Salvage Wire

Helping automotive recyclers become leaders in their industry

High Voltage Awareness

Helping automotive recyclers become leaders in their industry

Salvage Wire, Salvage Insight & Charg-Ed

- Unique, award winning consultancy service for the vehicle salvage and recycling industry
- Global specialist in electric and hybrid vehicles
- Helping vehicle recyclers become leaders in their industry

Identify and Assess Vehicle

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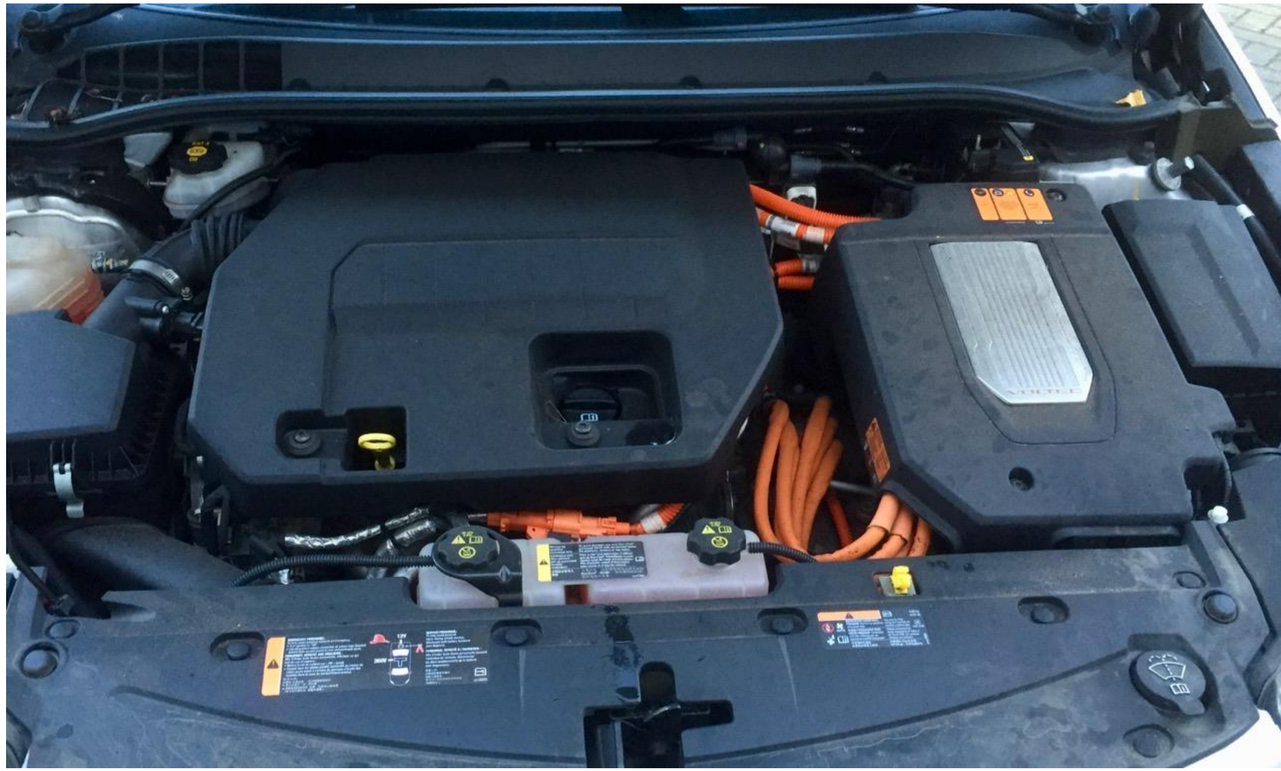
How to Identify?

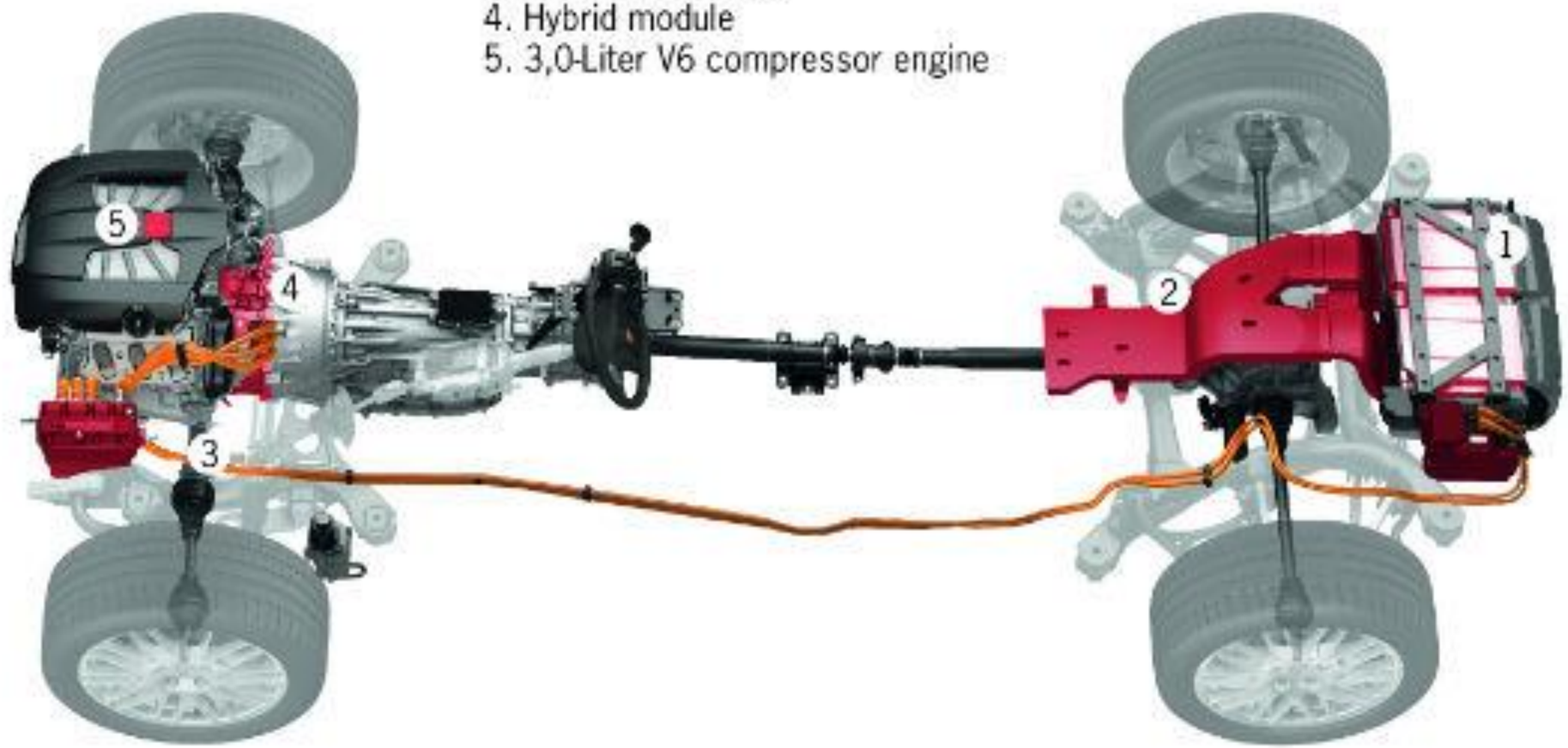


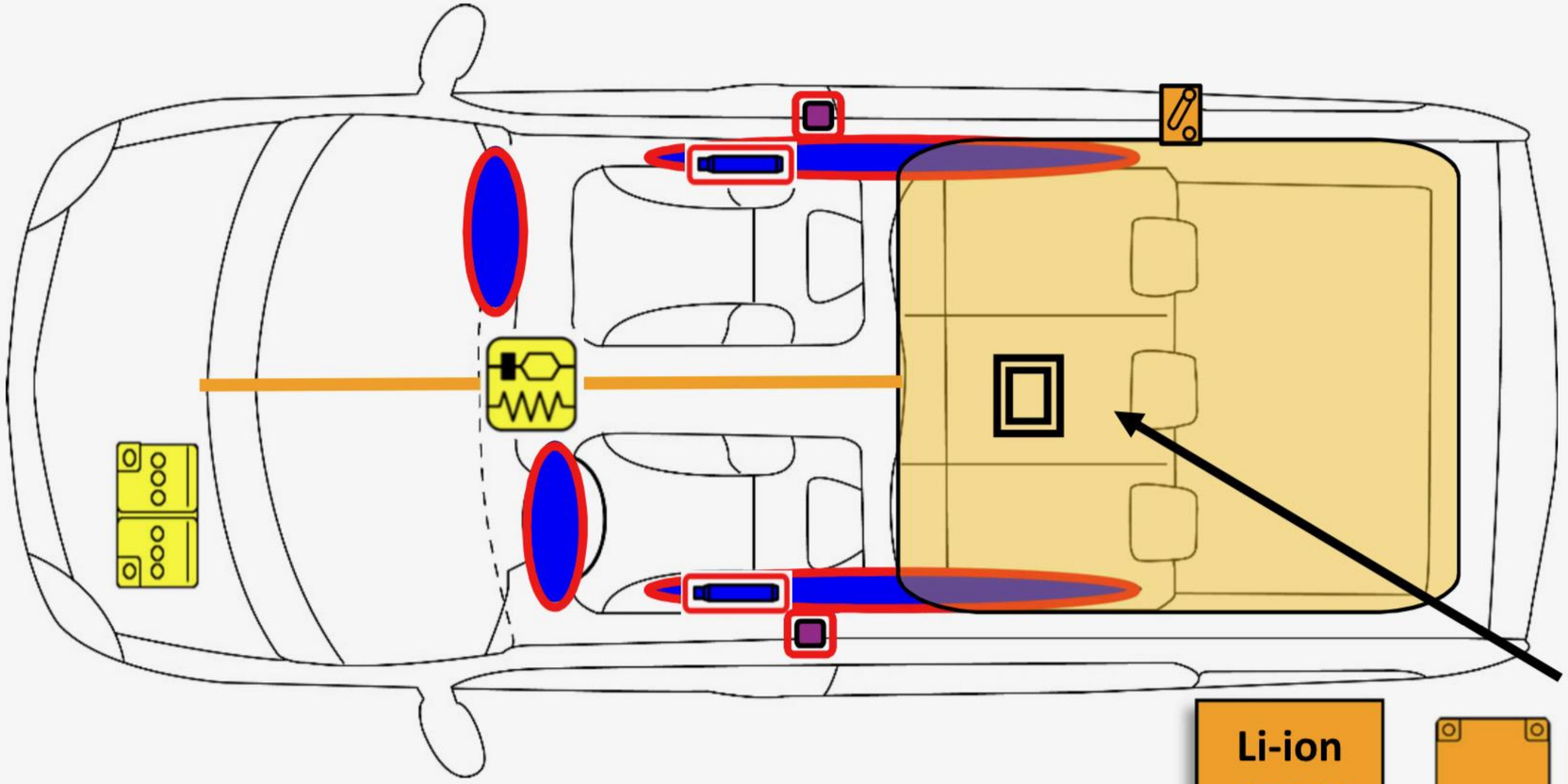
Circumstances

- Flood
- Fire
- Accident

Component Location

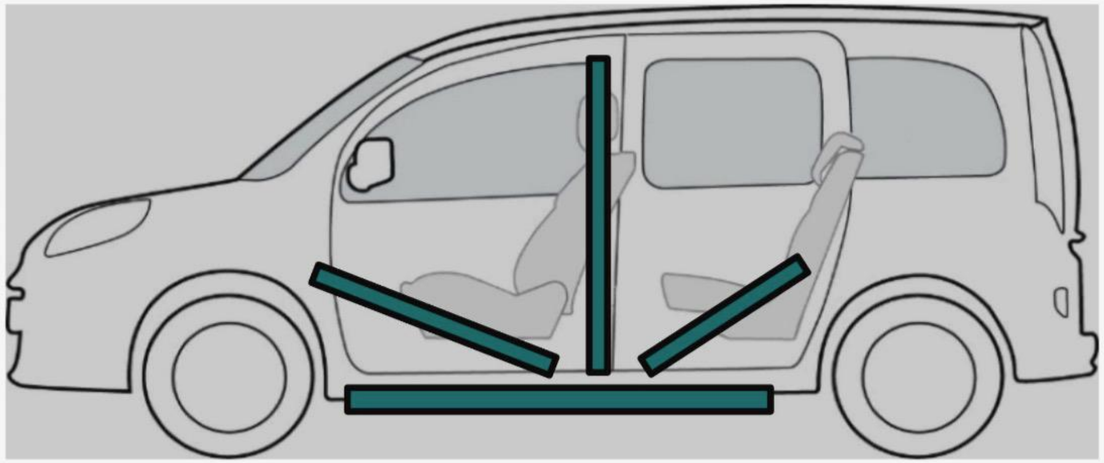
1. High voltage nickel-metal hydride battery
2. Air supply duct
3. Power electronics
4. Hybrid module
5. 3,0-Liter V6 compressor engine

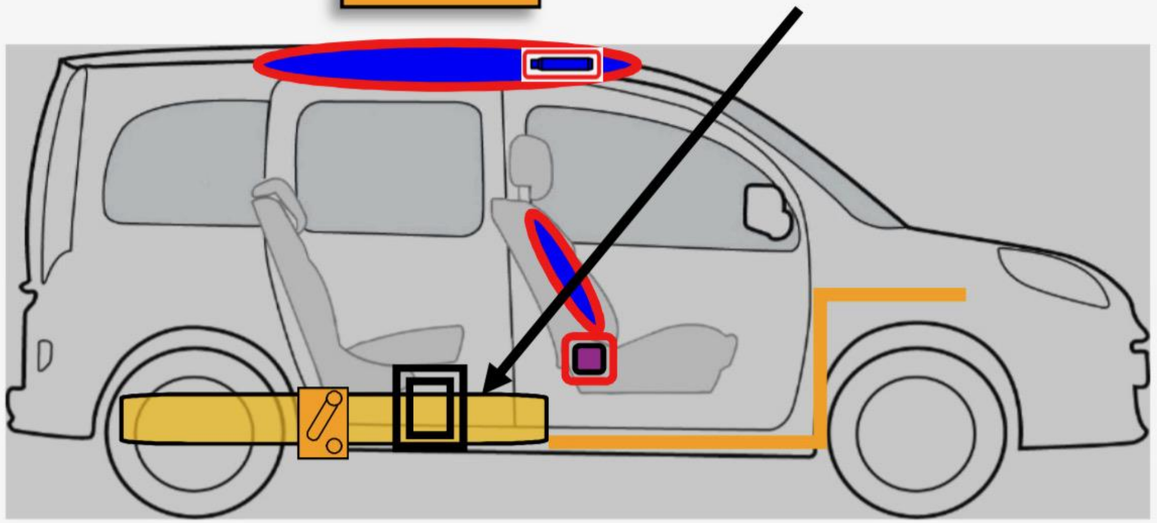


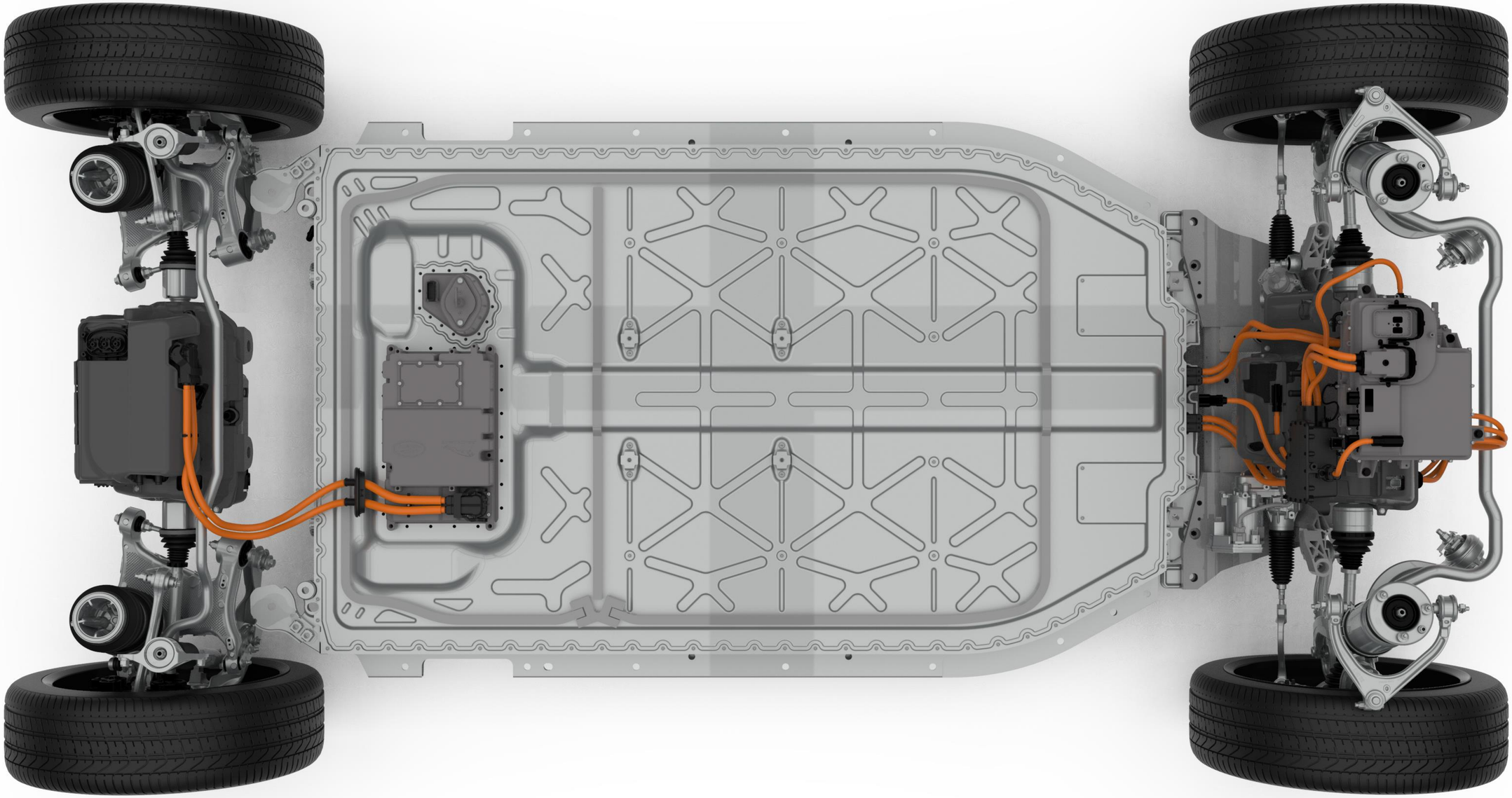


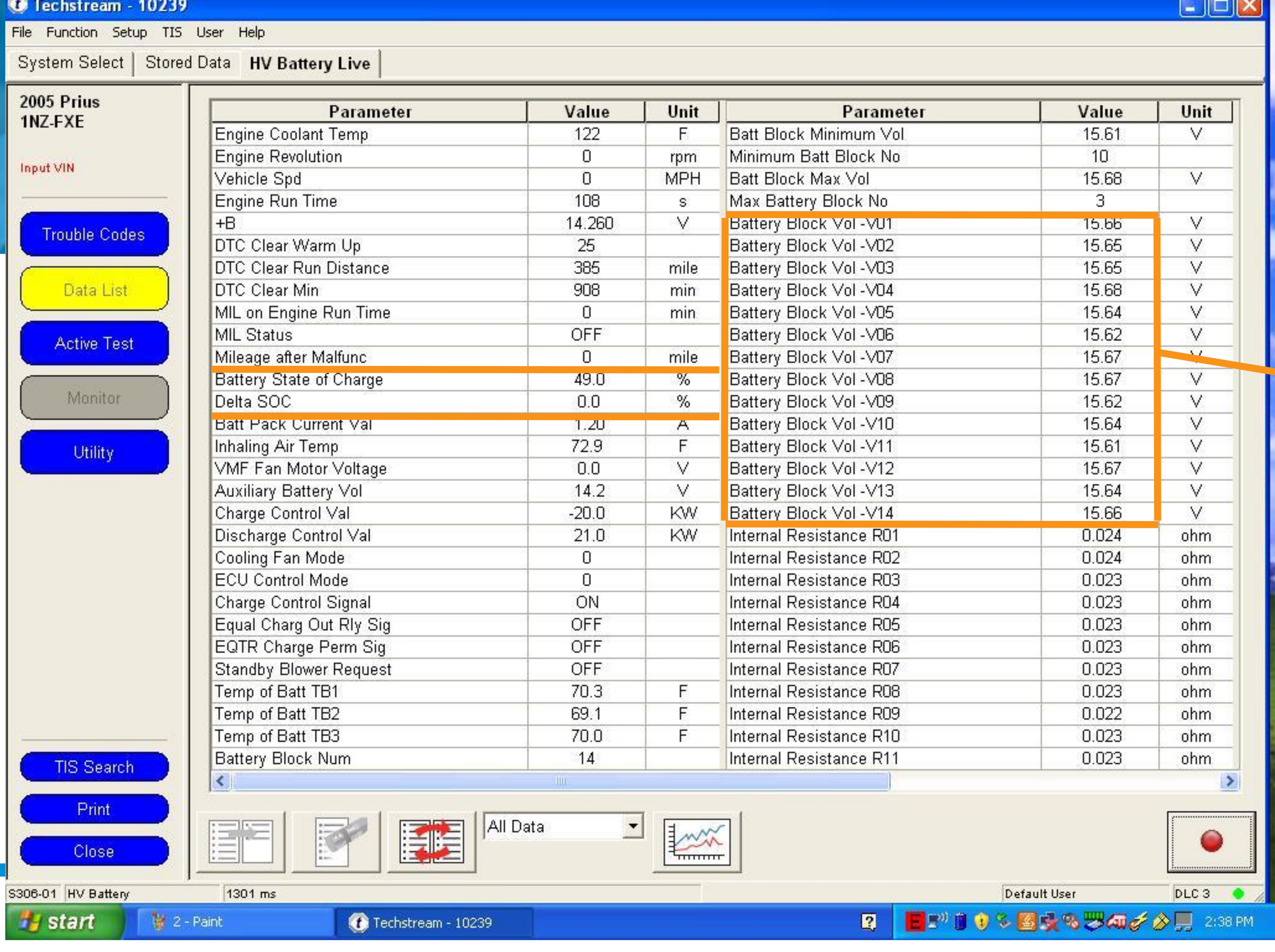
6.

Li-ion
400 V



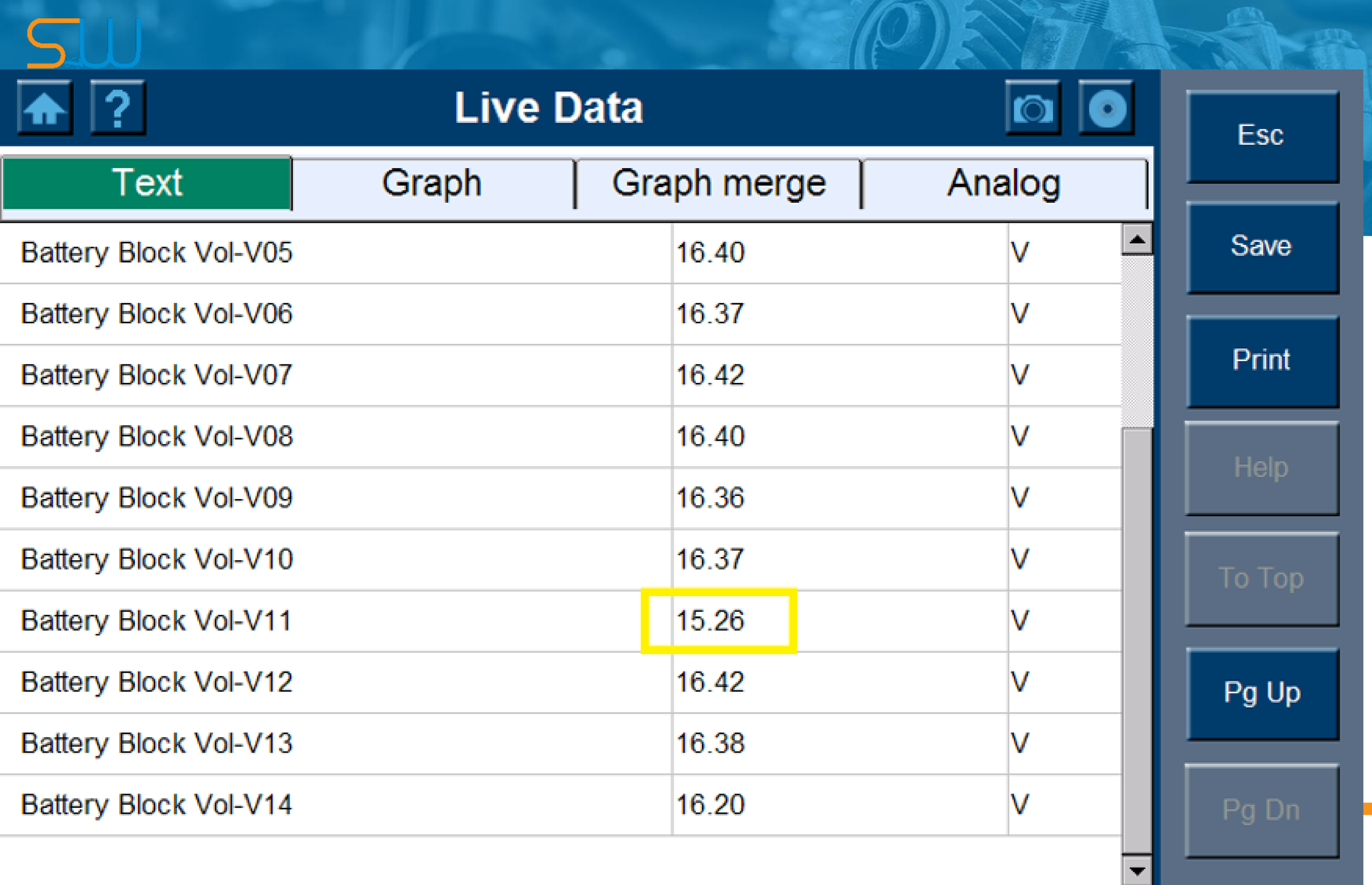






Parameter	Value	Unit	Parameter	Value	Unit
Engine Coolant Temp	122	F	Batt Block Minimum Vol	15.61	V
Engine Revolution	0	rpm	Minimum Batt Block No	10	
Vehicle Spd	0	MPH	Batt Block Max Vol	15.68	V
Engine Run Time	108	s	Max Battery Block No	3	
+B	14.260	V	Battery Block Vol -V01	15.66	V
DTC Clear Warm Up	25		Battery Block Vol -V02	15.65	V
DTC Clear Run Distance	385	mile	Battery Block Vol -V03	15.65	V
DTC Clear Min	908	min	Battery Block Vol -V04	15.68	V
MIL on Engine Run Time	0	min	Battery Block Vol -V05	15.64	V
MIL Status	OFF		Battery Block Vol -V06	15.62	V
Mileage after Malfunc	0	mile	Battery Block Vol -V07	15.67	V
Battery State of Charge	49.0	%	Battery Block Vol -V08	15.67	V
Delta SOC	0.0	%	Battery Block Vol -V09	15.62	V
Batt Pack Current Val	1.20	A	Battery Block Vol -V10	15.64	V
Inhaling Air Temp	72.9	F	Battery Block Vol -V11	15.61	V
VMF Fan Motor Voltage	0.0	V	Battery Block Vol -V12	15.67	V
Auxiliary Battery Vol	14.2	V	Battery Block Vol -V13	15.64	V
Charge Control Val	-20.0	KW	Battery Block Vol -V14	15.66	V
Discharge Control Val	21.0	KW	Internal Resistance R01	0.024	ohm
Cooling Fan Mode	0		Internal Resistance R02	0.024	ohm
ECU Control Mode	0		Internal Resistance R03	0.023	ohm
Charge Control Signal	ON		Internal Resistance R04	0.023	ohm
Equal Charg Out Rly Sig	OFF		Internal Resistance R05	0.023	ohm
EQTR Charge Perm Sig	OFF		Internal Resistance R06	0.023	ohm
Standby Blower Request	OFF		Internal Resistance R07	0.023	ohm
Temp of Batt TB1	70.3	F	Internal Resistance R08	0.023	ohm
Temp of Batt TB2	69.1	F	Internal Resistance R09	0.022	ohm
Temp of Batt TB3	70.0	F	Internal Resistance R10	0.023	ohm
Battery Block Num	14		Internal Resistance R11	0.023	ohm

Battery Modules


Live Data
Text
Graph
Graph merge
Analog
Battery Block Vol-V05 16.40 V
Battery Block Vol-V06 16.37 V
Battery Block Vol-V07 16.42 V
Battery Block Vol-V08 16.40 V
Battery Block Vol-V09 16.36 V
Battery Block Vol-V10 16.37 V
Battery Block Vol-V11 15.26 V
Battery Block Vol-V12 16.42 V
Battery Block Vol-V13 16.38 V
Battery Block Vol-V14 16.20 V
Esc
Save
Print
Help
To Top
Pg Up
Pg Dn

Vehicle Towing

- Always follow manufacturers guidelines
- As the drive wheels rotate they will activate the electric motor
- May require full lift

Safety

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Safety with Batteries

- Safety principles
- Hazards and Risks

WARNING

Arc Flash & Shock Hazard
Appropriate PPE Required

FLASH PROTECTION

Flash Hazard Category: **4**
Min. Arc Rating (cal/cm2): 37.9

PPE:
- [X] Cotton Underwear
- [X] Short Sleeved T-Shirt (Natural Fiber)
- [X] Arc Rated Long Sleeve Shirt, Long Pants & Coveralls
- [X] Arc Rated (40 cal) Arc Flash Suite Jacket, Pants & Hood
- [X] Hard Hat & Hearing Protection
- [X] Safety Glasses/Googles & Leather Shoes
- [X] Arc Rated Leather Gloves or Insulated Gloves

SHOCK PROTECTION

480 VAC Shock Hazard When:
WHEN COVER IS OPENED OR REMOVED

Flash Protection Boundary: 100"
Limited Approach Boundary: 42"
Restricted Approach Boundary: 12"
Prohibited Approach Boundary: 1"
Max. Available Fault Current: 38300 A

PPE: [X] CAT "00" Gloves

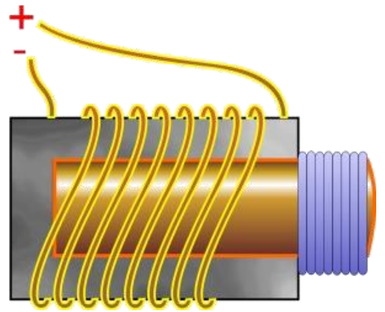
Equipment ID: XXXXXXXXXXXXXXXX 25/10/20

There are many hazards and risks associated with batteries

Chemical

Electrical

Fire



Electromagnetic

Chemical Risks

Battery acid is a chemical and is well known as a dangerous electrolyte, but NiMH batteries contain the equally dangerous potassium hydroxide

Electrical Risks

Although any battery provides a risk, the higher the voltage, the bigger the risk.

There are several different risks, but the most important one is the risk of electric shock

An electric shock occurs when the human body touches a live electrical circuit

Electrical Risks

- When electric shock occurs, the voltage causes a current to flow through the body
- The amount of current that flows is determined by the resistance of the body and the size of the voltage
- The path through the body also affects the severity of the shock
- The heart is extremely vulnerable to the effects of an electric current

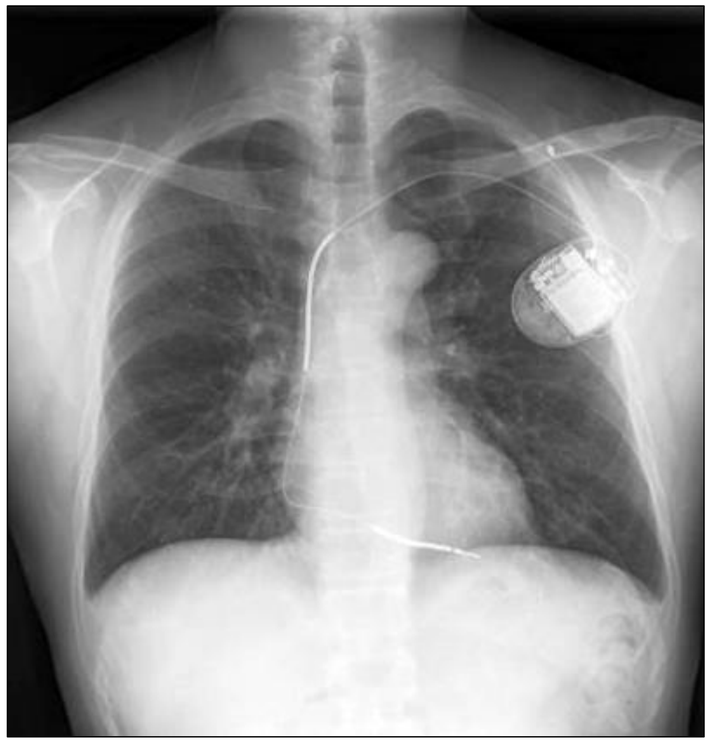
Electromagnetic Fields

There are large voltages and currents in electric cars, so there will be correspondingly high electromagnetic fields

In electric cars these fields and continuous but seem to be greatest when the vehicle is speeding up or slowing down

Electromagnetic Fields

It is quite possible that electronic devices, such as pacemakers, could be damaged, but there is no evidence of other risks



Safe Working

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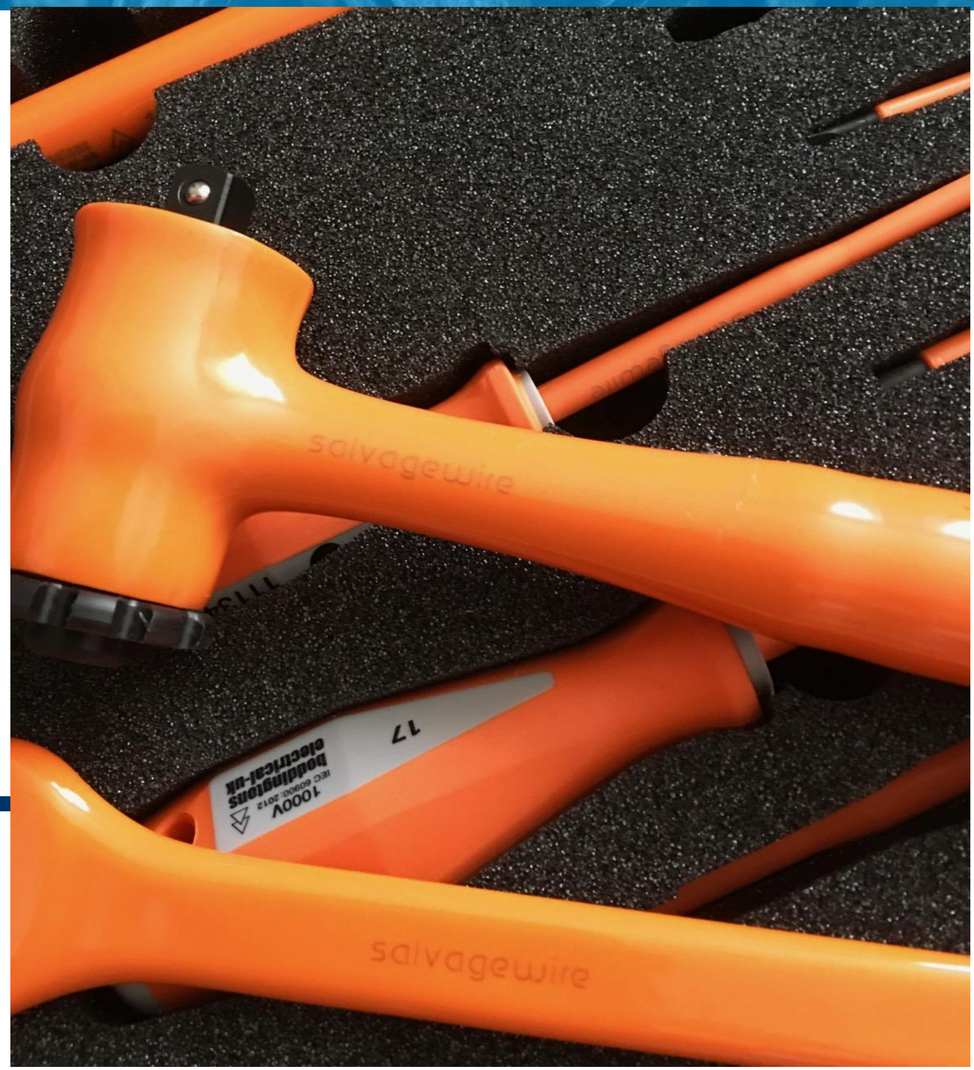
Safety Equipment

- Electricians Gloves - Class 0, 1000v Minimum
- Rubber Mat or HV overboots
- Safety Rescue Hook
- Multimeter - Cat3, 1000v Minimum
- Warning Signs, Barriers or Cones
- Safety Goggles

High Voltage Tools

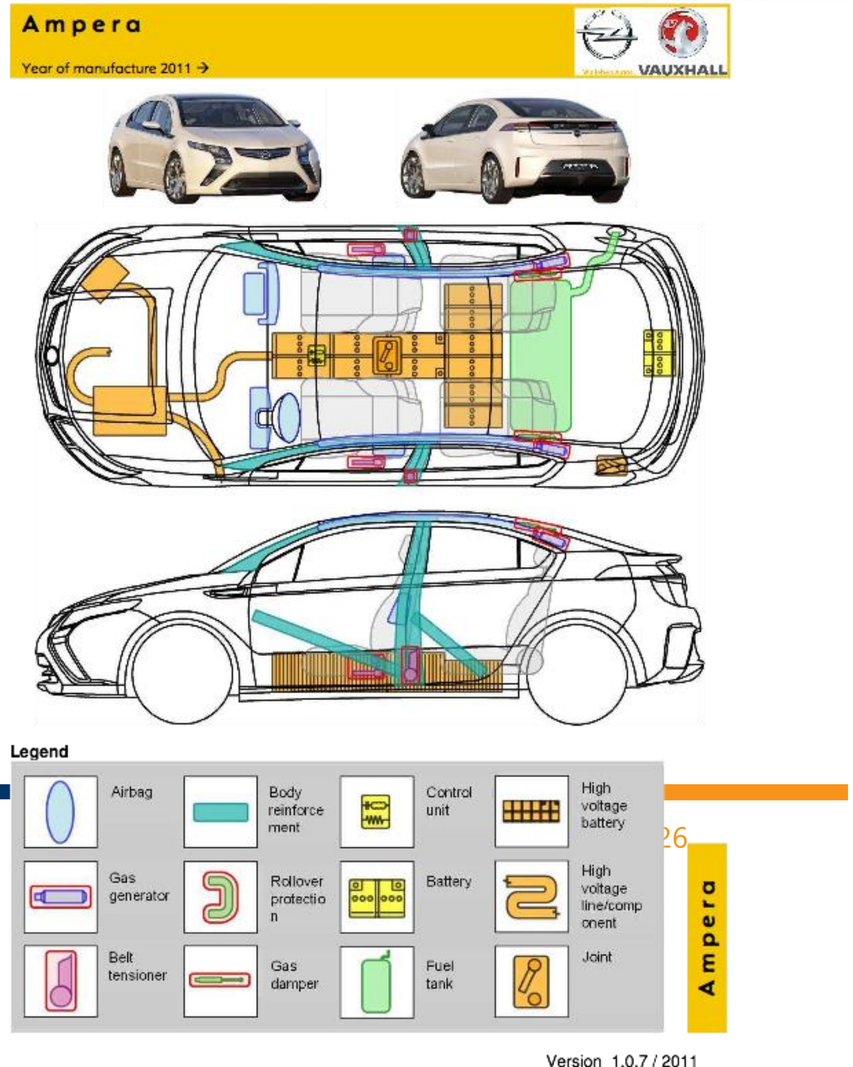


Process

- Research
- Always Follow Manufacturers Guidelines
- Vehicle Circumstances - Flood/Fire/Accident?
- Check Safety Kit and PPE
- Walk Around and Place Warning Signs
- Dry, well lit, well ventilated area
- Prepare and utilise PPE
- Shut Down Vehicle
- Shut Down High Voltage System
- Test, lock out, update signs
- Commence work on vehicle

Research

- IDIS - www.idis2.com
- NFPA - nfpa.org
- Euro Rescue App
- Pro-Assist Hybrid App
- Vehicle Manufacturer



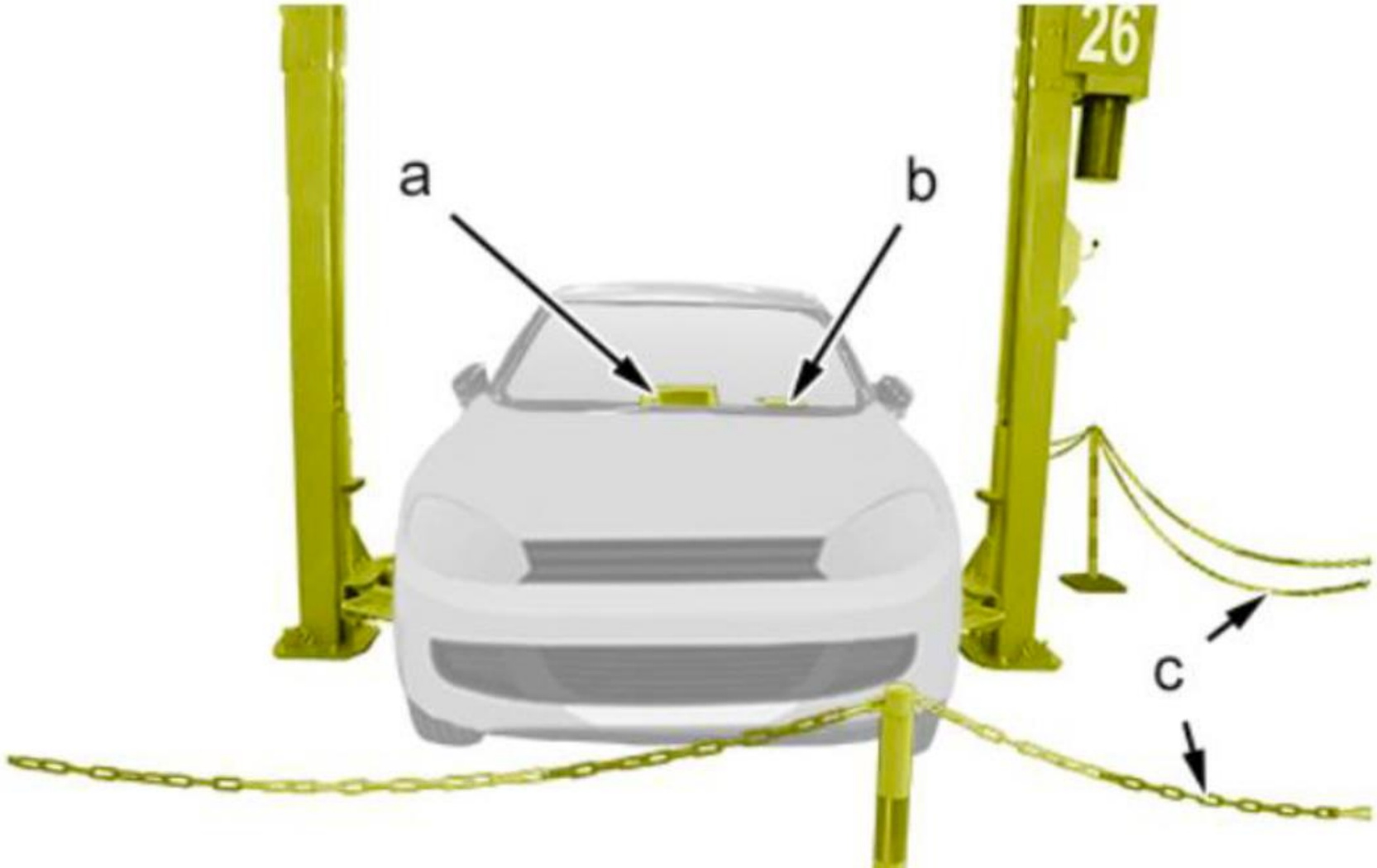
Vehicle Shut Down and Battery Removal

- Fully Trained and Competent Technicians
- Manufacturer Process
- Use correct Tools and PPE

Vehicle Shut Down

- Always follow manufacturers process
- Ensure vehicle is switched off
- Remove key and lock out
- Disconnect 12v Battery
- Remove HV link and leave vehicle for 10 minutes to allow capacitors to discharge
- Test with Multimeter to confirm shut down
- Mark vehicle to show it is safe

Battery Removal



Battery Removal

Battery Storage

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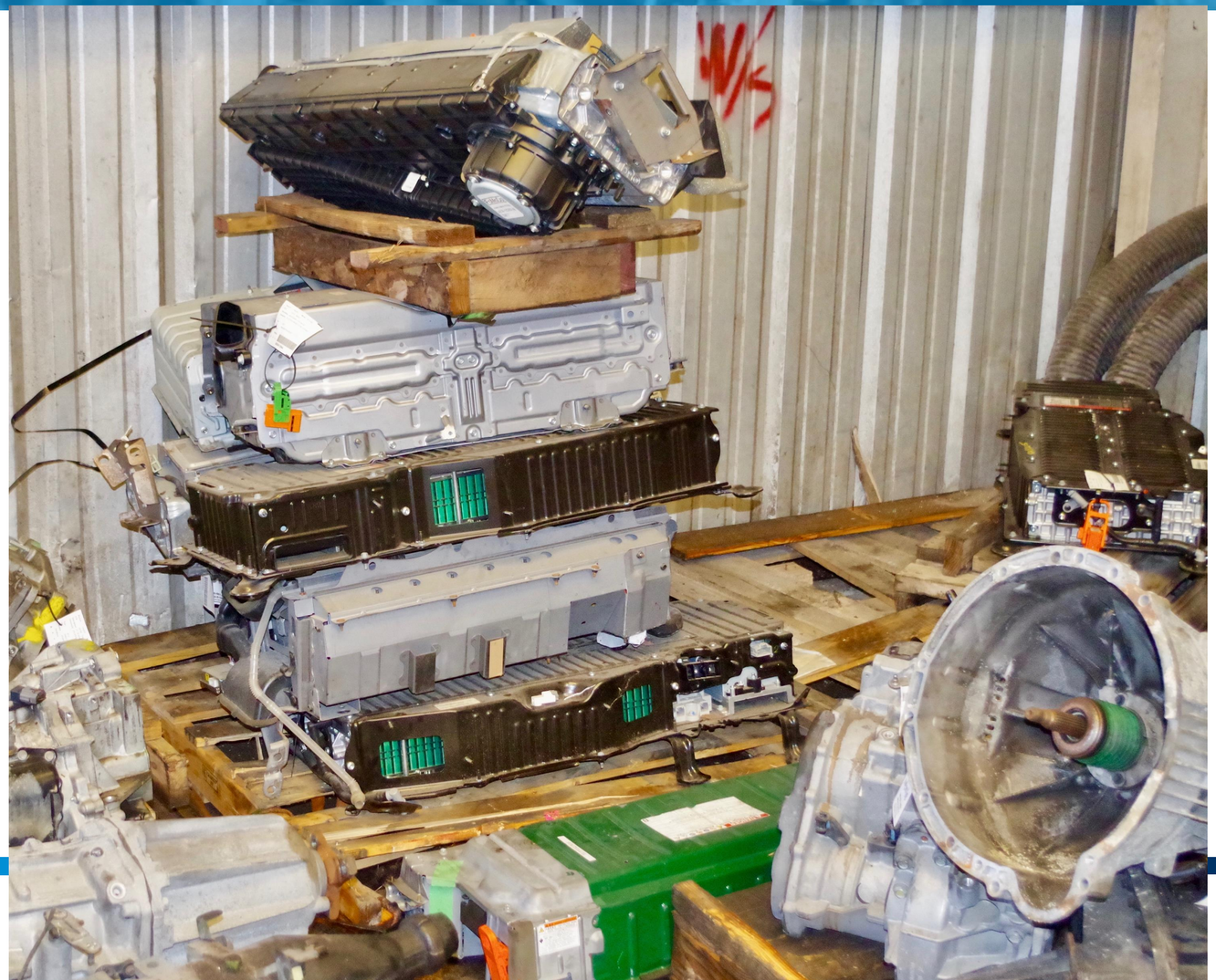
Battery Storage

- Store by Battery type
- Keep them dry
- Restrict Access
- Do not crush or puncture
- Do not discharge battery
- Avoid high temperatures
- Store and recycle according to legislation and regulations in the country you are operating
- Batteries are special waste and subject to mandatory recycling requirements

Battery Storage

Battery Storage



More than just a High Voltage Battery!

- All batteries must be recycled
- In some countries this is legislated
- Leaving any battery in the vehicle increases fire risk

DDR Batteries

- Treat with extreme care
- Storage considerations
- Shipping is very different
- May require specialist training, packaging and transportation

First Aid!

Causes of Battery Fires

- Mechanical Damage
- External Thermal Stress
- External Short Circuit
- Internal Short Circuit
- Incorrect Handling
- Overcharging
- Deep Discharging

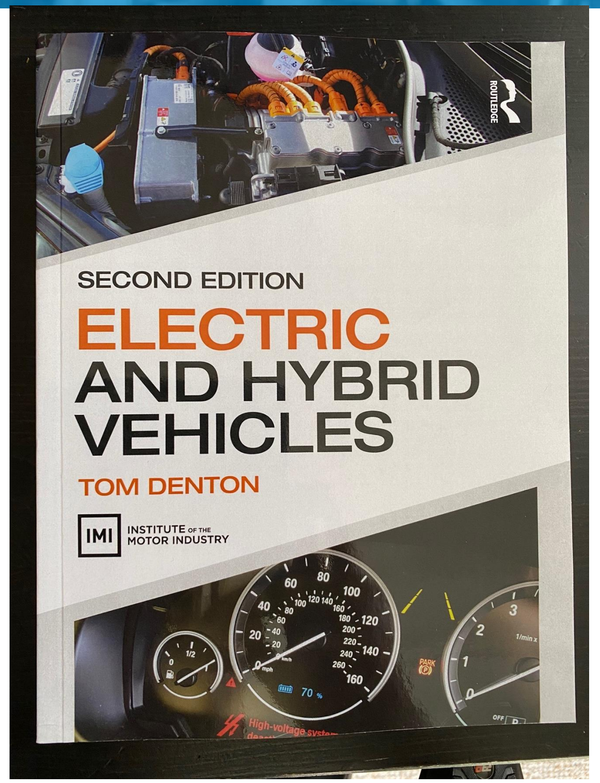
Fire Solutions - Vehicle Fire Blanket

- Fast
- Effective
- Simple
- Eco-Friendly
- Re-usable

Resources

- IDIS - www.idis2.com
- NFPA - nfpa.org
- ARA - https://arauniversity.org/store/
- eComply - https://www.ecomply.com
- Salvage Wire - https://salvagewire.com
- Charg-Ed - https://www.charg-ed.com/
- EV Fire Safe - https://www.evfiresafe.com/
- Energy Security Agency - https://energysecurityagency.com/
- ELV Solutions - https://elvsolutions.org/?page_id=1717
- Rescue Sheets - http://rescuesheet.info/seite_3.html
- Tesla - https://www.tesla.com/en_GB/firstresponders
- Apps
  - Pro-Assist Hybrid
  - Euro Rescue

Bo



AUTOMOTIVE RECYCLERS ASSOCIATION
ESTABLISHED 1943

ARA UNIVERSITY

Additional Training

- Accredited training
- On-Line and Face-2-Face
- All levels from entry to senior
- Electric and Hybrid as well as depollution

Test and Feedback

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