



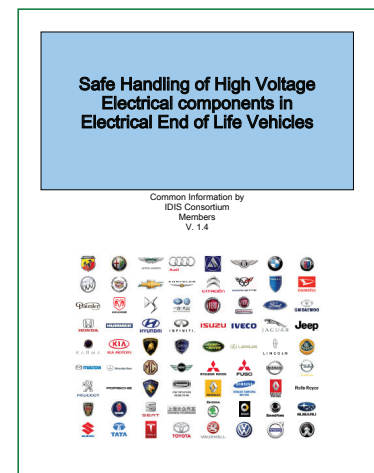
Safe Handling of High Voltage Electrical components in Electrical End of Life Vehicles

The following information is extracted from the document 'Safe Handling of High Voltage Electrical components in Electrical End of Life Vehicles' produced by IDIS, the International Dismantling Information Service. It has been provided to demonstrate the information available to assist with the handling of traction batteries. You remain responsible for the health and safety of you and your employees/colleagues/contractors.

A full copy of the document can be accessed by registering (for free) on the IDIS website.

Once on IDIS select the appropriate vehicle, then:

- Click on the  Battery logo
- Click on the  High Voltage Battery logo
- Click on 'Additional Information'
- Click on 'Common Information'



For mild hybrid vehicles (batteries under 60V DC) contact ELVES for assistance to find appropriate information.

This excerpt was extracted from Version 1.4 of 'Safe Handling of High Voltage Electrical components in Electrical End of Life Vehicles', downloaded 4 September 2017. Please check IDIS for the latest version.

IDIS – International Dismantling Information System

www.idis2.com

IDIS is the International Dismantling Information System, the central repository of manufacturer complied treatment information for ELVs. It is free for ATFs to register and access the information on IDIS.

1. Precautions

1.1 General Safety Instructions for Removal of EV Components

All EV components have been manufactured in accordance with applicable international laws. They may only be removed by suitably qualified personnel who must follow appropriate procedures defined by the manufacturer and in line with national legislation.

Where ELV's with EV components are due for recycling and disposal, care must be taken to ensure that the EV components identified by the vehicle manufacturer are removed and recovered.

In addition, the national legal requirements for other sectors such as accident prevention, hazardous substances legislation, hazardous and dangerous goods, traffic, building regulations and training etc. must be observed.

Vehicle dismantlers must ensure that all employees handling EV components, and their supervisors, familiarize themselves with this information / instruction material & any additional information that may be provided in the manufacturer specific documents. It is strongly recommended to let employees confirm in writing the receipt of and familiarity with the relevant documentation and safety / handling instructions.

It is essential that all relevant health and safety regulations together with the vehicle manufacturers' instructions for the handling and safe treatment of the vehicle itself and the EV components be observed.

Information, safety and instruction materials, provided by the vehicle and EV component manufacturers, as well as the attendance of training courses can be a suitable means of acquiring the necessary expertise.

High voltage electricity is stored in the high voltage battery (commonly referred to as EV battery). Components such as an electric motor, generator, compressor, inverter, heater and air conditioner are typically part of the high voltage electric system in today's EV.

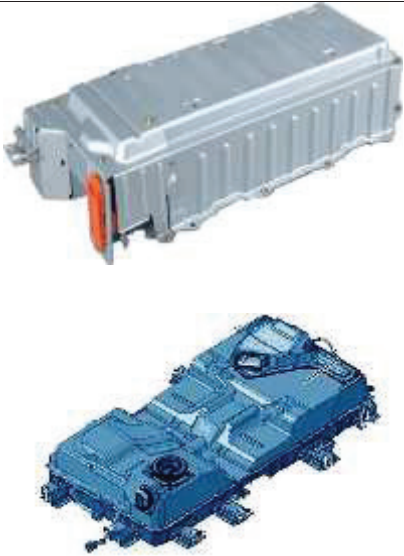

The voltage of the high voltage battery will vary according to vehicle type and the manufacturer. If fully charged high voltage batteries may have an electrical potential of up to several hundred volts.

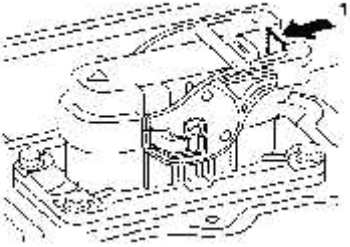
In addition to the high voltage battery there may be one or more normal 12 volt car battery, which is used to power other low voltage electrical devices such as the radio, horn, headlamps, and instrument cluster gauges, see battery information in IDIS.

1.2 Location of the High Voltage Power Source

Electrical power source components can be placed in different locations in the vehicle, actual components and their location can be found in the manufacturer's vehicle specific information.

The general component list may include, but is not restricted to:

<p>High Voltage Battery</p>	<p>1) Individually packed battery cells</p> <p>2) Integral battery system</p>	 <p>Examples for HEV and Pure-EV Batteries</p>
<p>High Voltage Cables</p>	<p>Orange colored cables that are labeled with the appropriate warning signs to indicate high voltage.</p> <p>From the high voltage battery the high voltage cables connect the electric motor</p>	

<p>Service Plug or Switch</p>	<p>Deactivates and disconnects the high voltage system if fitted</p>	
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1.3 High Voltage Caution Labels



This symbol indicates the high voltage system components. Relevant safety precautions must be taken at all times.

1.4 Other Warning Labels that may be on High Voltage Batteries



1.5 Required Protection Equipment

- a) Appropriate protective clothing – dry-electrical High Voltage safety rubber gloves, safety goggles, electrical hazard safety shoes, acid resistant apron




















Please take care to ensure that your equipment fits properly, is worn correctly and is not damaged in anyway.

- b) Self adhesive electrical insulation tape
c) High Voltage Rubber insulation mats
d) Safety barriers
e) High voltage insulated tools
f) High voltage insulated stick

Please refer to the manufacturer specific information for potential or specific national requirements for further information on the protection equipment.

1.6 Important General Points Concerning Handling of EVs and it's battery

	The high voltage system may remain powered for up to 10 minutes after being disabled. The method of disabling the high voltage system is manufacturer specific.
	Never assume that the EV is powered down because it is silent.
	Never touch, cut or open any orange high voltage power cable or high voltage components without personal protective equipment.
	Do not cause any impact that could result in any damage. The electrolyte may be flammable and/or toxic and can be damaging to human tissue.
	Do not have any metal objects in your possession while working on the battery.
	Do not allow open flames near, apply heat to the EV battery or do not expose to high temperature, e.g. long period in direct sunlight .

	Do not inhale spray, gas or aerosol emitted from the battery
	Avoid contact of battery contents with skin and eyes
	Wear suitable protective clothing, gloves and eye/face protection
	In case of accident or if you feel unwell, seek medical advice immediately (show label where possible)
	Only isolate and dismantle EV vehicle systems in well ventilated areas
	Avoid release of battery contents to the environment.
	Always refer to additional instructions that may be given by the vehicle manufacturer.
	If battery material is swallowed and the person is conscious, rinse mouth with water and seek medical advice immediately.
	The EV battery is heavy use mechanical assistance during manipulation.
	In case of misuse or severe damage of Lithium Ion batteries there is potential risk of heat, fire or degassing.
	Components with a strong magnetic field are used in this vehicle. Operators with medical electric device such as pacemakers must not carry out EV dismantling as strong magnetic fields can affect the function of the device.

2. General Removal Procedures

2.1 Identifying an EV

Each manufacturer has their specific identification method for EV. Please refer to the manufacturer specific information for further information where available.

There are several common ways for manufacturers to indicate an EV model:

- Vehicle Identification Number (VIN). This number is given by the manufacturer and may indicate model specifications such as the use of a High Voltage Electrical System. You must refer to manufacturer specific information to locate and read the information contained in the VIN
- Logos/ trademarks located on the exterior or engine compartment of the vehicle indicating use of EV Technology. Specific to each manufacturer.
- Interior: Instrument cluster (power meter/ battery surveillance device) located in the dash.
- Check owner's manual

2.2 Safety precautions

- On receiving an EV first examine the high voltage battery visually for physical, mechanical damage, intrusion and leakage.
- If the HV battery is identified as damaged handle in accordance with manufacturer specific instruction and applicable national legislation and guidelines.
- Before removal of HV battery, ensure the area around the EV is restricted and marked.
- Place a "High voltage" sign on the vehicle.