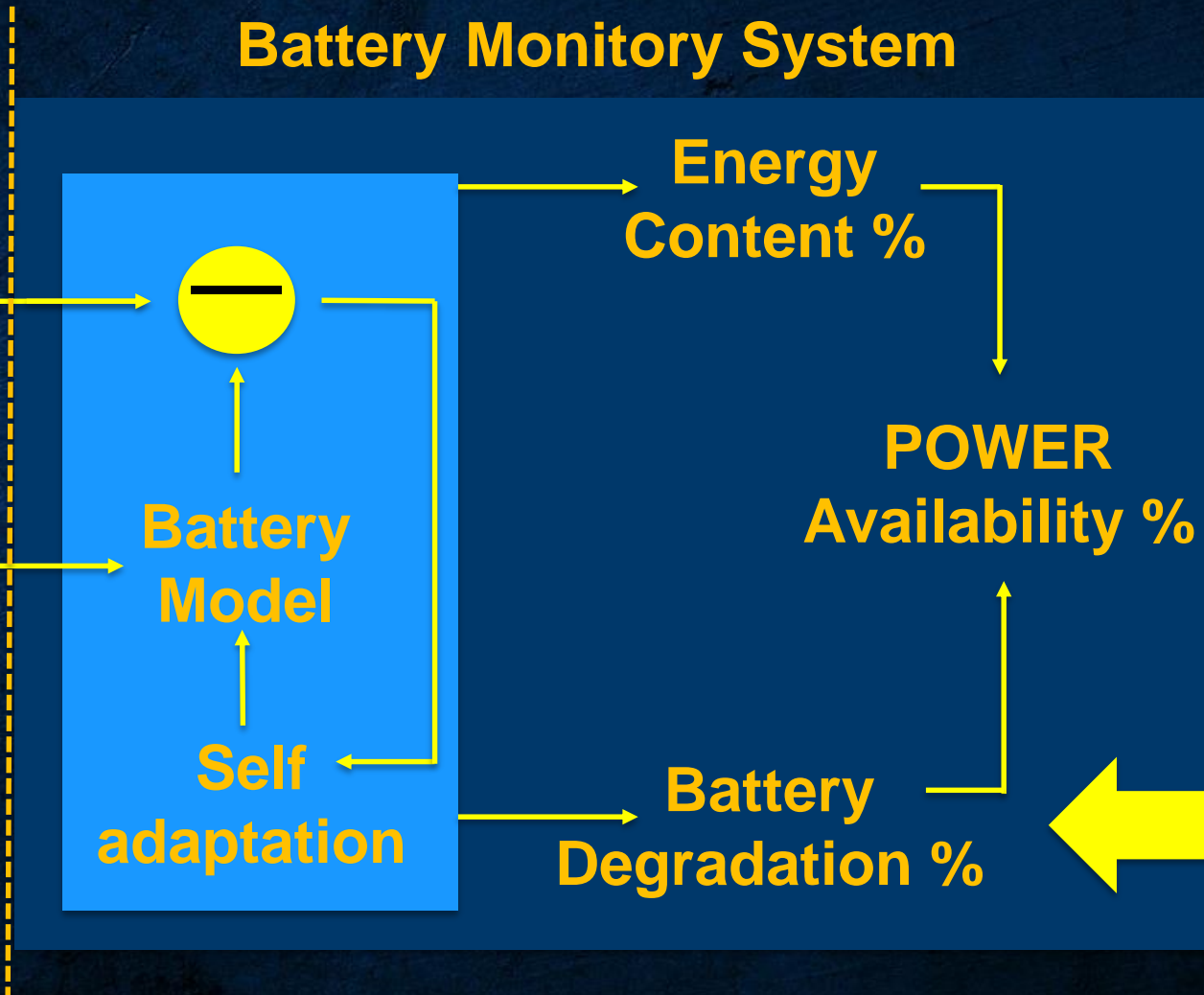


# INTELLIGENT BATTERY SENSOR (IBS)

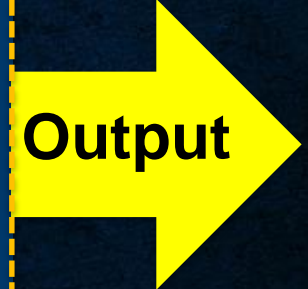


Sensor

Volts  
Current (A)  
Temperature  
Resistance



Can / Lin Bus



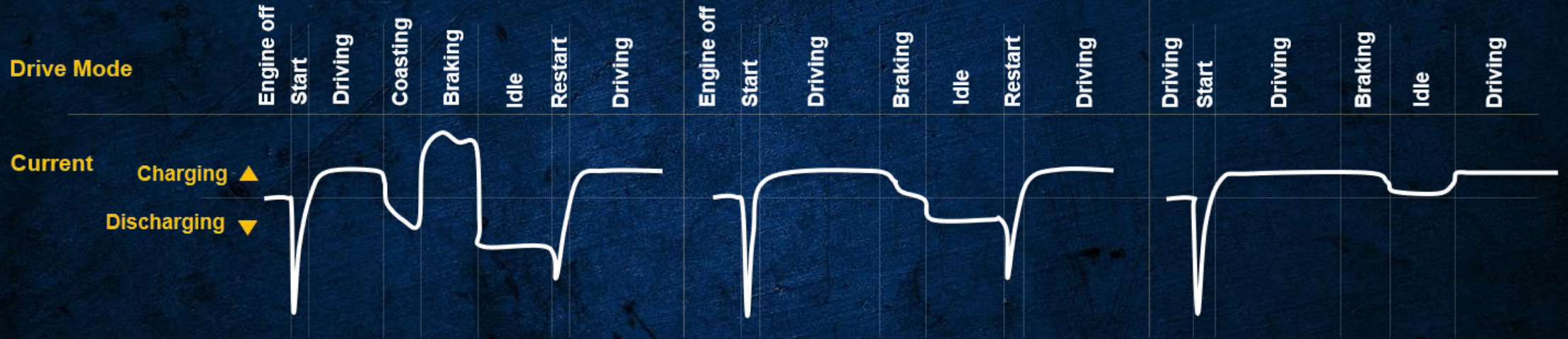
Output



Input



# ALTERNATOR CHARGING PROFILES



**Advanced Start - Stop  
Sophisticated Smart Charging**

**Basic Start - Stop  
Smart Charging**

**Conventional SLI Battery  
(Non Start - Stop)**





In electric vehicles all these consumers are supplied by a lead-acid battery

# Hybrid and Electric Cars



Interior light



Driver assistance systems



Alarm system



Radio/  
Soundsystem



Navigation system



Instruments



Door locking system



Onboard computer to start and control the high voltage battery

⚡ In case of failure of the high voltage battery



Windshild wipers



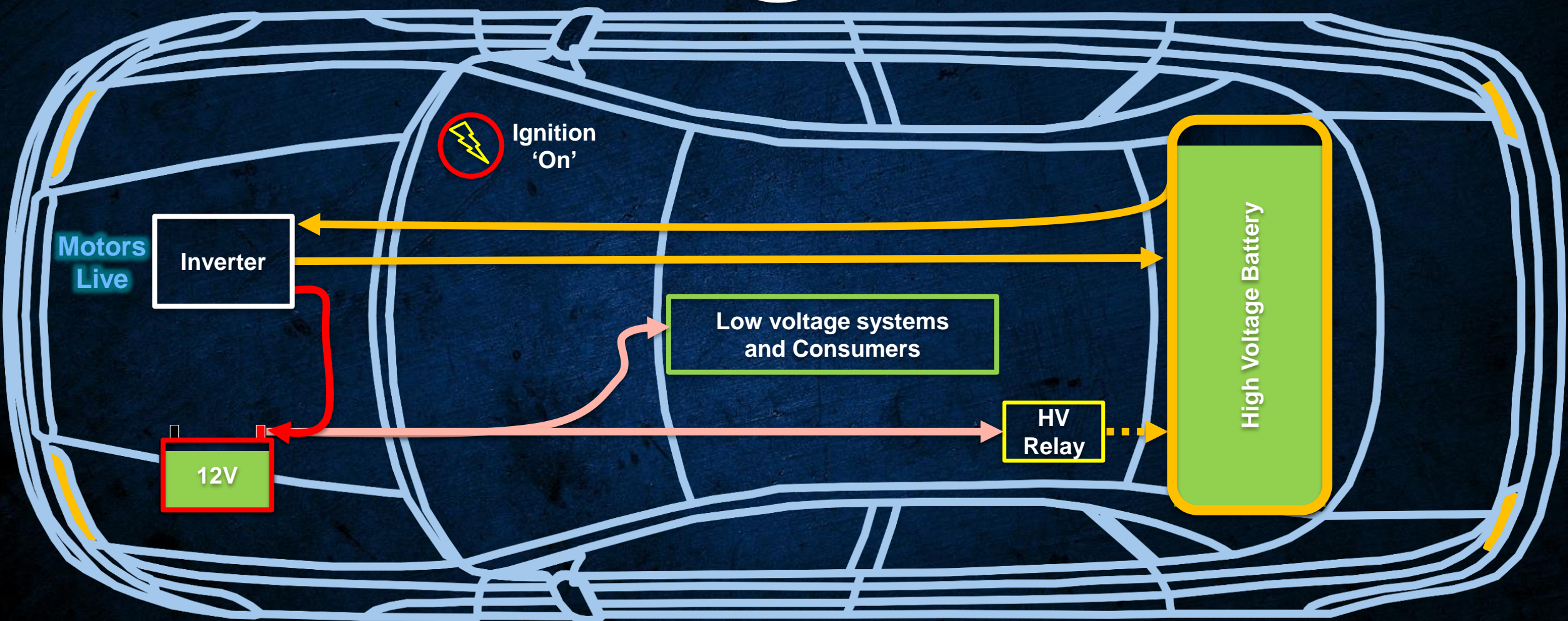
Power steering



Brakes and brake booster



# Remote unlock



Motors Live

Inverter

12V



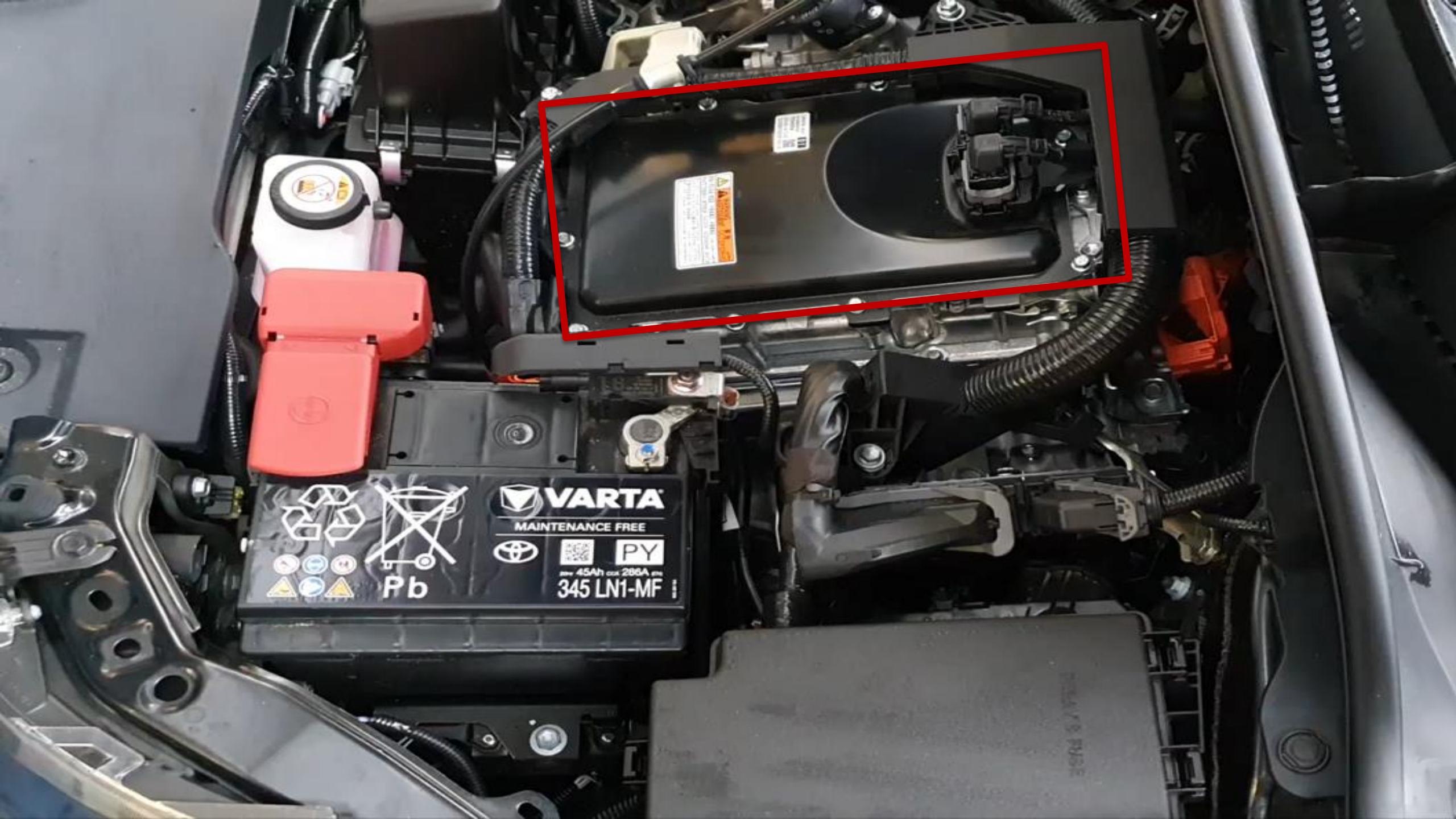
Ignition 'On'

Low voltage systems and Consumers

HV Relay

High Voltage Battery





**VARTA**  
MAINTENANCE FREE  
Pb  
45Ah 280A  
345 LN1-MF



# WHY START-STOP?





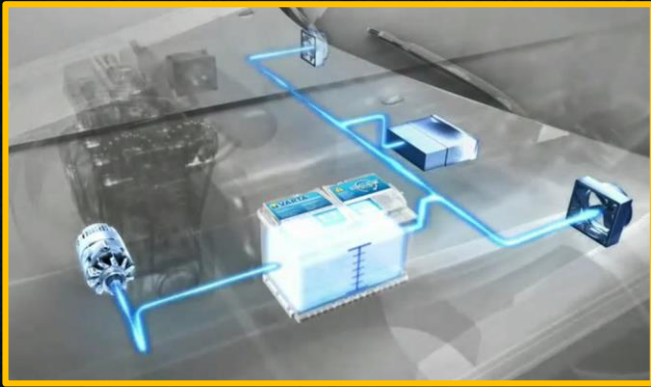
## WHY START-STOP?

- CO<sub>2</sub> policy regulations limit emissions to 95g by 2021.
- Environmentally friendly.
- Fuel saving measure for the vehicle owner.
- Vehicles become increasingly complex.
- Modern cars host over 150 electric devices and more than 50 computer modules.
- The role of the battery changes.
- EFB and AGM become the new standard.
- Battery management with integrated Smart charging.

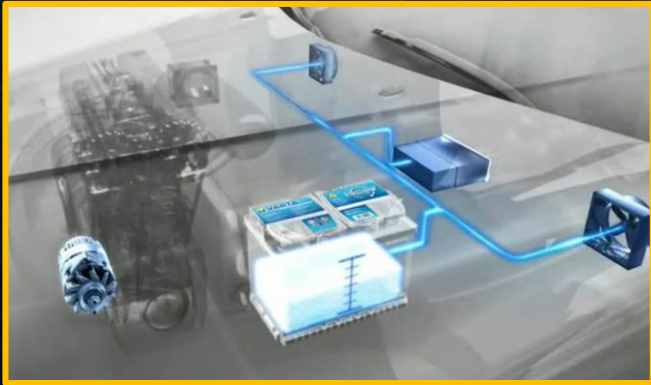




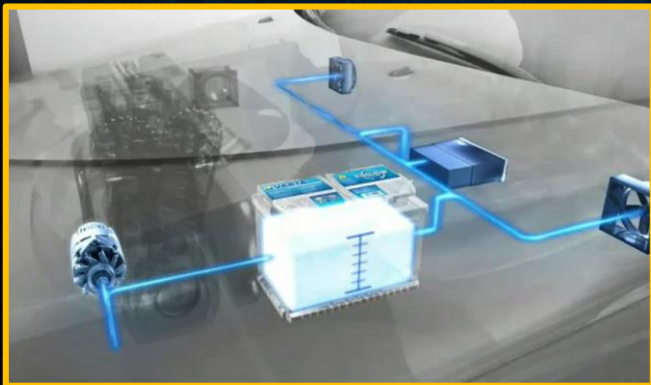
# START STOP and SMART CHARGING



Engine running / Alternator activated



Engine Stopped / Alternator switched off –  
Vehicle still powered up



Engine Restarted / Alternator re-activated





# INCREASING ELECTRICAL DEMAND



Rain sensor.  
Road sign recognition.  
Night vision assistance.  
Radar camera.  
Heated windscreen.



Seat warmers.  
Seat coolers.  
Lane departure.  
Heated mirrors.



Electric mirrors.  
Infotainment systems.  
DVD and TV players.



12v auxiliary outputs.  
Wifi and Bluetooth.  
Internal cabin pre heat  
and cooling systems.



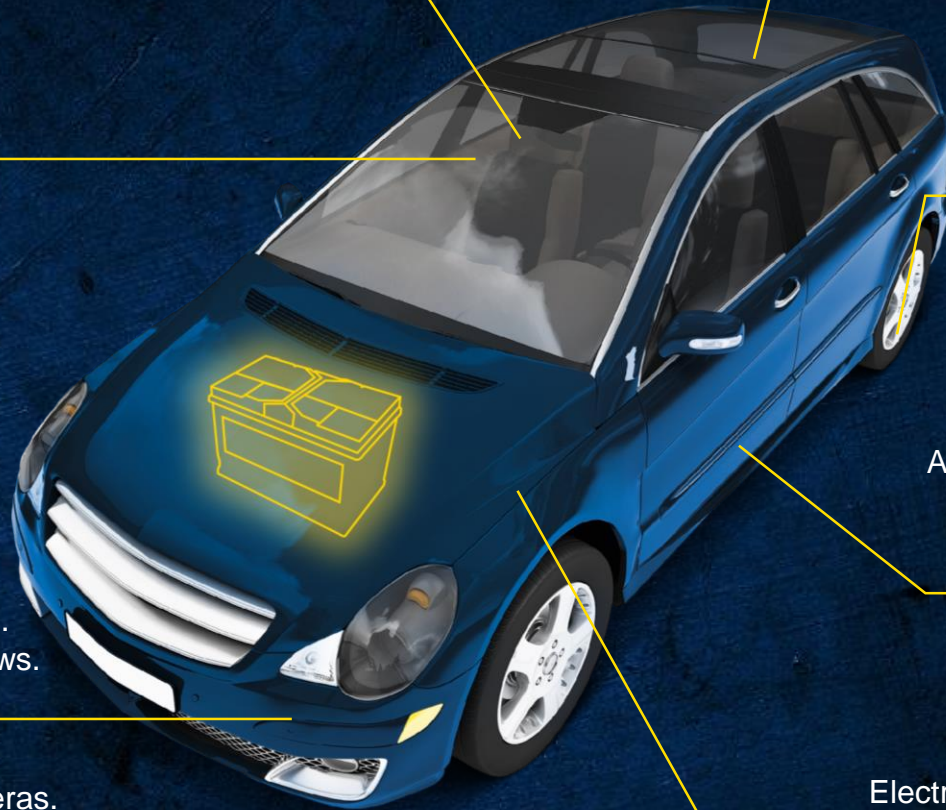
Automatic climate control.  
One touch electric windows.



Parking sensors.  
360 degree parking cameras.  
Autonomous braking sensor.  
Radar cruise sensor / camera.



Headlamp wash.  
LED projected auto directional  
headlamps.



Heated rear window.  
Electric sunroof.  
Electric convertible  
folding roof.



Regenerative braking.  
Automatic tyre  
pressure monitoring.  
ABS / TCS.



Electric assisted steering.

Auto remote central locking.  
Auto alarm activation.  
Auto remote lights on.



Smart charger alternator.  
Battery monitor system.  
Multi speed cooling fans.



Electric water pumps.  
Electric engine cooling pre heat.  
Electric EGR cleaning.



Electric heated catalytic converter.  
Sophisticated engine  
management system.







# VARTA® PARTNER-PORTAL



OE DATA



**BATTERY POSITION**



**BATTERY INSTRUCTIONS**



**BATTERY SELECTION  
AUXILIARY BATTERY**



**BATTERY KNOWLEDGE**

**FREE  
to use  
ONLINE**



# THE VARTA AUTOMOTIVE RANGE



Pre Year  
2000, low  
power  
consumers



More  
cranking  
power,  
more  
consumers



Premium  
Non  
Start-  
Stop  
battery



Basic  
  
SMART  
CHARGING



Advanced  
  
SMART  
CHARGING



SMART  
CHARGING



### 096 Conventional battery

Contains 7 **POSITIVE** and 8 **NEGATIVE** plates per cell = 90 plates in total



**V** **S**

### 096 AGM battery

Contains 7 **POSITIVE** and 8 **NEGATIVE** plates per cell = 90 plates in total

The plates in this battery are **MUCH** thicker, increased conductive paste which increases the depth of discharge





# Battery Testing





# BATTERY TEST CHECK PROGRAM



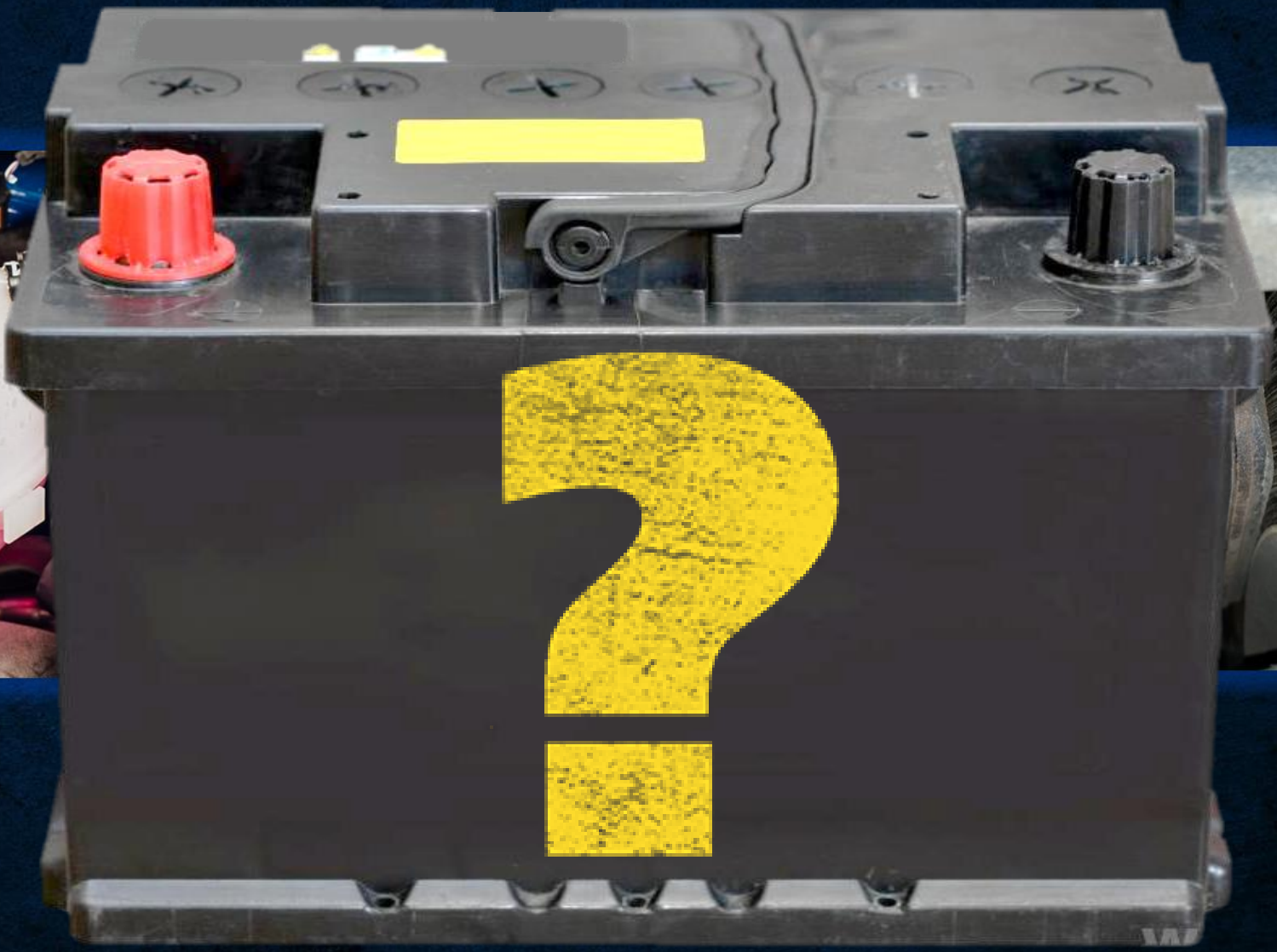
100%	>12.7v
90%	12.6v – 12.7v
80%	<b>12.5v</b> – 12.6v
70%	12.4v – <b>12.5v</b>
60%	12.3v – 12.4v
50%	<b>12.2v</b> – 12.3v
40%	12.1v – <b>12.2v</b>
30%	12.0v – 12.1v
20%	<b>11.9v</b> – 12.0v
10%	11.8v – <b>11.9v</b>
0%	<11.8v

0.8v





# CUSTOMER SATISFACTION and RETENTION





# THE BATTERY EXPERTS

Powered by  VARTA®



**OE**  
**ORIGINAL**  
**SPARE PART**



# WHAT'S INSIDE THE BOX ?





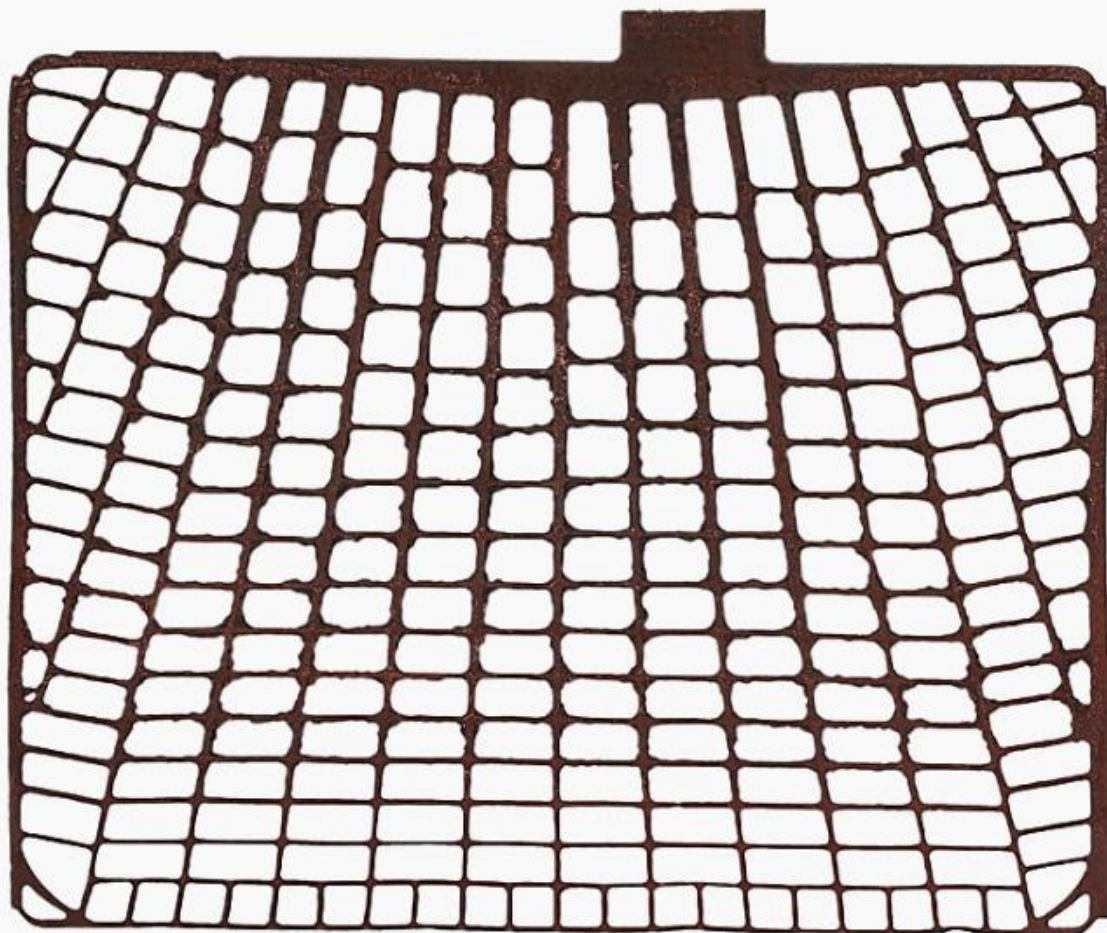
# Features and Benefits.

## POWERFRAME®



**POWERFRAME® GRIDS**

31,000 mi



**BOOKMOLD GRIDS**

31,000 mi





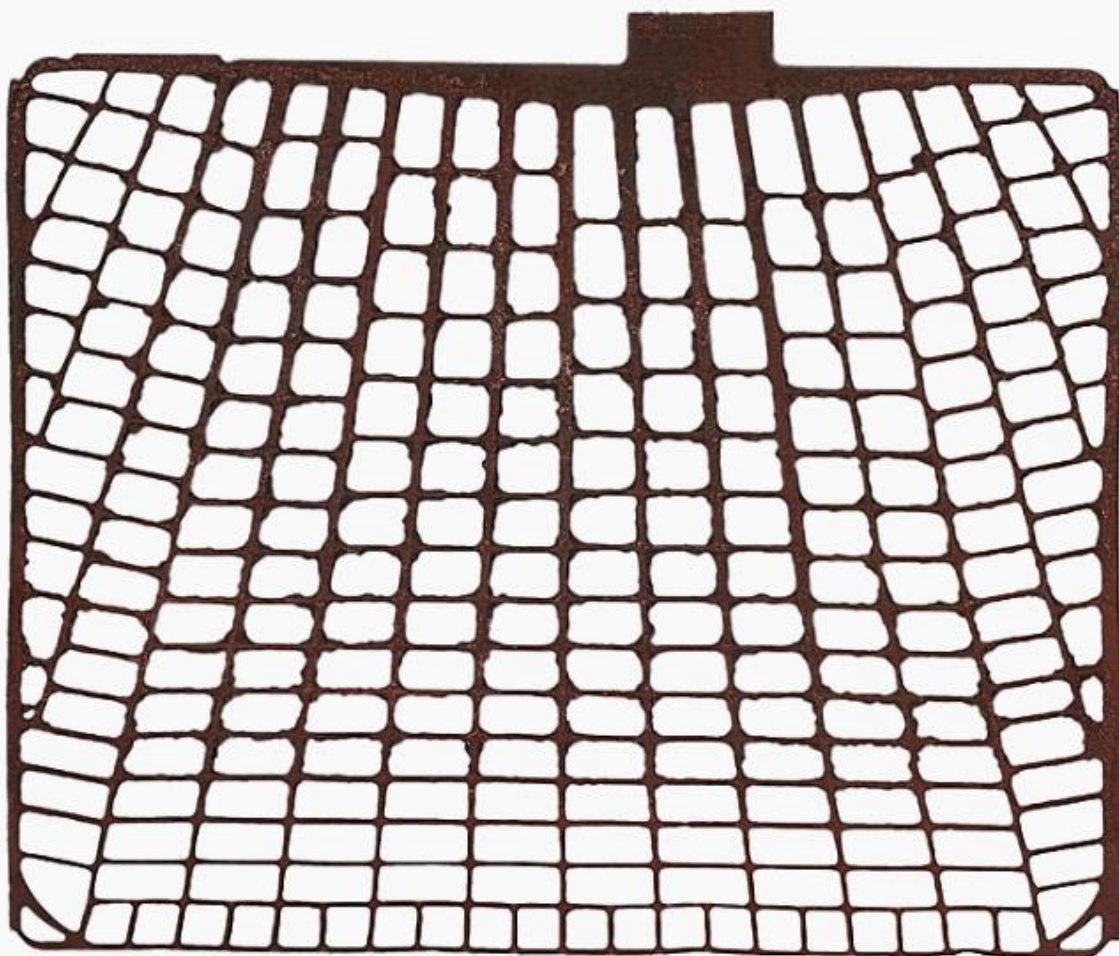
# Features and Benefits.

## POWERFRAME®



### POWERFRAME® GRIDS

31,000 mi



### EXPANDED METAL GRIDS

31,000 mi







Aston Martin · Audi · Bentley · BMW · Bugatti  
Chevrolet · Chrysler · Citroën · Ferrari · Fiat · Ford  
GMC · Honda · Hyundai · Jaguar · Kia · Lamborghini  
Land Rover · Maserati · Mercedes-Benz · Mini  
Nissan · Opel · Peugeot · Porsche · Renault · Seat  
Škoda · Toyota · Vauxhall · Volkswagen · Volvo







**VARTA®**  
**PARTNER**  
**PORTAL**



**VARTA®**  
**BATTERY**  
**TEST-CHECK**  
**PROGRAM**



**VARTA®**  
**TRAINING**  
**ACADEMY**  
plus  
**eLEARNING**



*It all starts with*  **VARTA®**

 **CLARIOS**



# Thank You. Q&A time...



## Varta-support@clarios.com



*It all starts with*



**VARTA®**