Detailed explanation of UN R136

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Japan Automobile Standards Internationalization Center

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Importance of Regulations / Standards Harmonizing

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Advantage of international harmonization of regulations and standards

For manufacturers

- Improvement in development efficiency and productivity
- Use of common parts
- Improvement in efficiency in obtaining approval by expanding mutually approved items
- Improvement in parts management

For customers

- Promotion of safer and more environmentally friendly vehicles
- Reduction in vehicle prices
- Expansion in choice of imported vehicles

For administration

- Improvement in efficiency of formulating regulations and standards
- Improvement in efficiency of review work from expansion in mutually approved items
- Smoother international distribution

Leading to development of the industry

International Regulation & Standards for e-PTW

Japan Automobile Standards Internationalization Center

Under development

@2016/Apr

		EV (Passenger Car)	e-PTW	Publication
International Regulations	Electrification safety	UN R100	UN R136	
	REESS safety			
	Electrification safety (post-impact)			
	Transportation safety	UN transportation rules UN38.3		
International Standards	Electrification safety (vehicle)	ISO 6469-1～-3	ISO13063	
	Charging systems	IEC 61851-1 ISO 17409	IEC60335-2-29(Rev.) IEC61851-3	Mid/2016 End/2018
			ISO18246	
	DC charging connectors	IEC 62196-3	IEC 62196-4	End/2018
	Cell size	ISO/IEC PAS16898		
	Cell testing & safety	IEC62660-1,-2		
	Cell safety	IEC 62660-3		Mid/2016
	Battery testing	ISO 12405-1,2	ISO18243	Mid/2016
	Battery safety	ISO 12405-3		
	Electricity consumption	ISO 8714	ISO 13064-1	
	Vehicle performance	ISO 8715	ISO 13064-2	

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We are explaining this.

Considerations at the introduction of electrically powered two-wheelers - Electric Safety -

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Major characteristics of e-PTW/e-bicycle/EPAC

◇On-board high-energy battery → Their quantity of electricity is 10–20 times as much as batteries of current gasoline vehicles. (Their electric voltage is also 3–10 times as much as batteries of current gasoline vehicles.)

◇Filling energy from commercial power sources (battery charge) → AC100–230 V is connected to vehicles.

Necessary items in light of user's safety

- **Electric shock** due to body contacts to high voltage parts (DC/AC) in usually using them (traveling) and charging a battery
  - → ・Protection requirements for direct/indirect contact,
    ・Insulating requirements including water resistance of vehicles or battery chargers
- **Fire/explosion caused by a battery**
  - → ・Requirements for toughness of batteries complying with the conditions of use for motorcycles

Satisfaction of international criteria/standards is important.
→ As a result, make vehicles possible to be sold and used beyond the national boundaries!

Considerations at the introduction of electrically powered two-wheelers - Safety of Li-ion battery -

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Since a Li-ion battery using a flammable electrolyte has a possibility of ignition, the use of the battery satisfying the international safety criteria/standards is required for safety use.

Reason of necessity for safety of lithium ion

A nickel-cadmium battery or a nickel-hydrogen battery uses “water” as a solvent, whereas a Li-ion battery uses “organic solvent.” The lithium ion is compound liquid consisting of mainly of methyl ethyl carbonate (Class 4 Petroleum No. 2 insoluble in water), dimethyl carbonate (Class 4 Petroleum No. 2 insoluble in water), and propylene carbonate (Class 4 Petroleum No. 3 insoluble in water), etc., and falls into Class 4 Petroleum No. 2 (approximately 23 ℃ of flashpoint, insoluble in water).

Fire authorities implemented the test to heat the battery with an external fire, and the battery severely burned.

While a young man was travelling by an electric motorcycle near the Shishan bridge in Suzhou City of Jiangsu Province at the night of the 30th , the motorcycle suddenly ignited to explode.（3/AUG/2008）

Fire accident of “MODEL S” manufactured by TESLA (6/OCT/2013)

Satisfaction of international criteria/standards is important.
→ As a result, make vehicles possible to be sold and used beyond the national boundaries!

Overview of UN R136

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Electrical/battery safety international regulation for electrically powered two-wheelers, UN R136, is about to take effect.
Japan also plans to adopt it.

Scope

Category L vehicles, electric power with maximum speed exceeding 6km/h and their batteries

Type of regulation

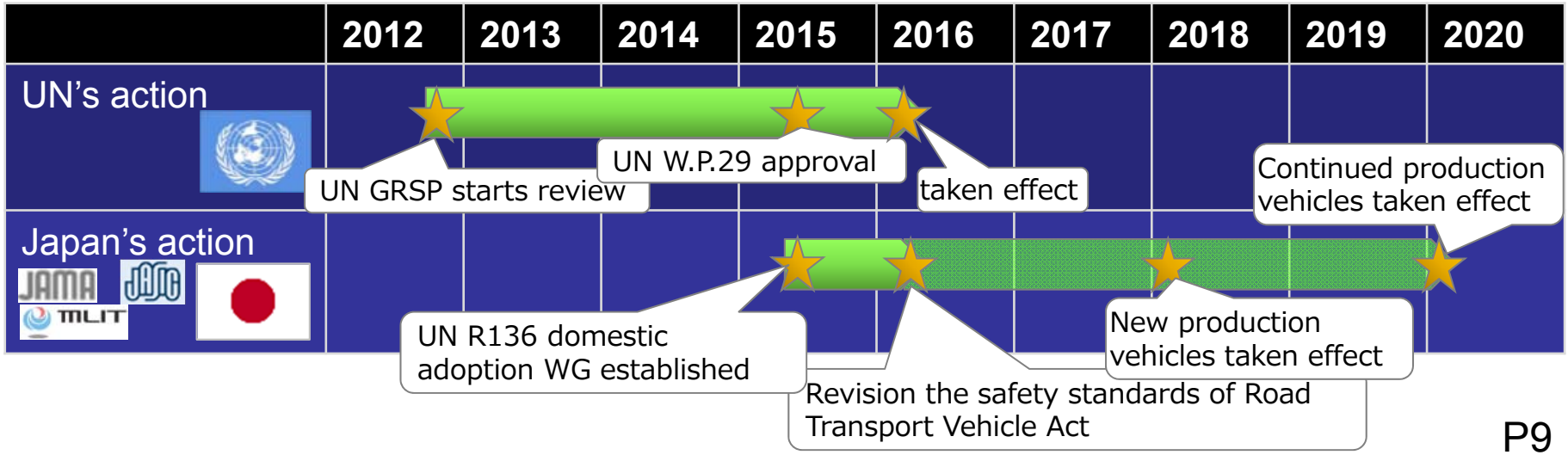
UN 1958 agreement (international regulations)

Regulation format

Part Ⅰ High voltage safety and functional safety of vehicles in ordinary usage
Part Ⅱ Batteries' safety requirement

Schedule

As of April 2016



Main requirements of UN R136

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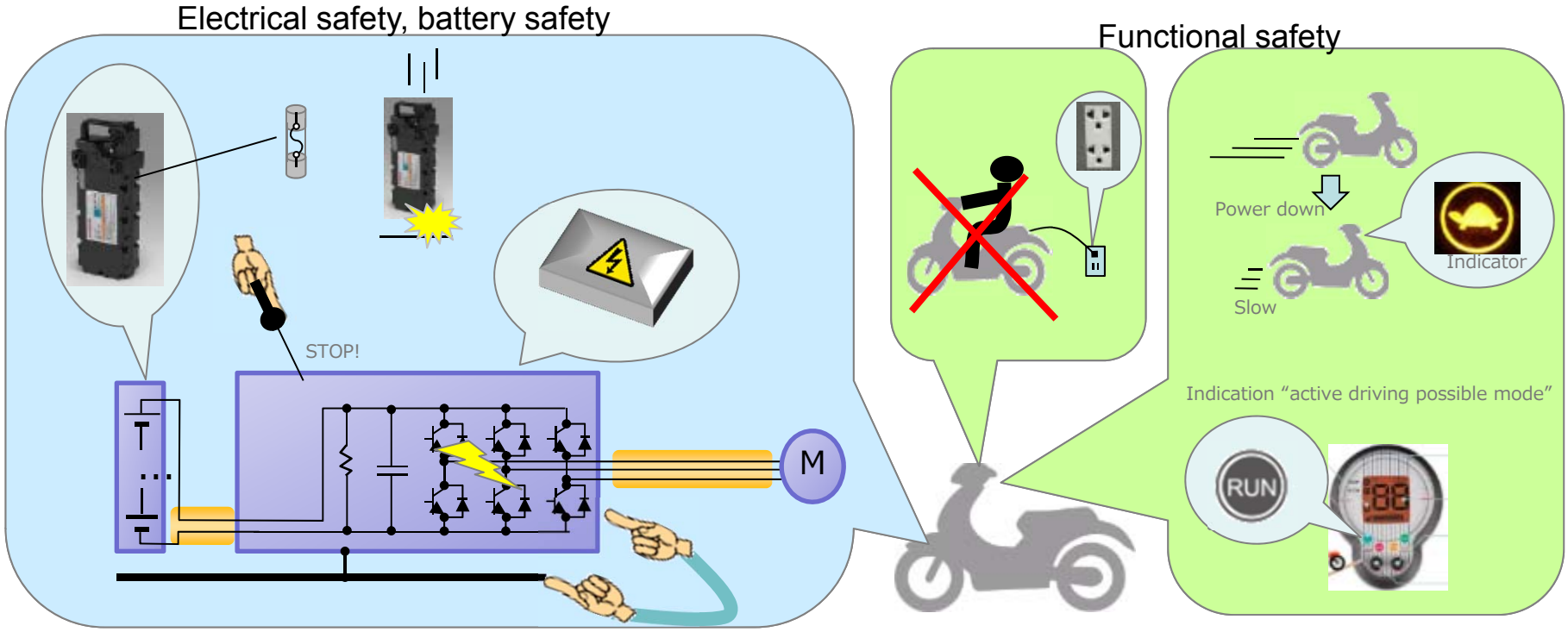
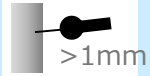


Protection from direct contact
- No contact with live parts
- Warning mark on high-voltage section
- Orange covering on high voltage bus



- Confirmation of electrical protection function of batteries
- Securing mechanical strength of batteries

- Preventing driving while charger is connected

- Appropriate display for riders

Protection from indirect contact
- Electrical connection between high voltage section barrier and electrical chassis

- Securing insulation resistance

*This slide does not cover all requirements of UN R136.

Differences between electrically powered four-wheelers and electrically powered two-wheelers

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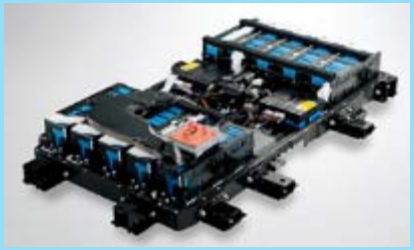
Electrically powered two-wheelers have requirements that are different from electrically powered four-wheelers

Body Shell

Air Bag & Seat Belt



Differences between two-wheeled EV and four-wheeled EV

- No passenger cabin
- Rider can be separated from the vehicle when an accident occurs
- Battery and charger are small
- Posture control and parking/stopping methods

Charger

International Regulation　UN R136 vs UN R100

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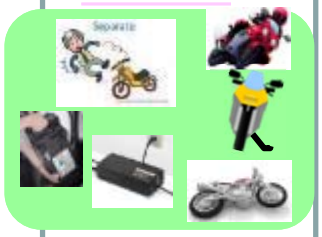
UN R100

§5. Electrical safety
- Protection against direct contact
- Protection against indirect contact
- Insulation resistance
- REESS installation
- Functional safety
- Hydrogen discharge

§6. REESS safety
- Vibration
- Thermal shock and cycling
- Mechanical impact (in case of collision)
- Fire resistance
- External short circuit protection
- Overcharge protection
- Over-discharge protection
- Over temperature protection

Change

Features of L category



Major changes

UN R136

§5. Electrical safety
- Protection against direct contact **(strengthened)**
- Protection against indirect contact **(expanded)**
- Insulation resistance
- REESS installation
- Functional safety **(strengthened)**
- Hydrogen discharge

§6. REESS safety
- Vibration **(strengthened)**
- Thermal shock and cycling
- Mechanical impact **(replaced)**
- Fire resistance **(two-wheelers are excluded)**
- External short circuit protection
- Overcharge protection
- Over-discharge protection
- Over temperature protection

Summary & JASIC proposal
- Detailed explanation of UN R136 -

Japan Automobile Standards Internationalization Center

- Appropriate EV regulations are necessary for the people's safety.
- The international regulations for Category L EV's electricity and REESS safety have gone into effect in January 2016. Japan also have adopted them and revised relevant laws and regulations at the time of enactment.
- To protect the people's safety and develop the EV industry in a sound manner, JASIC recommends also to establish electricity and REESS safety regulations for Category L EV harmonized with UN R136.

Contents

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Detailed explanation of **UN R136**

1.Background of UN R136

2.Detail of UN R136

∗A change part from R100 is indicated by the red character.

Appendix

Introduction of e-PTW-related ISO/IEC

Scope

This regulation does not cover post-crash safety requirements of road vehicles.

Part I: Safety requirements with respect to the electric power train of vehicles of category L with a maximum design speed **exceeding 6 km/h**, equipped with one or more traction motor(s) operated by electric power and not permanently connected to the grid, as well as their high voltage components and systems which are galvanically connected to the high voltage bus of the electric power train.

Part II: Safety requirements with respect to the Rechargeable Energy Storage System (REESS), of vehicles of category L with a maximum design speed **exceeding 6 km/h**, equipped with one or more traction motors operated by electric power and not permanently connected to the grid.

Part II of this Regulation does not apply to REESS(s) whose primary use is to supply power for starting the engine and/or lighting and/or other vehicle auxiliaries systems.

Individual examination contents and requirements

§5 Part Ⅰ:

Requirements of a vehicle with regard to its electrical safety

§5.1.1.1.～2. Protection against direct contact/ requirements for vehicles without cabin

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*A change part from R100 is indicated by the red character.

◆ Objective

Protection against electrical shock

These electrical safety requirements apply to high voltage buses under conditions where they are not connected to external high voltage power supplies.

◆ General conditions

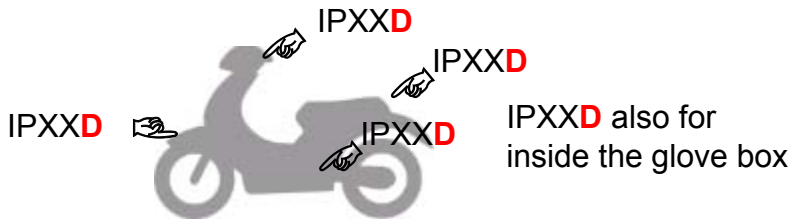
- Environmental temperature: no regulations
- SOC at the start of test: no regulations

◆ Typical individual conditions

Contact protection grade for vehicle without cabin

*See the right section for vehicles with cabin (the same as four-wheelers)

In case of vehicles without cabin, they need to satisfy protection grade IPXXD in terms of whole vehicle



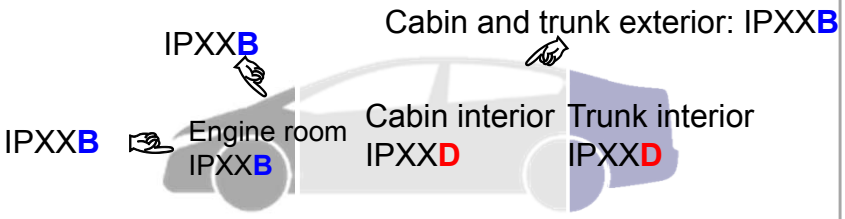
*Cabin denotes the covered space around a passenger.

◆ Criteria

5.1.1. These protections (solid insulator, barrier, enclosure, etc.) shall not be able to be opened, disassembled or removed without the use of tools.
5.1.1. 1. For protection of live parts inside the passenger compartment or luggage compartment, the protection degree IPXXD shall be provide
5.1.1.2. Protection of live parts in areas other than the passenger compartment or luggage compartment.
5.1.1.2.1. For vehicles with a passenger compartment, the protection degree IPXXB shall be satisfied.
5.1.1.2.2. For vehicles without passenger compartment, the protection degree IPXXD shall be satisfied.

Reference: four-wheelers

- Cabin and trunk have to satisfy protection grade IPXXD
- Parts other than cabin and trunk have to satisfy protection grade IPXXB



§5.1.1.3. Protection against direct contact/ Connector

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◆ Objective

Protection against electrical shock

These electrical safety requirements apply to high voltage buses under conditions where they are not connected to external high voltage power supplies.

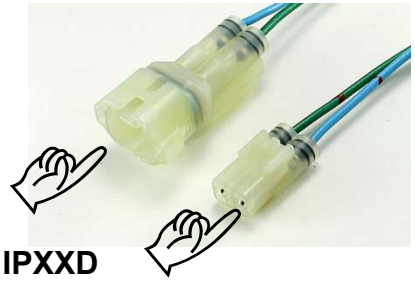
◆ General conditions

no regulations

◆ Typical individual conditions

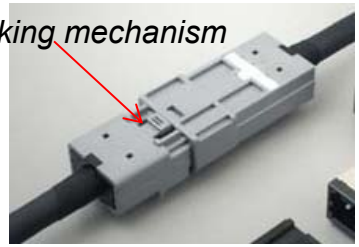
a)

IPXX**B or IPXXD**



IPXX**B or IPXXD**

b) *underneath the floor and are provided with a locking mechanism*

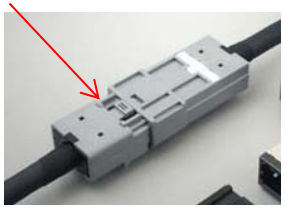


◆ Criteria

Connectors (including vehicle inlet) are deemed to meet this requirement if:
a) They comply with 5.1.1.1. and 5.1.1.2. when separated without the use of tools; or
b) They are located underneath the floor and are provided with a locking mechanism; or
c) They are provided with a locking mechanism and other components shall be removed with the use of tools in order to separate the connector; or
d) The voltage of the live parts becomes equal or below DC 60V or equal or below AC 30V (rms) within one second after the connector is separated.

c)

and, with a locking mechanism



d)

The voltage of the live parts becomes equal or below DC 60V or equal or below AC 30V (rms) within one second after the connector is separated.

§5.1.1.4. Protection against direct contact/ Service disconnect

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◆ Objective

Protection against electrical shock

These electrical safety requirements apply to high voltage buses under conditions where they are not connected to external high voltage power supplies.

◆ Criteria

For a service disconnect which can be opened, disassembled or removed without tools, it is acceptable if ***protection degree IPXXB*** *is satisfied under a condition where it is opened, disassembled or removed without tools.*

◆ General conditions

no regulations

◆ Typical individual conditions

e.g., service disconnect for category M/N

§5.1.1.5. Protection against direct contact/ Marking

Japan Automobile Standards Internationalization Center

◆ Objective

-Protection against electrical shock

These electrical safety requirements apply to high voltage buses under conditions where they are not connected to external high voltage power supplies.

◆ General conditions

no regulations

◆Criteria

5.1.1.5.1. In the case of a REESS having high voltage capability the symbol shown in Figure 1 shall appear on or near the REESS.
The symbol background shall be yellow, the bordering and the arrow shall be black.
5.1.1.5.2. The symbol shall also be visible on enclosures and barriers, which, when removed expose live parts of high voltage circuits.

fig1.

5.1.1.5.2.But, don't apply to the following cases
a) Where barriers or enclosures cannot be physically accessed, opened, or removed; unless other vehicle components are removed with the use of tools
b) Where barriers or enclosures are located underneath the vehicle floor.

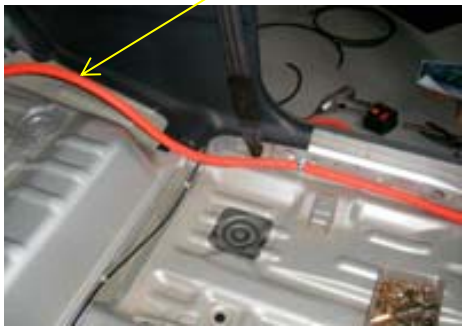
5.1.1.5.3. Cables for high voltage buses which are not located within enclosures shall be identified by having an outer covering with the color orange.

◆ Typical individual conditions

Mark the decoration of the REESS(@High voltage)

Mark the decoration of the enclosure for expose live parts of high voltage circuits

Distinguish the high voltage line by orange covering



§5.1.2.1.~2. Protection against in-direct contact/ Equalizing

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◆ Objective

Protection against electrical shock

- Protection against indirect contact is also required for vehicles equipped with any REESS type approved under Part II of this Regulation.

- This requirement is satisfied if the galvanic connection has been established by welding.

◆ General conditions

no regulations

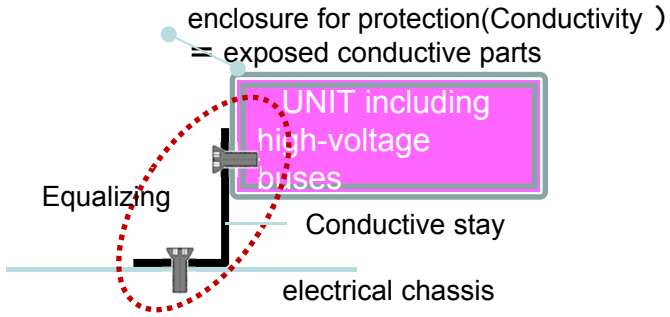
◆Criteria

5.1.2.1. For protection against electrical shock which could arise from indirect contact, the exposed conductive parts, such as the conductive barrier and enclosure, shall be galvanically connected securely to the electrical chassis by connection with electrical wire or ground cable, or by welding, or by connection using bolts, etc. so that no dangerous potentials are produced.

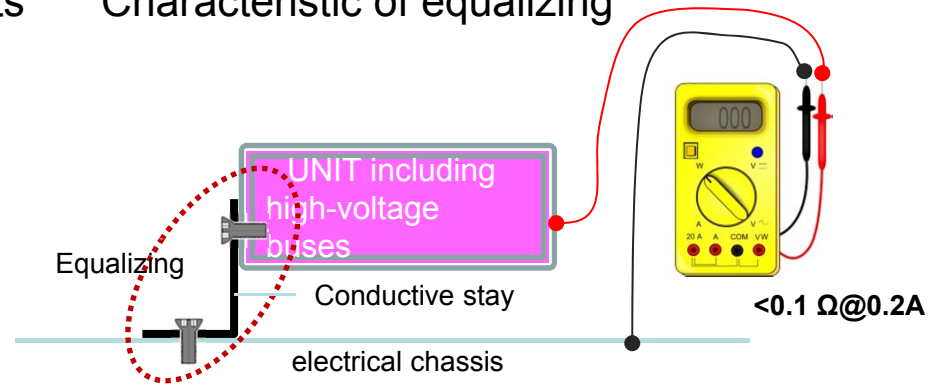
5.1.2.2. The resistance between all exposed conductive parts and the electrical chassis shall be lower than 0.1 Ω when there is current flow of at least 0.2 amperes.

◆ Typical individual conditions

Equalizing the exposed conductive parts



Characteristic of equalizing



∗This requirement is satisfied if the galvanic connection has been established by welding.

§5.1.2.3. Protection against indirect contact/ Earth ground

Japan Automobile Standards Internationalization Center

◆ Objective

Protection against electrical shock

◆ General conditions

**Compliance to this requirement may be demonstrated either by using the connector specified by the vehicle manufacturer, or by analysis.*

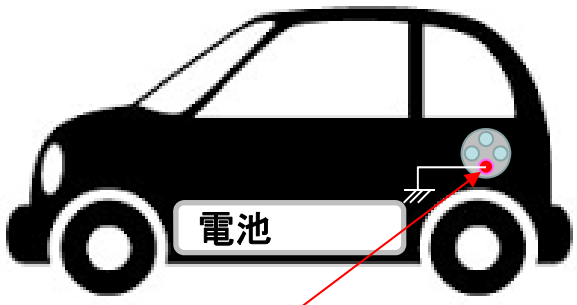
◆Criteria

• In the case of motor vehicles which are intended to be connected to the grounded external electric power supply through the conductive connection, a device to enable the galvanical connection of the electrical chassis to the earth ground shall be provided.

• The device shall enable connection to the earth ground before exterior voltage is applied to the vehicle and retain the connection until after the exterior voltage is removed from the vehicle.

◆ Typical individual conditions

∗ It's explained by a vehicle example, but same as motorcycle.



AC output
Normal Charger

The galvanical connection of the electrical chassis to the earth ground

The grounded external electric power supply

DC output
Quick Charger

Terminal for the earth ground shall be provided.

&

The connection of this terminal shall be connected before the voltage is applied., and maintained to the removed the voltage from the vehicle..

§5.1.2.4. Protection against indirect contact/ vehicle requirements for charging batteries

Japan Automobile Standards Internationalization Center

◆ Objective

Protection against electrical shock

- Use of a charger without ground connection

◆ General conditions

- Environmental temperature: no regulations
- SOC at the start of test: no regulations

◆ Criteria

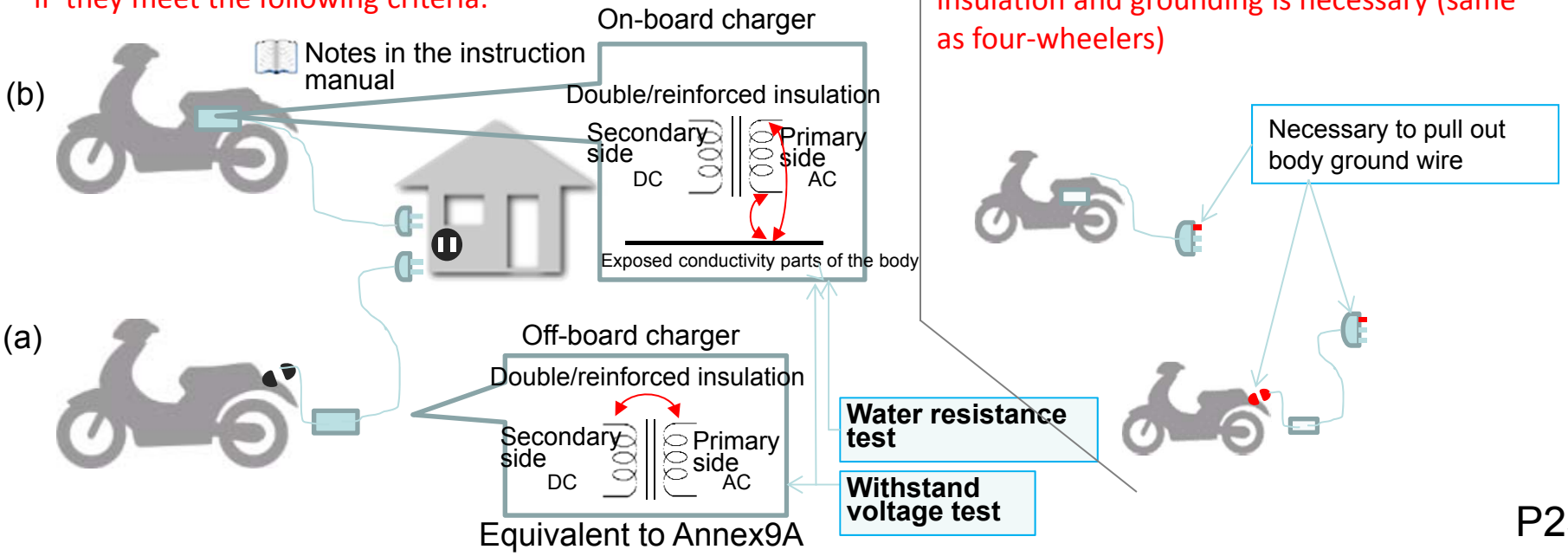
	5.1.2.4.1 Withstand voltage	*5.1.2.4.2 Protection against ingress of water*	*5.1.2.4.3 Handling Instructions*
Appry to 5.1.2.4.(a) Off-board charger	○	—	○
Appry to 5.1.2.4.(b) On-board charger	○	○	○

◆ Typical individual conditions

The following requirements are necessary for vehicles using on-board chargers without ground connection or off-board chargers.

Chargers without ground connection are exempted from 5.1.2.3. if they meet the following criteria:

5.1.2.3 is applicable to charger with basic insulation and grounding is necessary (same as four-wheelers)



§5.1.2.4.1. Protection against indirect contact / Withstand voltage

Japan Automobile Standards Internationalization Center

◆ Objective

Protection against electrical shock

- Use of a on-board charger
  without ground connection

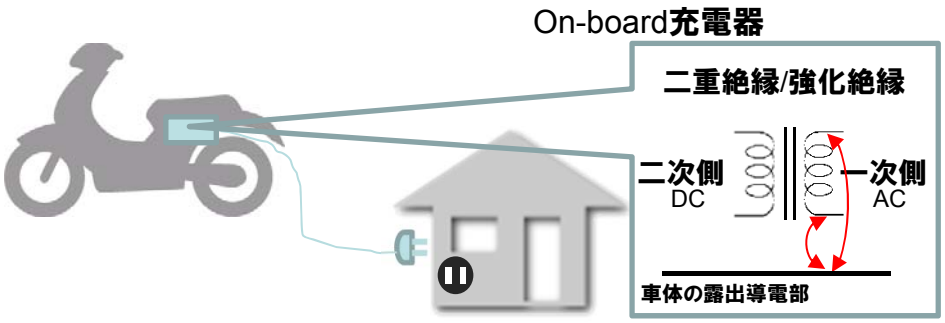
◆ General conditions

- The test shall be performed on the complete vehicle
- All the electrical devices shall be connected.

◆ Criteria

5.1.2.4.1.2.
The insulation resistance shall be equal to or greater than 7 MΩ when applying 500 V DC between all the inputs connected together and the vehicle's exposed conductive parts/electrical chassis.

◆ Typical individual conditions



① Between all the inputs of the charger (plug) and the vehicle's exposed conductive parts including the electrical chassis if present, apply a AC test voltage of 2 x (Un + 1200) V rms at a frequency of 50 Hz or 60 Hz for one minute, where Un is the AC input voltage (rms).
② After the test, measure the insulation resistance when applying 500V D.C. between all the inputs and the vehicle's exposed conductive parts including the electrical chassis if present.

⇒ The insulation resistance shall be equal to or greater than 7 MΩ

§5.1.2.4.2. Protection against indirect contact/ Protection against ingress of water

Japan Automobile Standards Internationalization Center

◆ Objective

Protection against electrical shock

- for vehicle with on-board charger without ground connection

◆ Criteria

5.1.2.4.2.2. After the TEST ,

The insulation resistance shall be equal to or greater than 7 MΩ, when applying 500 V DC.

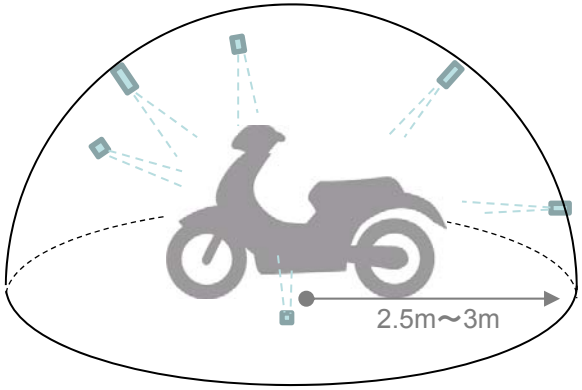
◆ General conditions

- Vehicle Test
- SOC at the start of test: no regulations

◆ Typical individual conditions

In accordance with the test procedure to evaluate IPX5 protection against ingress of water.

Spraying with a stream of fresh water
the enclosure from all practicable directions .



Test condition

- *Internal diameter of the nozzle: 6.3 mm;*
- *Delivery rate: 12.5 l/min ± 5 per cent;*
- *Water pressure: to be adjusted to achieve the specified delivery rate;*
- *Core of the substantial stream: circle of approximately 40 mm diameter at 2.5 m distance from nozzle;*
- *Test duration per square metre of enclosure surface area likely to be sprayed: 1 min;*
- *Minimum test duration: 3 min;*
- *Distance from nozzle to enclosure surface: between 2.5 m and 3 m.*

§5.1.2.4.3. Protection against indirect contact/ Handling instruction

Japan Automobile Standards Internationalization Center

◆ Objective

Protection against electrical shock

- Use of a on-board charger without ground connection

◆ General conditions

•Instruction Manual

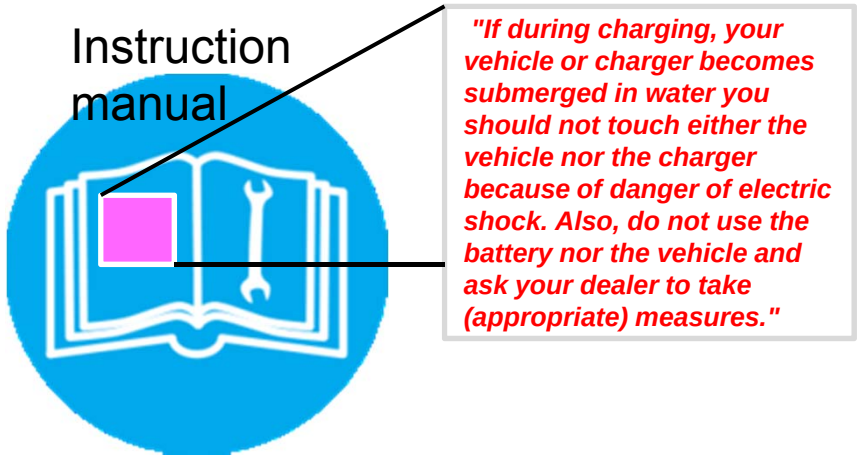
◆ Criteria

Appropriate instructions for charging shall be provided and included in the manual.

Example of the content in the manual：

"If during charging, your vehicle or charger becomes submerged in water you should not touch either the vehicle nor the charger because of danger of electric shock. Also, do not use the battery nor the vehicle and ask your dealer to take (appropriate) measures."

◆ Typical individual conditions



§5.1.3.1. Protection against indirect contact / Isolation resistance

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◆ Objective

Protection against electrical shock

-Electric power train consisting of separate Direct Current- or Alternating Current-buses

◆ General conditions

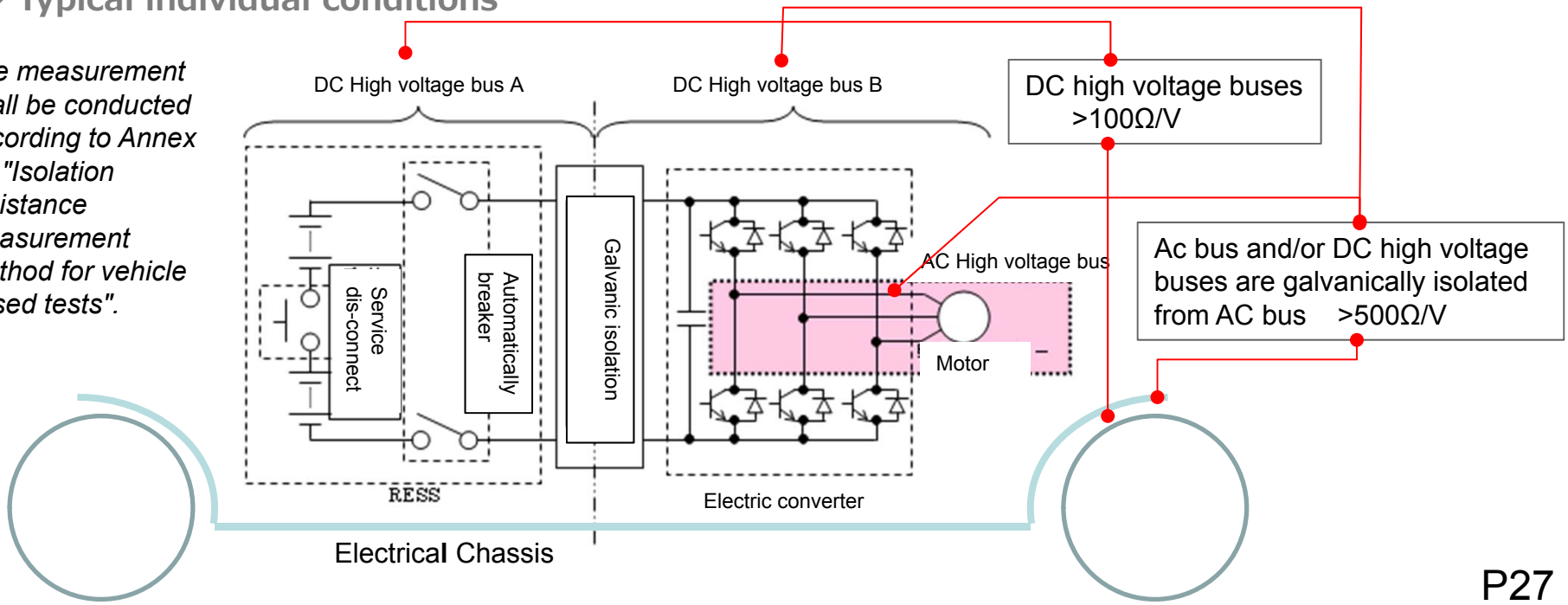
This paragraph shall not apply to chassis connected electrical circuits where the maximum voltage between any live part and the electrical chassis or any exposed conductive part does not exceed 30V AC (rms) or 60 V DC.

◆ Criteria

5.1.3.1.
If AC buses and DC buses are galvanically isolated from each other, the isolation resistance between the high voltage bus and the electrical chassis shall have a minimum value of 100 Ω/V of the working voltage for DC buses, and a minimum value of 500 Ω/V of the working voltage for AC buses.

◆ Typical individual conditions

The measurement shall be conducted according to Annex 4A "Isolation resistance measurement method for vehicle based tests".



§5.1.3.2. Protection against indirect contact/ Isolation resistance

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◆ Objective

Protection against electrical shock

-Electric power train consisting of combined DC- and AC-buses

◆ General conditions

The isolation resistance between the high voltage bus and the electrical chassis may be demonstrated by calculation, measurement or a combination of both.

This paragraph shall not apply to chassis connected electrical circuits where the maximum voltage between any live part and the electrical chassis or any exposed conductive part does not exceed 30V AC (rms) or 60 V DC.

◆ Criteria

5.1.3.2. If AC buses and DC buses are galvanically connected, isolation resistance between any high voltage bus and the electrical chassis shall have a minimum value of 500 Ω/volt of the working voltage.

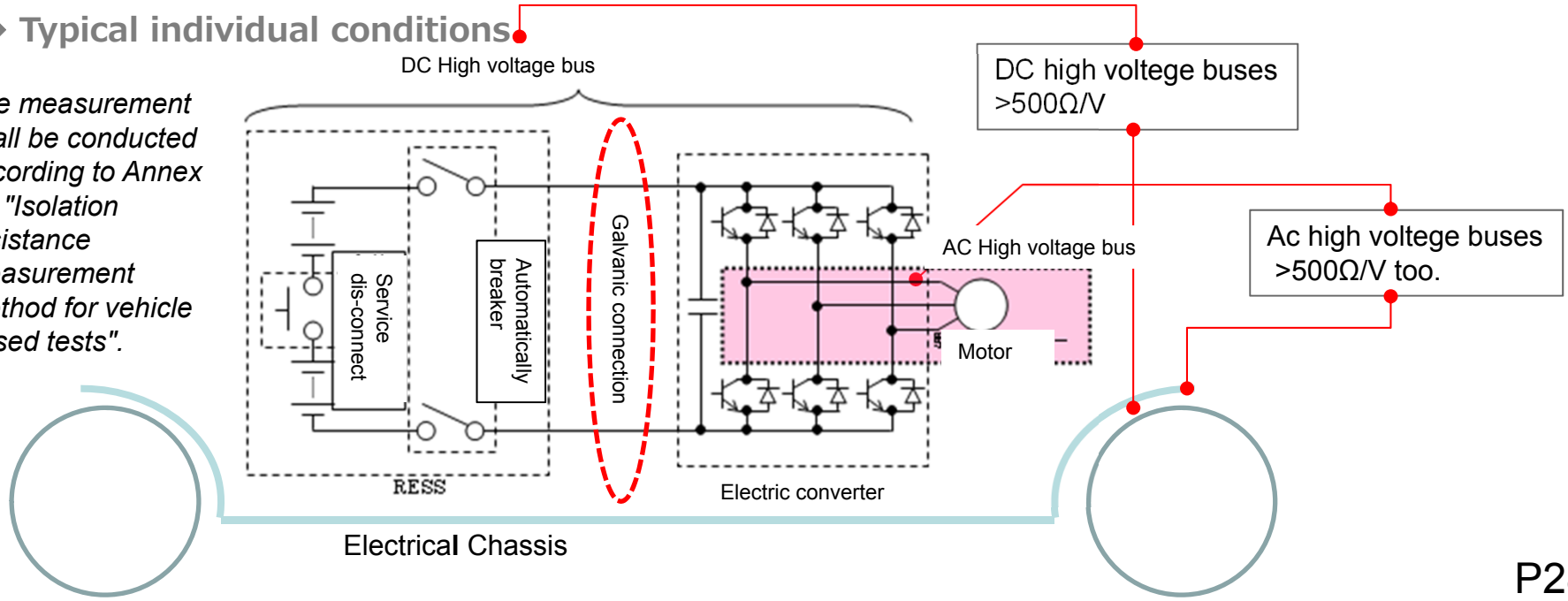
However, if all AC high voltage buses are protected by one of the two following measures, isolation resistance between any high voltage bus and the electrical chassis shall have a minimum value of 100 Ω/V of the working voltage:

(a) Double or more layers of solid insulators, barriers or enclosures that meet the requirement in paragraph 5.1.1. independently, for example wiring harness;)

(b) Mechanically robust protections that have sufficient durability over vehicle service life such as motor housings, electronic converter cases or connectors;

◆ Typical individual conditions

The measurement shall be conducted according to Annex 4A "Isolation resistance measurement method for vehicle based tests".



§5.1.3.3. Protection against indirect contact / Fuel cell vehicle

Japan Automobile Standards Internationalization Center

◆ Objective

Protection against electrical shock

◆ General conditions

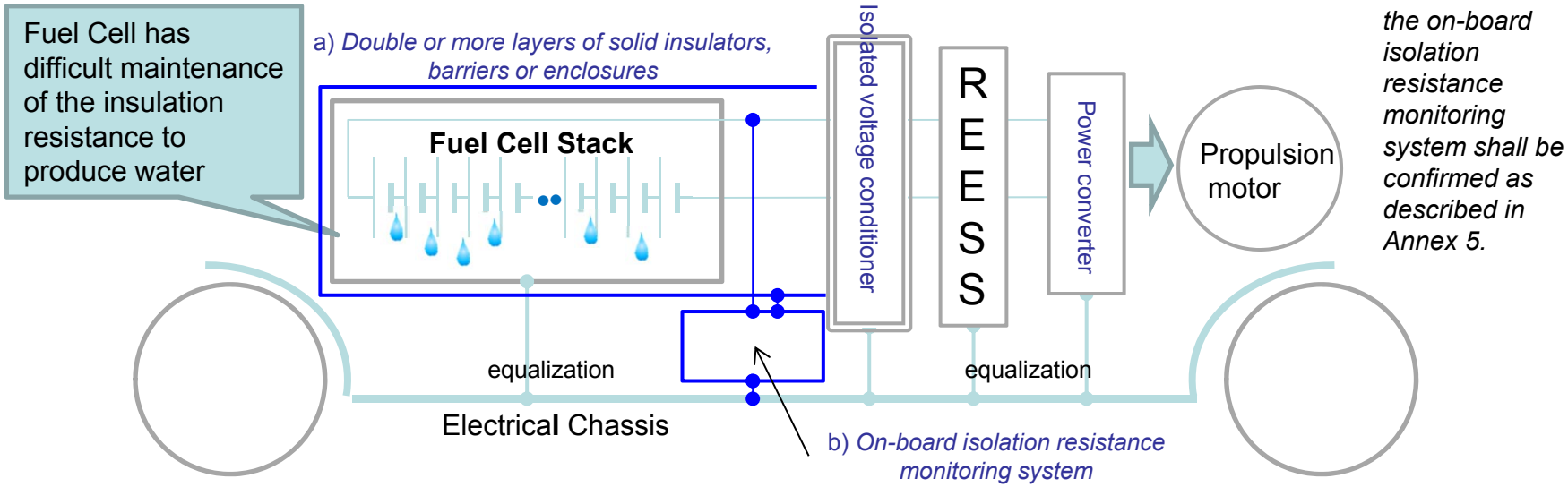
•This requirement is applied to only Fuel cell vehicle.

•The isolation resistance between the high voltage bus of the coupling system for charging the REESS and the electrical chassis need not be monitored, because the coupling system for charging is only energized during charging of the REESS

◆ Criteria

5.1.3.3. If the minimum isolation resistance requirement cannot be maintained over time, then protection shall be achieved by any of the following:
a) Double or more layers of solid insulators, barriers or enclosures that meet the requirement in paragraph 5.1.1. independently;
b) On-board isolation resistance monitoring system together with a warning to the driver if the isolation resistance drops below the minimum required value.

◆ Typical individual conditions



The function of the on-board isolation resistance monitoring system shall be confirmed as described in Annex 5.

§5.1.3.4. Protection against indirect contact/ Coupling system used to charge the REESS

Japan Automobile Standards Internationalization Center

◆ Objective

Protection against electrical shock

・Isolation resistance requirement for the coupling system for charging the REESS

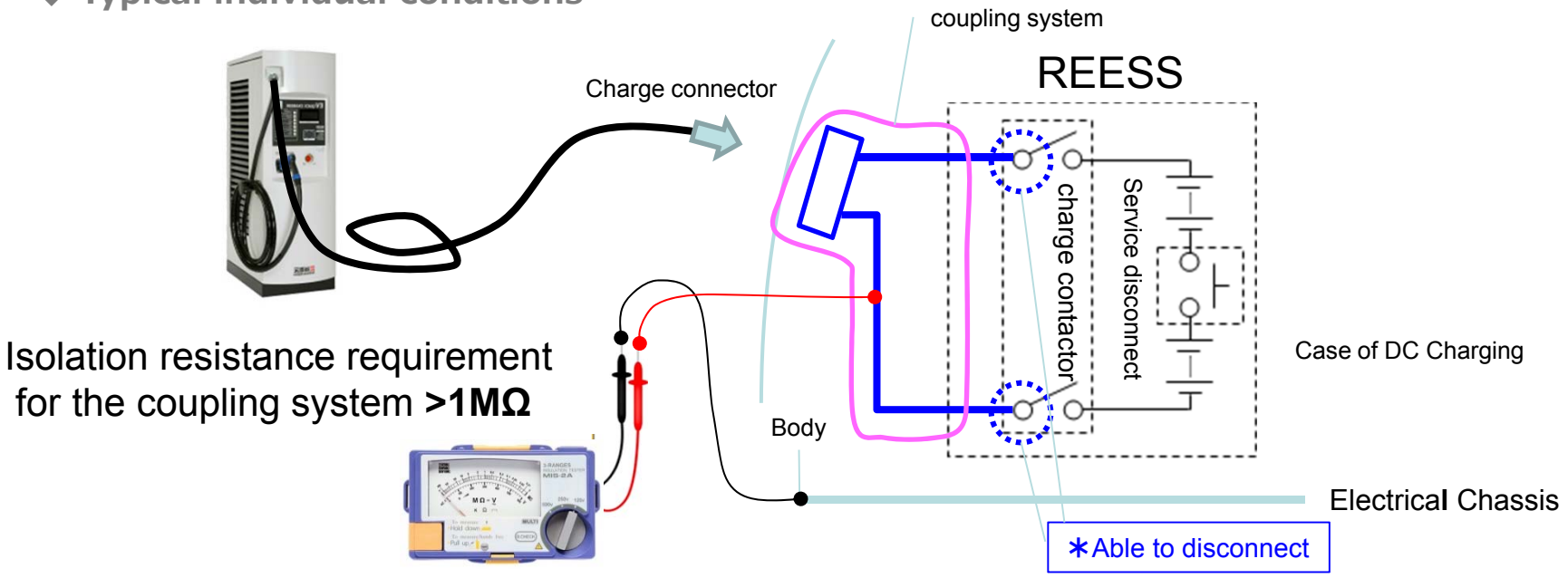
◆ General conditions

During the measurement, the REESS may be disconnected.

◆ Criteria

5.1.3.4.
For the coupling system (used to charge the REESS and intended to be conductively connected to the grounded external AC power supply) the isolation resistance shall be at least 1 MΩ when the charger coupler is disconnected. During the measurement, the REESS may be disconnected.

◆ Typical individual conditions



§5.2. Requirements for equipped REESS

Japan Automobile Standards Internationalization Center

◆ Objective

Safety requirement for equipped REESS

◆ Criteria

5.2.1. For a vehicle with a REESS, the requirement of either paragraph 5.2.1.1. or paragraph 5.2.1.2. shall be satisfied.
5.2.1.1
For a REESS which has been type approved in accordance with Part II of this Regulation, installation shall be in accordance with the instructions provided by the manufacturer of the REESS, and in conformity with the description provided in Part 2 of Annex 6 to this Regulation.
5.2.1.2
The REESS shall comply with the respective requirements of paragraph 6. of this Regulation.

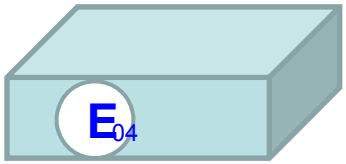
◆ General conditions

no regulations

◆ Typical individual conditions

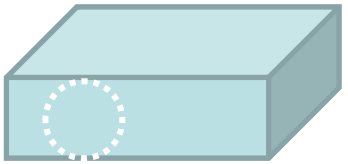
Annex 6

5.2.1.1.
For a REESS which has been type approved in accordance with Part II of this Regulation



The installation to a vehicle be based on installation directions of a REESS manufacturer.

5.2.1.2.
REESS of approval non-acquisition



The REESS shall comply with the respective requirements of paragraph 6. of this Regulation.

§5.2.2. Accumulation of gas

Japan Automobile Standards Internationalization Center

◆ Objective

Safety requirement for equipped REESS

for open type traction batteries that may produce hydrogen gas

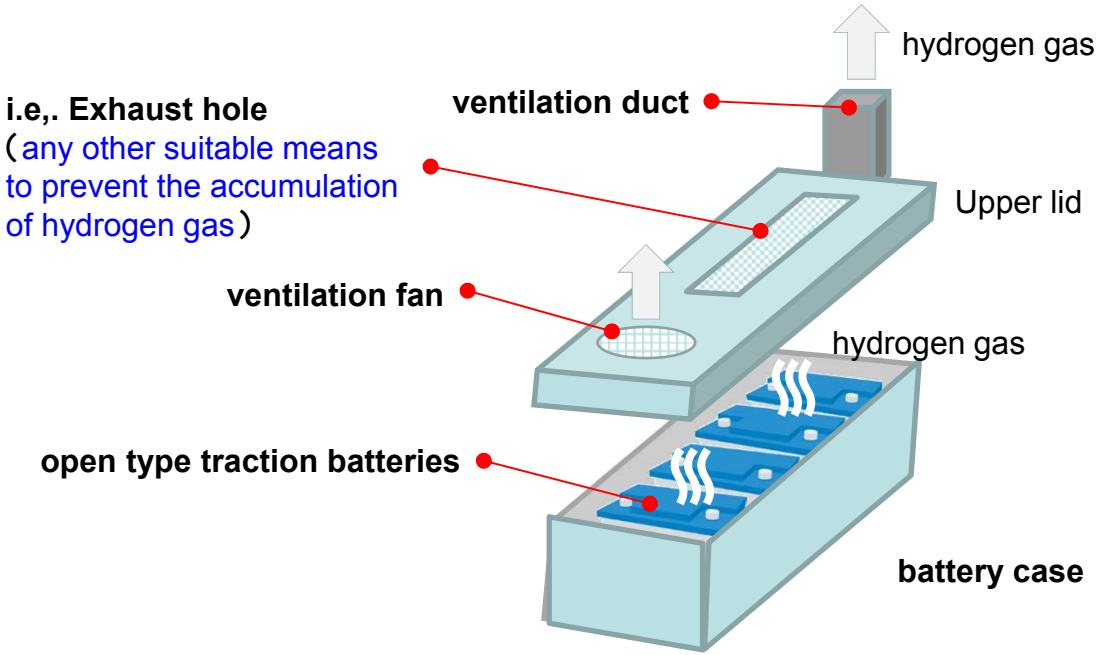
◆ Criteria

5.2.2.
Spaces for open type traction batteries that may produce hydrogen gas shall be equipped with a ventilation fan, a ventilation duct ***or any other suitable means*** *to prevent the accumulation of hydrogen gas.*

◆ General conditions

no regulations

◆ Typical individual conditions



§5.2.3. Protection against electrolyte spills

Japan Automobile Standards Internationalization Center

◆ Objective

Safety requirement for equipped REESS

Prevent injury to driver/passenger/people around from electrolyte leakage in normal use conditions.

◆ General conditions

In ordinary use or when operating a function

◆ Criteria

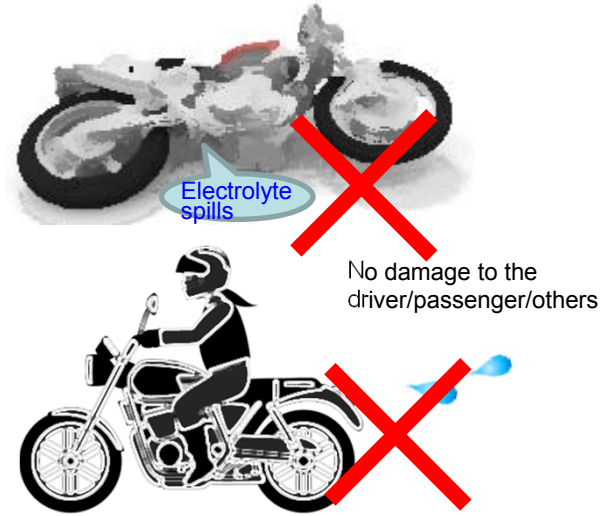
5.2.3. Vehicles shall foresee that no spilled electrolyte from the REESS and its components shall reach the driver, rider or passenger nor any person around the vehicle during normal condition of use and/or functional operation.
When the REESS is in the upside-down position, no electrolyte shall spill.

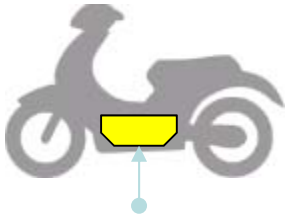
◆ Typical individual conditions

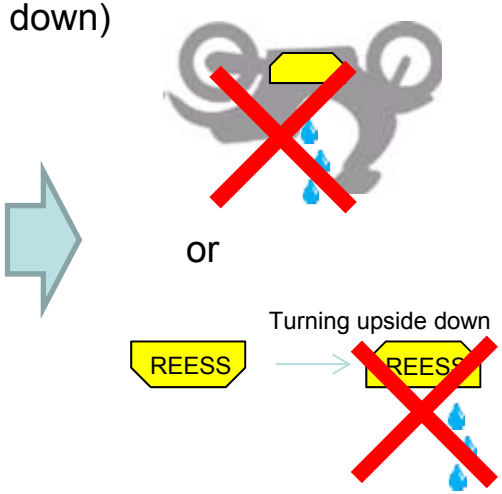
Objective
-Leakage when it falls
-No leakage onto surroundings while driving →

Confirmation method

Confirm using alternative confirmation method
(turning upside down)







§5.2.4. Accidental or unintentional detachment

Japan Automobile Standards Internationalization Center

◆ **Objective**

Safety requirement for equipped REESS

Prevent injury to driver/passenger/people around from accidental or unintentional detachment of REESS and its parts

◆ **General conditions**

In ordinary use or when operating a function

◆ **Criteria**

5.2.4.

The REESS and its components shall be installed in the vehicle in such a way so as to preclude the possibility of inadvertent or unintentional detachment of the REESS.

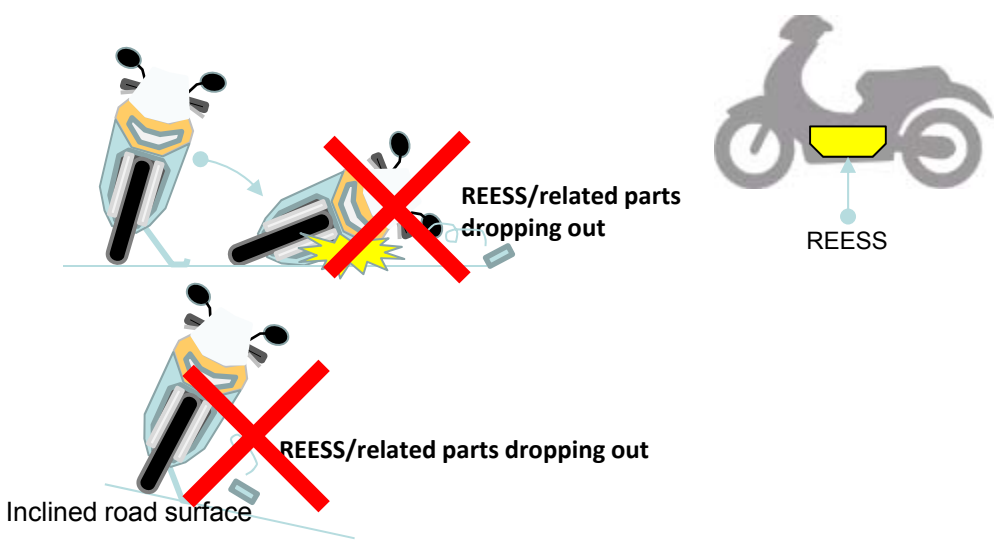
The REESS in the vehicle shall not be ejected when the vehicle is tilted.

The REESS components shall not be ejected when the REESS is put upside-down.

◆ **Typical individual conditions**

Due to the shock from a fall or the load from inclination

→REESS and related parts do not drop out or the parts do not scatter → Confirm using alternative confirmation method (Turning upside down)



§5.3. Functional safety

Japan Automobile Standards Internationalization Center

◆ Objective

Peculiar functional safety requirement
for an electric vehicle

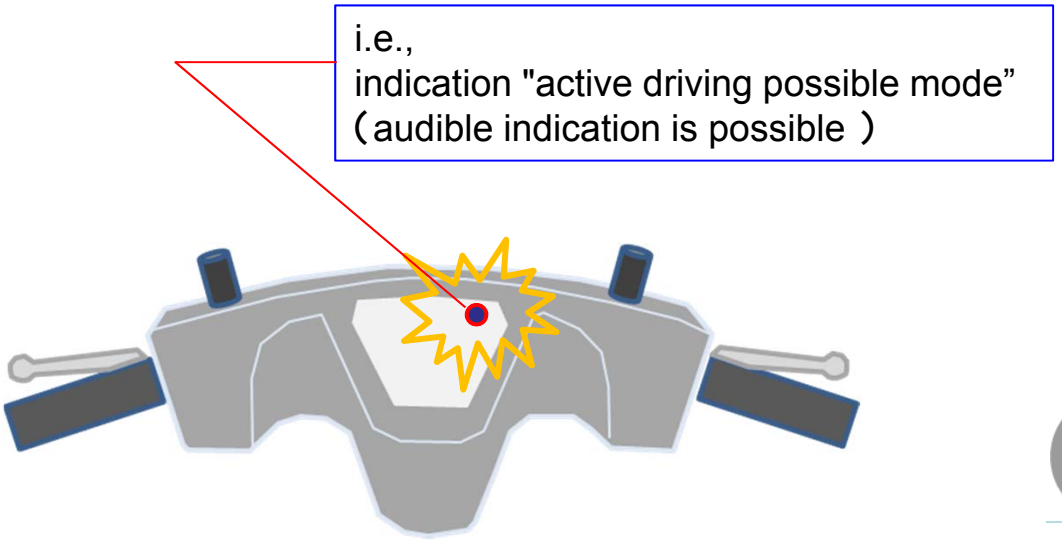
◆ General conditions

no regulations

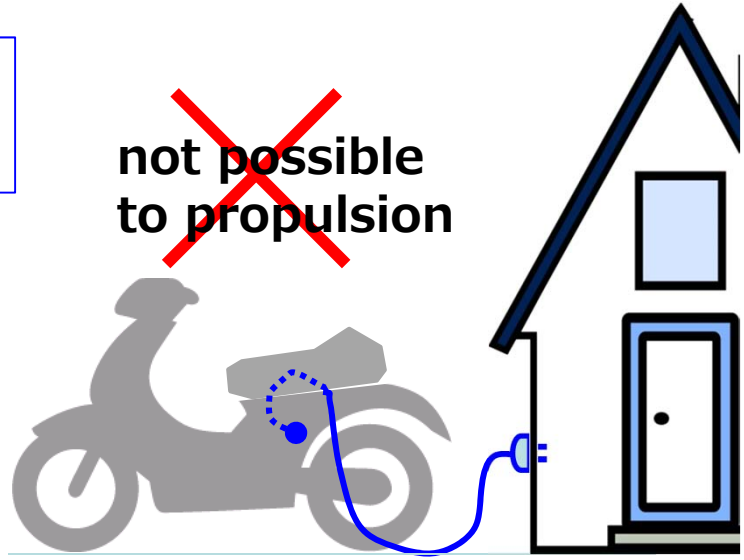
◆ Criteria

- A momentary indication shall, as minimum, be given to the driver when the vehicle is in "active driving possible mode".
- When leaving the vehicle, the driver shall be informed by a signal (e.g. optical or audible signal) if the vehicle is still in the active driving possible mode.
- If the onboard REESS can be externally charged by the user, movement caused by the vehicle's propulsion system shall not be possible while the external electric power supply is physically connected to the vehicle inlet.

◆ Typical individual conditions



＊ *This provision does not apply under conditions where an internal combustion engine provides directly or indirectly the vehicle´s propulsion power.*



Connecting to the power source for charging

§5.3. Functional safety

Japan Automobile Standards Internationalization Center

◆ Objective

Safety requirement at the charging.

＊ The case that requirement is not apply.

◆ Criteria

- For vehicles with a permanently connected recharge cable, the requirement above is not applicable if using the cable to charge the vehicle prevents the use of the vehicle (e.g. seat cannot be closed, the cable position does not allow the rider to sit in or step into the vehicle).

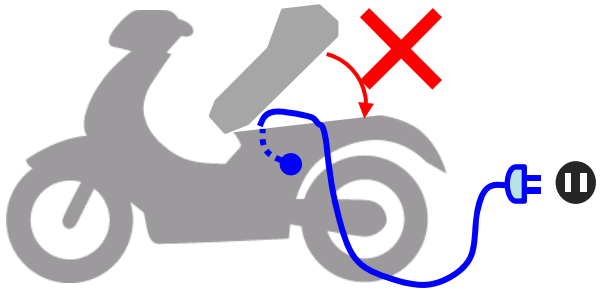
◆ General conditions

no regulations

◆ Typical individual conditions

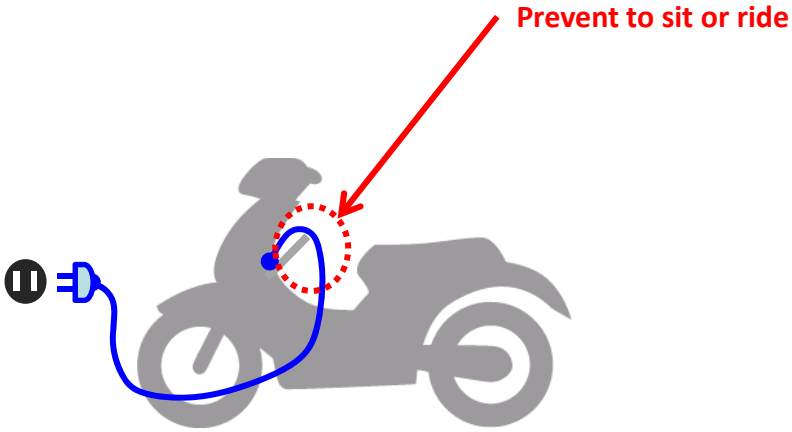
The following cases are not applied to this requirement.

- seat cannot be closed



A seat cannot be closed
A seat loosens

- the cable position does not allow the rider to sit in or step into the vehicle



§5.3.1.1.～2. Additional functional safety / prevention of the unexpected departure

Japan Automobile Standards Internationalization Center

◆ Objective

Safety requirement .
Prevention of the unexpected departure.

◆ General conditions

no regulations

◆ Criteria

5.3.1.1.
At least two deliberate and distinctive actions shall be performed by the driver at the start-up to select the active driving possible mode.
5.3.1.2.
Only a single action shall be required to deactivate the active driving possible mode.

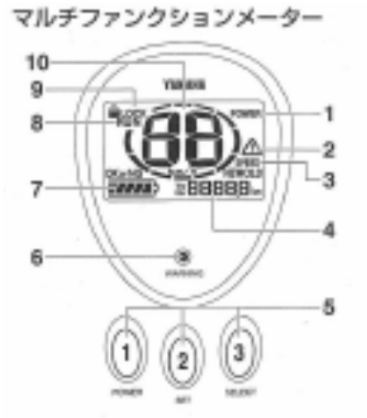
◆ Typical individual conditions

There is no idling by electric vehicle and as for the vehicle driver is difficult to grasp the vehicle conditions.
→There is a possibility that vehicle start by unexpected throttle operation.
→To prevent above , Intentional operation by driver is needed to activate to drive.
→At least two actions shall be performed by the driver to shift the active driving possible mode.

First action ⟶ Second action

Power SW（Main SW）

Start button（Activate） or Other intentional operations
i.e.， gear shift operation



§5.3.1.3. Additional functional safety/ during temporary power down

Japan Automobile Standards Internationalization Center

◆ Objective

Peculiar functional safety requirement
for an electric vehicle
＊Ensure driving safety during power down aimed at protecting vehicle functions

◆ General conditions

Indication of temporary power down not caused by failure or temporary power down due to SOC of REESS

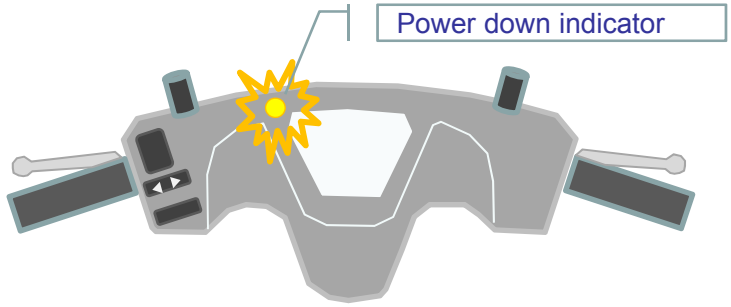
◆ Criteria

5.3.1.3.1.
The vehicle shall have a function/device that indicates to the driver/rider if the power is automatically reduced below a certain level, (e.g. due to activation of the output controller to protect the REESS or the propulsion system) or due to a low SOC.

◆ Typical individual conditions

- Driving force is prominently involved in the banking movement in cornering of a two-wheeler.
- Unintentional reduction of this driving force affects the posture of the two-wheeler and the course.
- The driver has to ride the two-wheeler upon grasping the driving force of own vehicle.

Temporary power down of electrically powered two-wheelers has to be conveyed to the driver promptly.



§5.3.1.4. Additional functional safety/ backward driving

Japan Automobile Standards Internationalization Center

◆ Objective

Safety requirement at the backward driving.

◆ Criteria

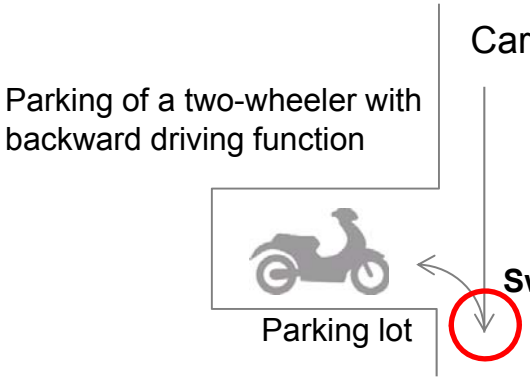
It shall not be possible to activate the vehicle reverse control function whilst the vehicle is in forward motion.

◆ General conditions

-No prescribed conditions

◆ Typical individual conditions

Example



The two-wheeler cannot drive backward when it switches the driving force while the vehicle is going forward (it can switch driving force only when it is almost in a stopped situation).

Switching driving direction

§5.4. Determination of hydrogen emissions

Japan Automobile Standards Internationalization Center

◆ Objective

Measurement of the quantity of hydrogen emission by vehicle equipped with open type traction batteries

◆ General conditions

5.4.1.If the REESS has been approved under Part II of this Regulation and installed in accordance with paragraph 5.2.1.1., this test can be omitted for the approval of the vehicle.
5.4.2. The test shall be conducted according to the method described in Annex 7 of the present Regulation. 。

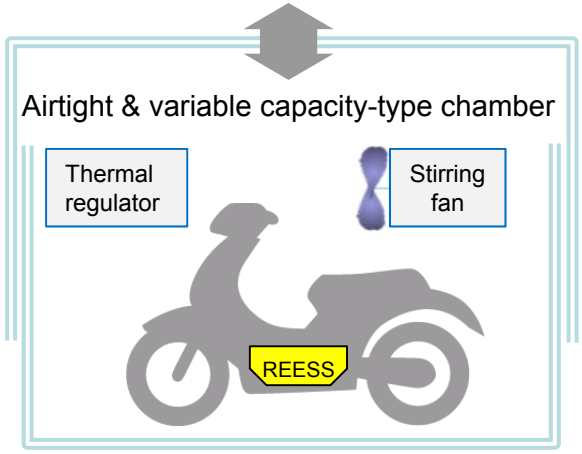
◆ Typical individual conditions

① The measurement of the quantity of hydrogen emission at the normal charge in the vehicle equipped with open type traction batteries
② The measurement of the quantity of hydrogen emission at the charge in imitation of the trouble of the battery charger

◆ Criteria

5.4.1. This test shall be carried out on all vehicles equipped with open type traction batteries.
5.4.3. During a normal charge procedure in the conditions given in Annex 7, hydrogen emissions shall be below 125 g during 5 h, or below 25 x t2 g during t2 (in h).
5.4.4. During a charge carried out by a charger presenting a failure (conditions given in Annex 7), hydrogen emissions shall be below 42 g. The charger shall limit such a failure to 30 minute maximum.

◆Measurement equipment

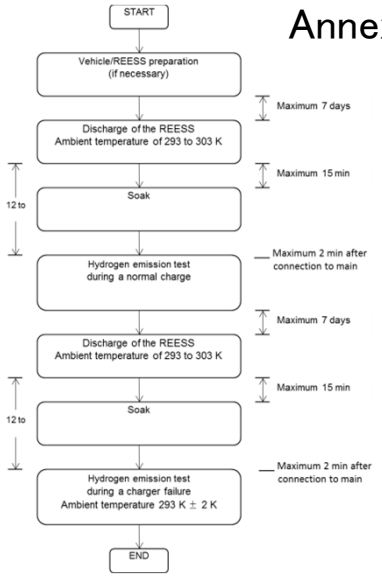


◆Measurement item
- Hydrogen Analyser（Indoor hydrogen density）
- Temperature（Indoor & Battery neighborhood ）
- Indoor/outdoor pressure
- Charger output（Voltage & Current）

◆The quantity of hydrogen emission calculated by the following calculating formula after the test.

$$M_{H2} = k \times V \times 10^{-4} \times \left(\frac{(1+\frac{V_{out}}{V}) \times C_{H2f} \times P_f}{T_f} - \frac{C_{H2i} \times P_i}{T_i} \right)$$

TEST Flow Annex7



Individual examination contents and requirements

§6 Part Ⅱ:

Requirements of a **REESS** with regard to its safety

REESS: Rechargeable Electrical Energy Storage System

§6.2. Vibration test

Japan Automobile Standards Internationalization Center

◆ Objective

The purpose of this test is to verify the safety performance of the REESS under a vibration environment which the REESS will likely experience during the normal operation of the vehicle.

◆ General conditions

- Implement with complete REESS or REESS subsystem
- Environmental temperature: 20 ±10°C
- SOC at the start of test: 50% or higher

◆ Criteria

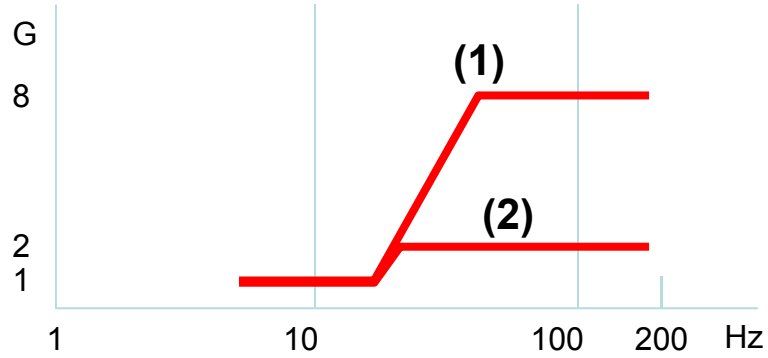
- No electrolyte leakage (to be verified by visual inspection without disassembling)
- No rupture (applicable only to high-voltage REESS)
- No fire
- No explosion

For a high voltage REESS, the isolation resistance measured after the test in accordance with Annex 4B to this Regulation shall not be less than 100 Ω/Volt.

◆ Typical individual conditions

Vibration profile

(1) Weight of test body <12kg (2) Weight of test body ≥ 12kg



•The test shall end with an observation period of 1h at the ambient temperature conditions of the test environment.

§6.3. Thermal shock and cycling

Japan Automobile Standards Internationalization Center

◆ **Objective**

The purpose of this test is to verify the resistance of the REESS to sudden changes in temperature.

◆ **General conditions**

- Implement with complete REESS or REESS subsystem
- Environmental temperature: 20 ±10°C
- SOC at the start of test: 50% or higher

◆ **Criteria**

- No electrolyte leakage (to be verified by visual inspection without disassembling)
- No rupture (applicable only to high-voltage REESS)
- No fire
- No explosion

For a high voltage REESS, the isolation resistance measured after the test in accordance with Annex 4B to this Regulation shall not be less than 100 Ω/Volt.

◆ **Typical individual conditions**

•Thermal shock and cycling pattern

60℃±2℃(6h≤)⇔(≤ 30min)⇔- 40±2℃(6h≤)

The above pattern is repeated more than 5 times.

• After the storage for 24 hours, a standard cycle as described in Annex 8, Appendix 1 shall be conducted, if not inhibited by the tested-device.
•The test shall end with an observation period of 1h at the ambient temperature conditions of the test environment.

§6.3. Removable battery drop test

Japan Automobile Standards Internationalization Center

◆ Objective

Simulates a mechanical impact load which may occur at an unintended drop after REESS removal.

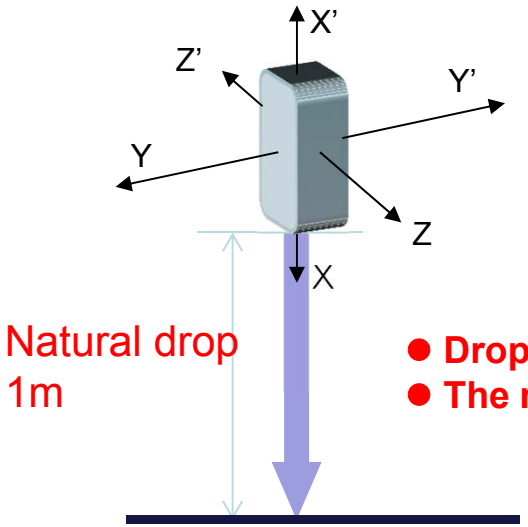
◆ General conditions Parts test

- Environmental temperature: 20 ±10℃
- SOC at the start of test: Part 90% or higher of the rated capacity described in Annex6
-1m/6 directions/each time

◆ Criteria

- No electrolyte leakage (to be verified by visual inspection without disassembling)
- No rupture (applicable only to high-voltage REESS)
- No fire
- No explosion
For a high voltage REESS, the isolation resistance measured after the test in accordance with Annex 4B to this Regulation shall not be less than 100 Ω/Volt.

◆ Typical individual conditions



- **Dropped in six directions (to be decided with the testing institution)**
- **The manufacturer may use different units for each test**

A smooth and level concrete surface or a floor with equivalent hardness.

§6.4. Shock test

Japan Automobile Standards Internationalization Center

◆ Objective

The purpose of this test is to verify the safety performance of the REESS under mechanical shock which may occur during fall on the side from stationary or parked situation.

◆ General conditions Parts test

- Applicable for vehicles with centerstand/sidestand
- Implement with complete REESS or REESS subsystem
- Environmental temperature: 20 ±10°C
- SOC at the start of test: 50% or higher

◆ Criteria

- No electrolyte leakage (to be verified by visual inspection without disassembling)
- No rupture (applicable only to high-voltage REESS)
- No fire
- No explosion

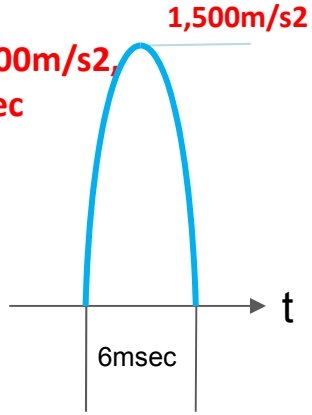
For a high voltage REESS, the isolation resistance measured after the test in accordance with Annex 4B to this Regulation shall not be less than 100 Ω/Volt.

◆ Typical individual conditions

-Impact profile

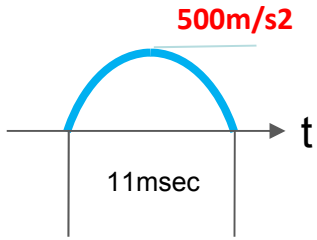
(1)Weight of test body <12kg

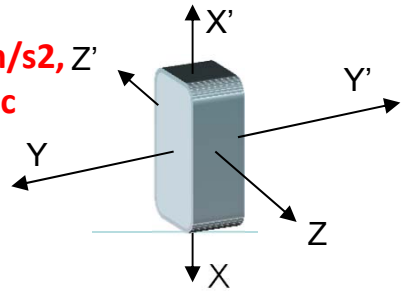
Sine half wave shock at peak acceleration of 1,500m/s2, and pulse duration of 6msec



(2) Weight of test body ≥ 12kg

Sine half wave shock at peak acceleration of 500m/s2, and pulse duration of 11msec





Give shock test a total of 18 times for three axes of x, y and z; up/down - 3 times each, front/back 3 times each, sides - 3 times each

§6.5. Fire resistance

Japan Automobile Standards Internationalization Center

◆ Objective

The purpose of this test is to verify the resistance of the REESS, against exposure to fire from outside of the vehicle due to e.g. a fuel spill from a vehicle (either the vehicle itself or a nearby vehicle).

◆ Criteria

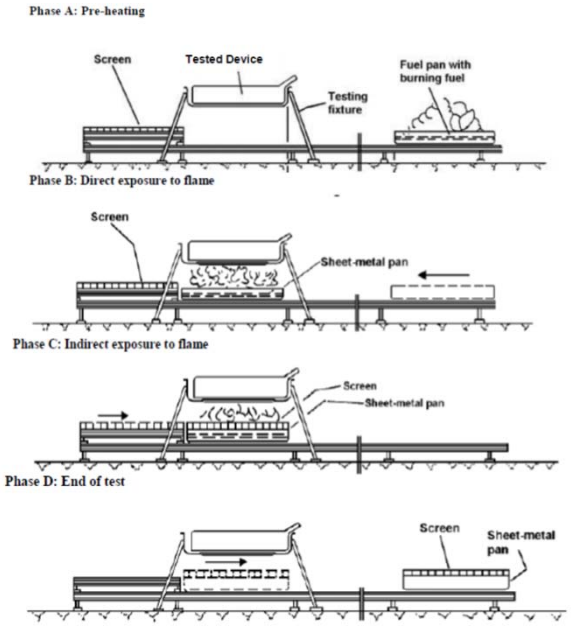
- No explosion

◆ General conditions

This test applies for vehicles with a passenger compartment only.
This test is required for REESS containing flammable electrolyte.
The test shall be carried out on one test sample.

- Environmental temperature: >0°C
- SOC at the start of test: 50% or higher

◆ Typical individual conditions



Phase A: Pre-heating(60sec)

Phase B: Direct exposure to flame(70sec)

Phase C: Indirect exposure to flame (60sec)

Phase D: End of test

After removal of the pan the tested-device shall be observed until such time as the surface temperature of the tested-device has decreased to ambient temperature or has been decreasing for a minimum of 3 hours.

§6.6. External short circuit protection

Japan Automobile Standards Internationalization Center

◆ Objective

The purpose of this test is to verify the performance of the short circuit protection.

◆ General conditions

- Environmental temperature: 20 ±10°C
- SOC at the start of test: 50% or higher

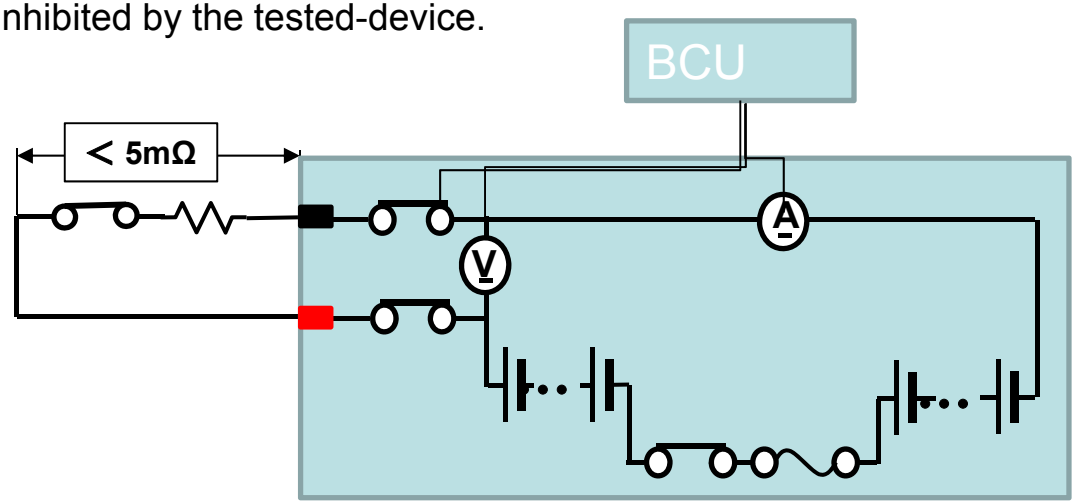
◆ Criteria

- No electrolyte leakage (to be verified by visual inspection without disassembling)
- No rupture (applicable only to high-voltage REESS)
- No fire
- No explosion
For a high voltage REESS, the isolation resistance measured after the test in accordance with Annex 4B to this Regulation shall not be less than 100 Ω/Volt.

◆ Typical individual conditions

ANNEX8F

- Turn on the protection device
- The connection used for this purpose shall have a resistance not exceeding 5 mΩ.
- Directly after the termination of the short circuit a standard cycle as described in Annex 8, Appendix 1 shall be conducted, if not inhibited by the tested-device.
- The test shall end with an observation period of 1 h at the ambient temperature conditions of the test environment.



§6.7. Overcharge protection

Japan Automobile Standards Internationalization Center

◆ Objective

The purpose of this test is to verify the performance of the overcharge protection.

◆ General conditions

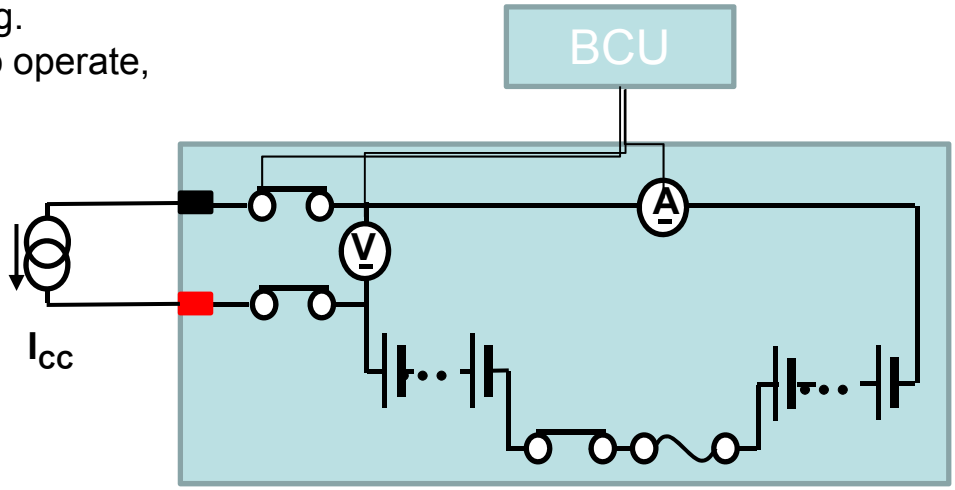
- Environmental temperature: 20 ±10°C
- SOC at the start of test: 50% or higher

◆ Criteria

- No electrolyte leakage (to be verified by visual inspection without disassembling)
- No rupture (applicable only to high-voltage REESS)
- No fire
- No explosion
For a high voltage REESS, the isolation resistance measured after the test in accordance with Annex 4B to this Regulation shall not be less than 100 Ω/Volt.

◆ Typical individual conditions

- Protection device : Charger side OFF , Vehicle side ON
- Charge current is 1/3C< Ic< Maximum current
- The charging shall be continued until the tested-device (automatically) interrupts or limits the charging.
- Where an automatic interrupt function fails to operate, or if there is no such function the charging shall be continued until the tested-device is charged to twice of its rated charge capacity



§6.8. Over-discharge protection

Japan Automobile Standards Internationalization Center

◆ Objective

The purpose of this test is to verify the performance of the over-discharge protection.
This functionality, if implemented, shall interrupt or limit the discharge current to prevent the REESS from any severe events caused by a too low SOC as specified by the manufacturer.

◆ General conditions

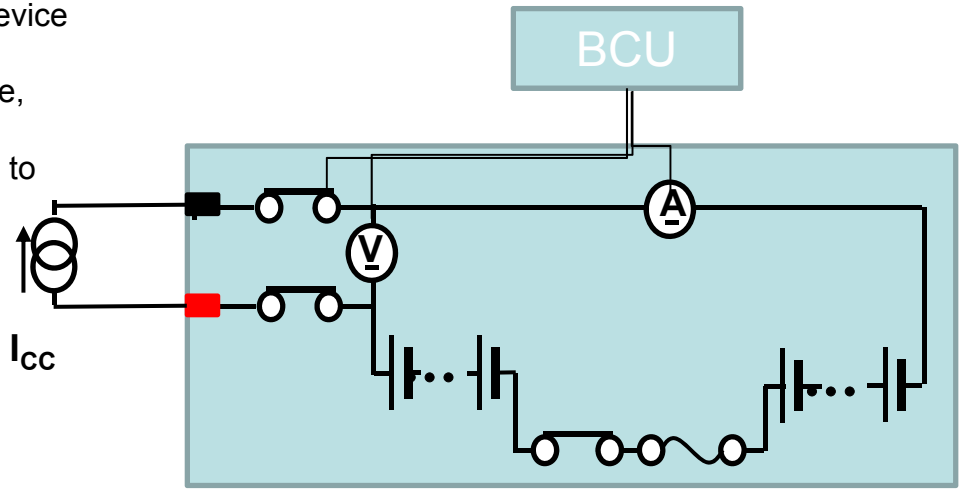
- Environmental temperature: 20 ±10°C
- SOC at the start of test: No regulation

◆ Criteria

- No electrolyte leakage (to be verified by visual inspection without disassembling)
- No rupture (applicable only to high-voltage REESS)
- No fire
- No explosion
For a high voltage REESS, the isolation resistance measured after the test in accordance with Annex 4B to this Regulation shall not be less than 100 Ω/Volt.

◆ Typical individual conditions

• A discharge shall be performed with at least 1/3 C rate but shall not exceed the maximum current within the normal operating range as specified by the manufacturer.
• The discharging shall be continued until the tested-device (automatically) interrupts or limits the discharging.
• Where an automatic interrupt function fails to operate, or if there is no such function then the discharging shall be continued until the tested-device is discharged to 25 per cent of its nominal voltage level.



§6.9. Over-temperature protection

Japan Automobile Standards Internationalization Center

◆ Objective

The purpose of this test is to verify the performance of the protection measures of the REESS against internal overheating during the operation, even under the failure of the cooling function if applicable.

◆ General conditions

The following test shall be conducted with the complete REESS (maybe as a complete vehicle) or with related REESS subsystem(s), including the cells and their electrical connections.

◆ Criteria

- No electrolyte leakage (to be verified by visual inspection without disassembling)
- No rupture (applicable only to high-voltage REESS)
- No fire
- No explosion

For a high voltage REESS, the isolation resistance measured after the test in accordance with Annex 4B to this Regulation shall not be less than 100 Ω/Volt.

附則8I

◆ Typical individual conditions

•Where the REESS is equipped with protective measures, the temperature shall be increased to the temperature defined by the manufacturer as being the operational temperature threshold for such protective measures. ***(Fig.1)。***

•Where the REESS is not equipped with any specific measures, the temperature shall be increased to the maximum operational temperature specified by the manufacturer. ***(Fig.2)。***

•The test will end when one of the followings is observed:

a) The tested-device inhibits and/or limits the charge and/or discharge.

b) The temperature of the tested-device is stabilised.

c) Any failure of the acceptance criteria.

Fig.1 Image of temperature during the test (with protection)

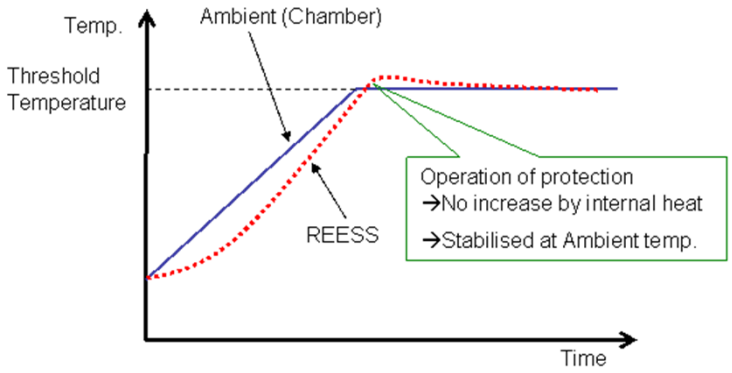
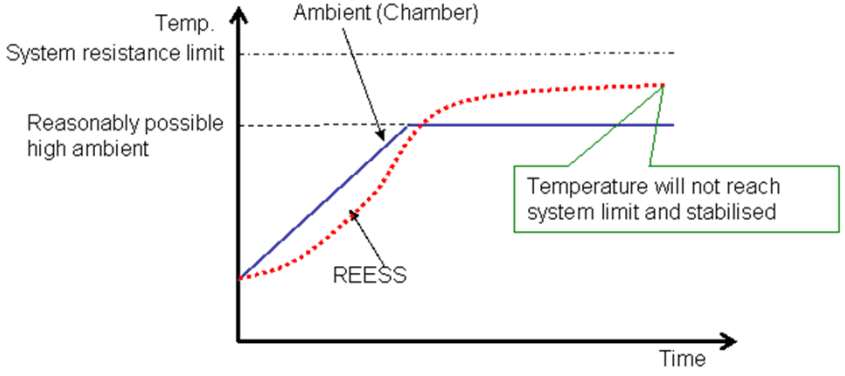


Fig.2 Image of temperature during the test (without protection)



§6.10. Emission

SAME : § 5.4. Determination of hydrogen emissions

Japan Automobile Standards Internationalization Center

◆ Objective

Measurement of the quantity of hydrogen emission by vehicle equipped with open type traction batteries

◆ General conditions

5.4.1.If the REESS has been approved under Part II of this Regulation and installed in accordance with paragraph 5.2.1.1., this test can be omitted for the approval of the vehicle.
5.4.2. The test shall be conducted according to the method described in Annex 7 of the present Regulation.

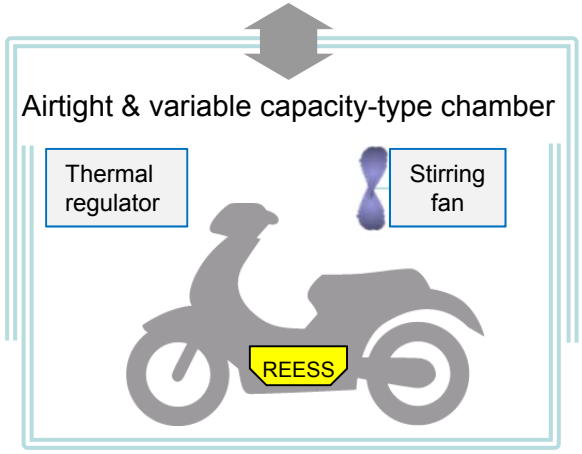
◆ Typical individual conditions

① The measurement of the quantity of hydrogen emission at the normal charge in the vehicle equipped with open type traction batteries
② The measurement of the quantity of hydrogen emission at the charge in imitation of the trouble of the battery charger

◆ Criteria

5.4.1. This test shall be carried out on all vehicles equipped with open type traction batteries.
5.4.3. During a normal charge procedure in the conditions given in Annex 7, hydrogen emissions shall be below 125 g during 5 h, or below 25 x t2 g during t2 (in h).
5.4.4. During a charge carried out by a charger presenting a failure (conditions given in Annex 7), hydrogen emissions shall be below 42 g. The charger shall limit such a failure to 30 minute maximum.
5.4.5. All the operations linked to the REESS charging shall be controlled automatically, included the stop for charging
5.4.6. Manual control of the charging phases shall not be possible.
5.4.7. Normal operations of connection and disconnection to the mains or power cuts shall not affect the control system of the charging phases.
5.4.8. An important failure is a failure that can lead to a malfunction of the charger during charging later on.

◆Measurement equipment

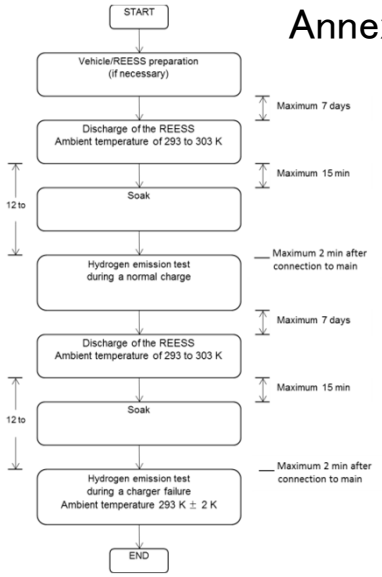


◆Measurement item
- Hydrogen Analyser（Indoor hydrogen density）
- Temperature（Indoor & Battery neighborhood ）
- Indoor/outdoor pressure
- Charger output（Voltage & Current）

◆The quantity of hydrogen emission calculated by the following calculating formula after the test.

$$M_{H2} = k \times V \times 10^{-4} \times \left(\frac{(1+\frac{V_{out}}{V}) \times C_{H2f} \times P_f}{T_f} - \frac{C_{H2i} \times P_i}{T_i} \right)$$

TEST Flow Annex7



Japan Automobile Standards Internationalization Center

Thank you for your attention !

Japan Automobile Standards Internationalization Center

Appendix

Introduction of e-PTW-related ISO/IEC

International Regulation & Standards for e-PTW

Japan Automobile Standards Internationalization Center

Under development

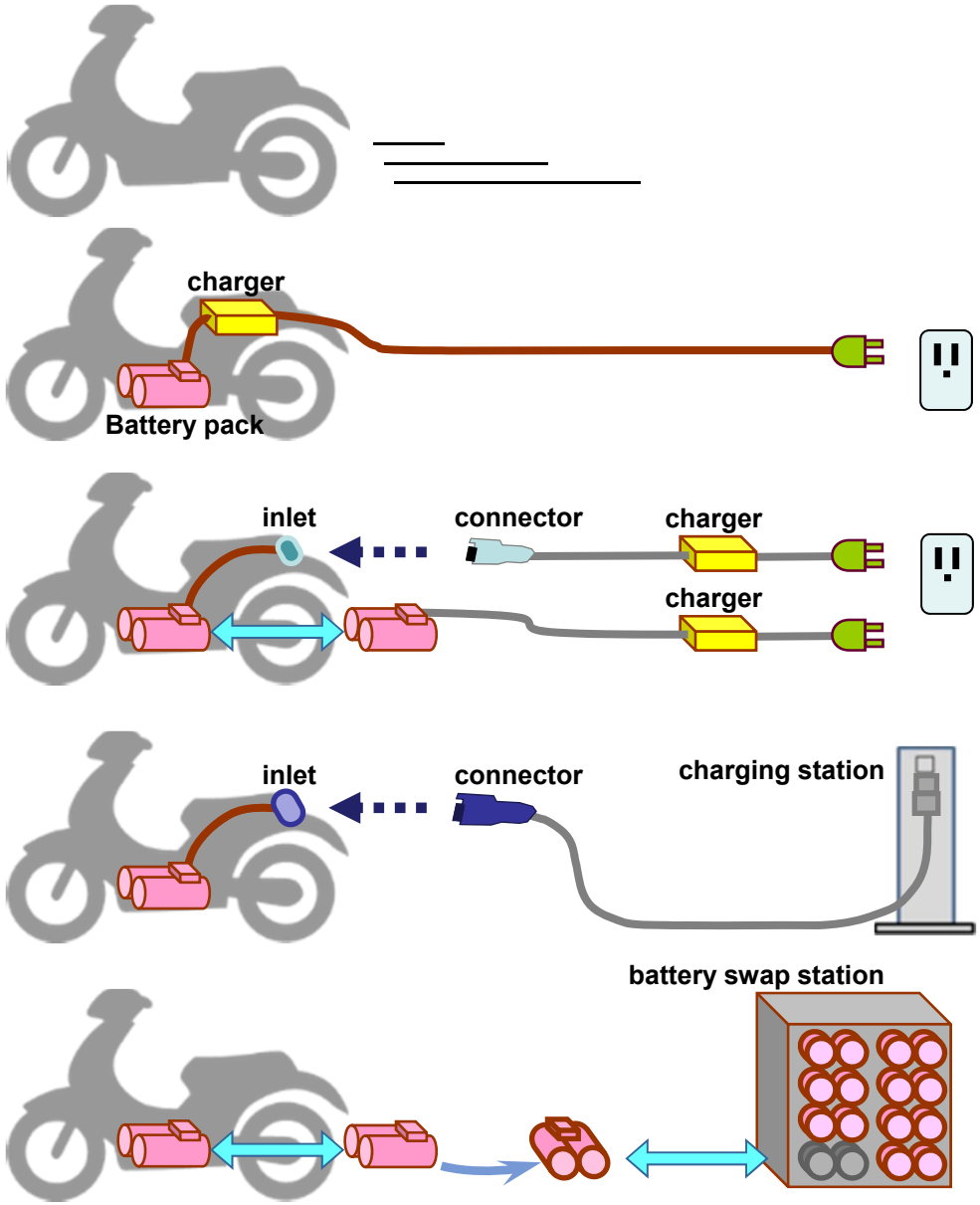
@2016/Apr

		EV (Passenger Car)	e-PTW	Publication
International Regulations	Electrification safety	UN R100	UN R136	
	REESS safety			
	Electrification safety (post-impact)			
	Transportation safety	UN transportation rule N38.3		
International Standards	Electrification safety (vehicle)	ISO 6469-1～-3	ISO13063	
	Charging systems	IEC 61851-1 ISO 17409	IEC60335-2-29(Rev.) IEC61851-3	Mid/2016 End/2018
			ISO18246	
	DC charging connectors	IEC 62196-3	IEC 62196-4	End/2018
	Cell size	ISO/IEC PAS16898		
	Cell testing & safety	IEC626 0-1,-2		
	Cell safety	IEC 62 60-3		Mid/2016
	Battery testing	ISO 12405-1,2	ISO18243	Mid/2016
	Battery safety	ISO 12405-3		
	Electricity consumption	ISO 8714	ISO 13064-1	
	Vehicle performance	ISO 8715	ISO 13064-2	

We are explaining this.

Existing and developing standards for e-PTWs

Japan Automobile Standards Internationalization Center



ISO

ISO 13063
Electrical safety for e-PTWs

ISO 13064-1
Electricity consumption for e-PTWs

ISO 13064-2
Vehicle performance for e-PTWs

ISO 18243 (under development)
Battery pack testing and safety for e-PTWs

ISO 18246 (to be published)
Electrical safety for charging to e-PTWs

IEC

IEC 62660 series (partially under development)
Battery cell testing and safety

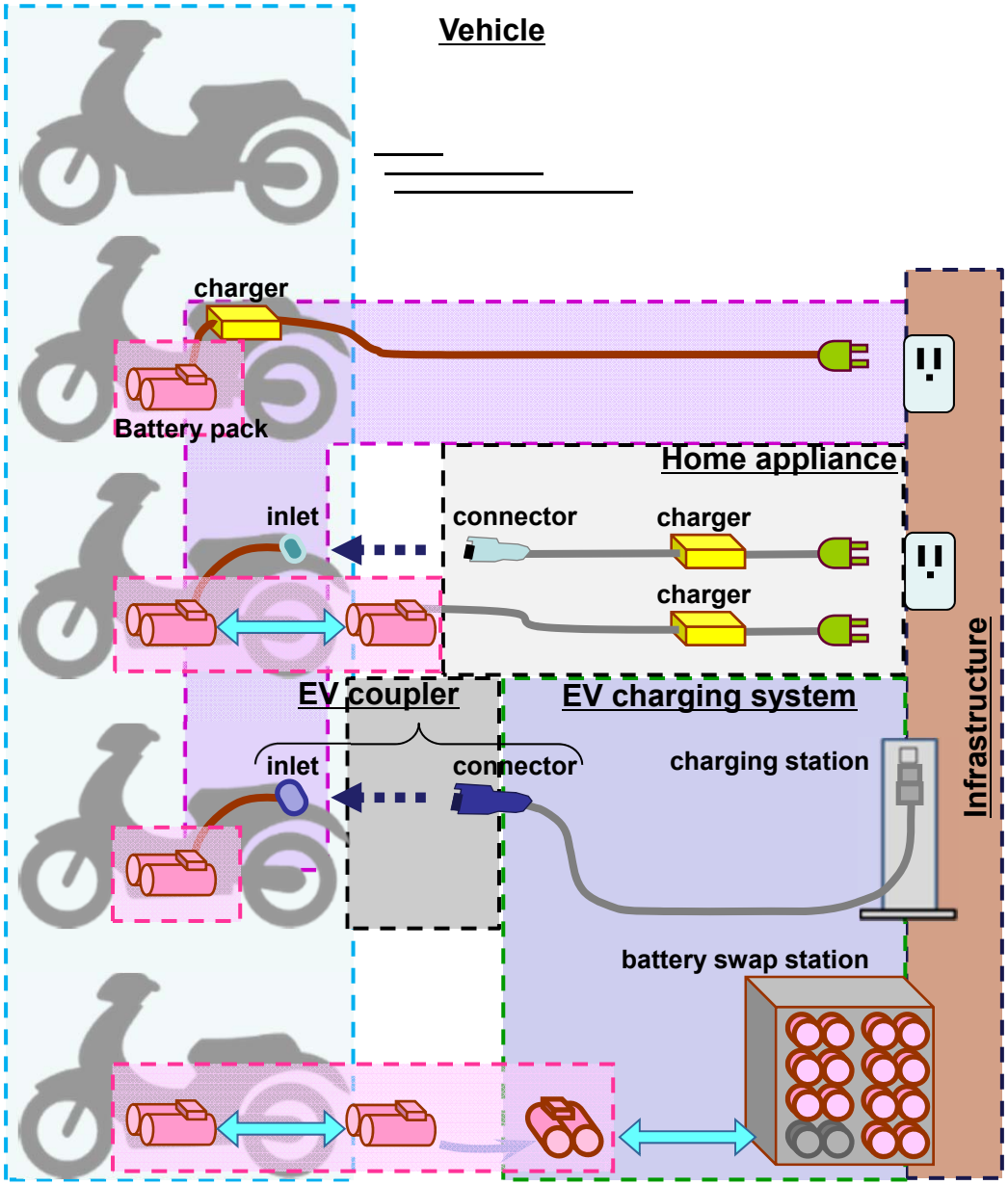
IEC 60335-2-29
Household charger safety

IEC/TS 61851-3 series (under development)
Charging system for light electric vehicles

IEC/TS 62196-4 (under development)
Charging coupler for light electric vehicles

Existing and developing standards for e-PTWs

Japan Automobile Standards Internationalization Center



ISO

ISO 13063
Electrical safety for e-PTWs

ISO 13064-1
Electricity consumption for e-PTWs

ISO 13064-2
Vehicle performance for e-PTWs

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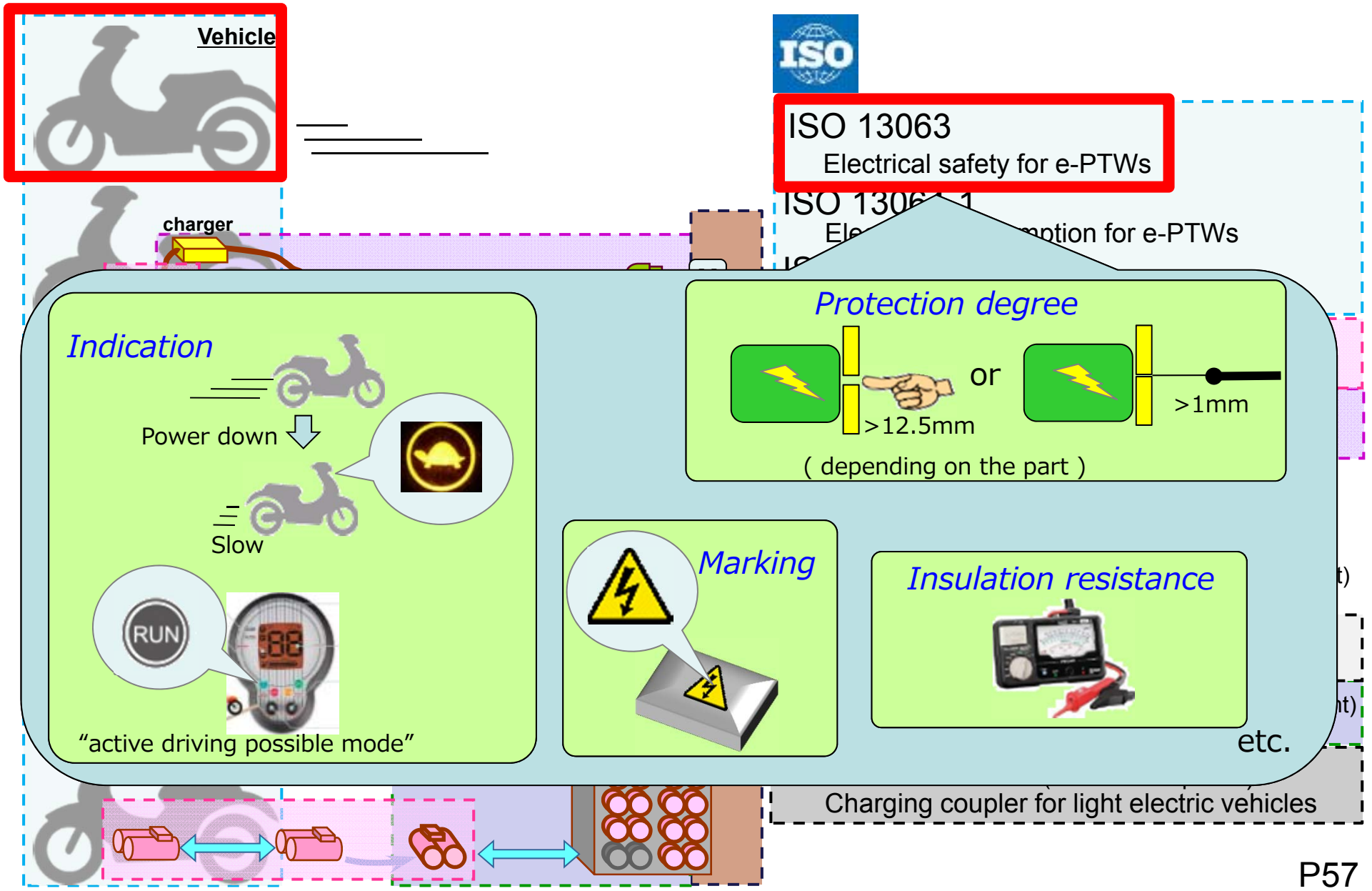
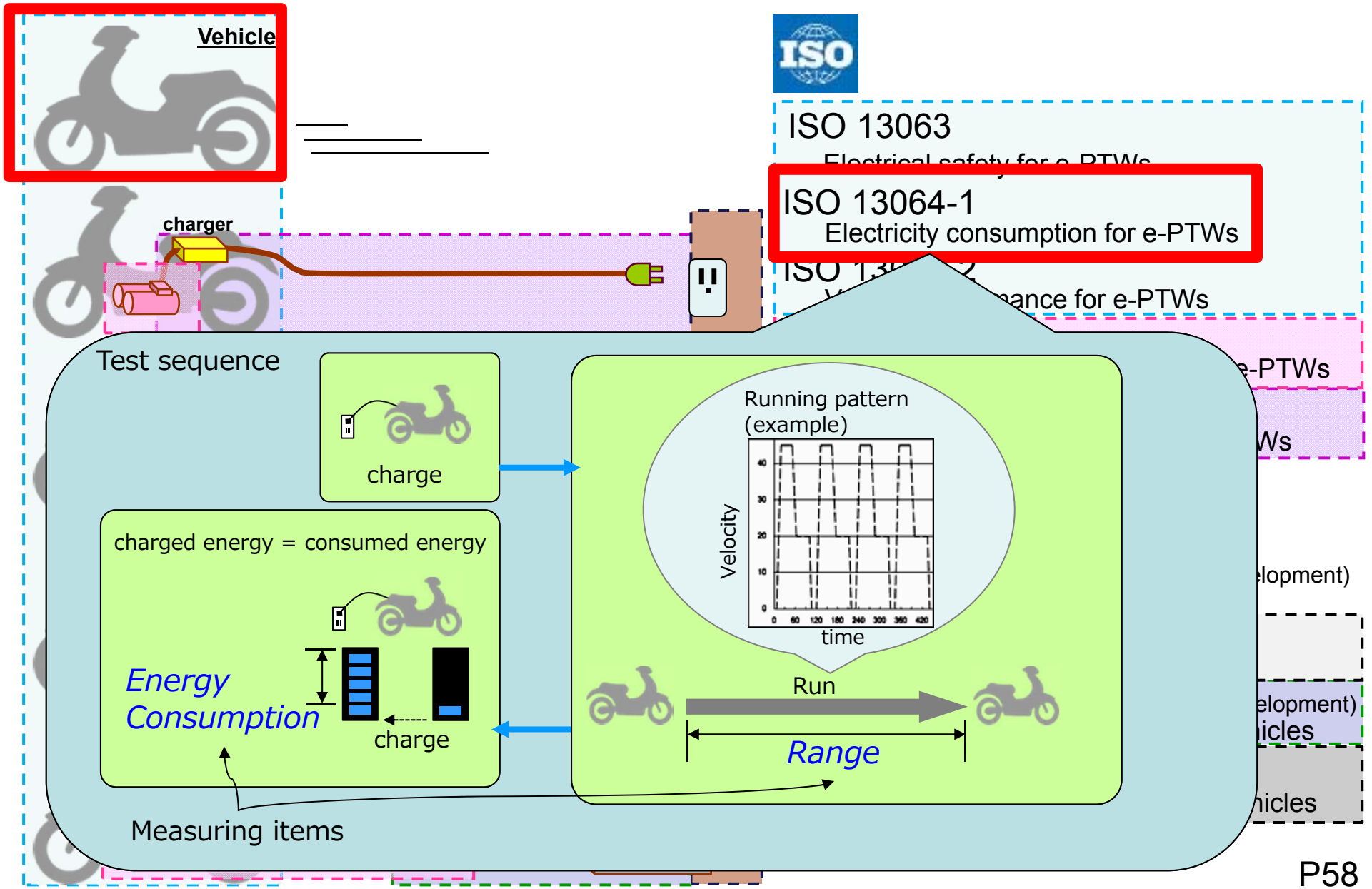
Existing and developing standards for e-PTWs

Japan Automobile Standards Internationalization Center



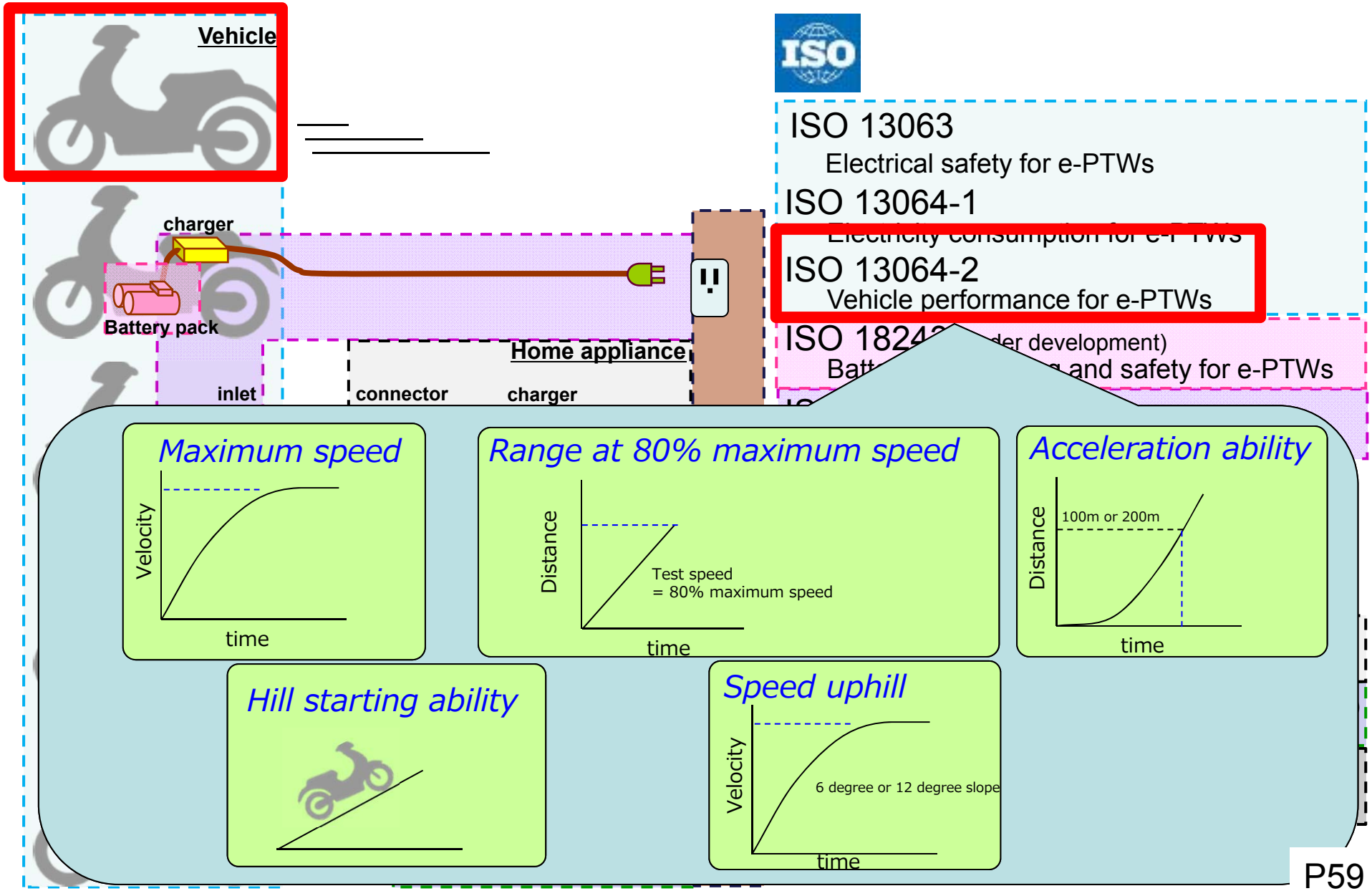
Existing and developing standards for e-PTWs

Japan Automobile Standards Internationalization Center



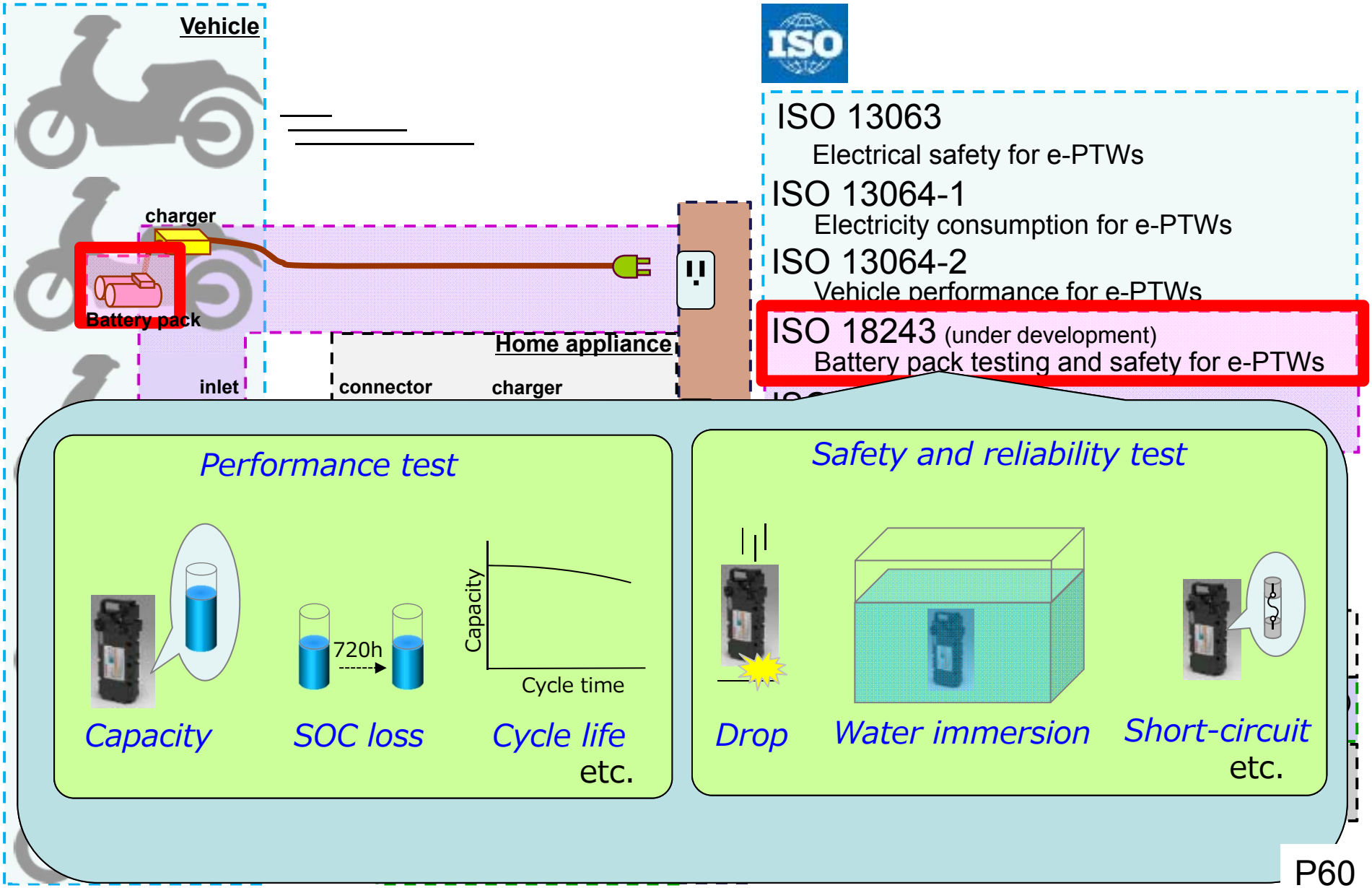
Existing and developing standards for e-PTWs

Japan Automobile Standards Internationalization Center



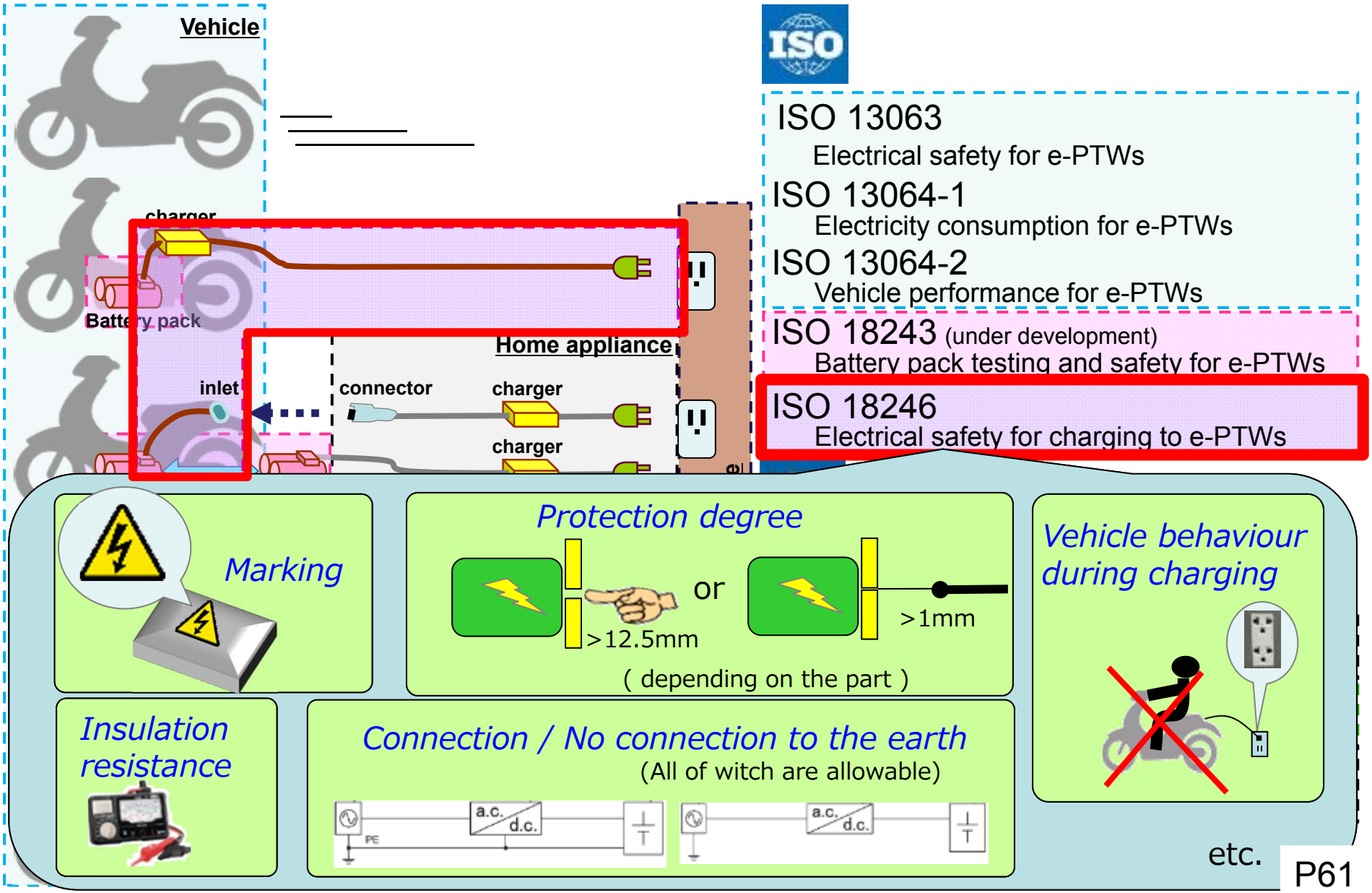
Existing and developing standards for e-PTWs

Japan Automobile Standards Internationalization Center



Existing and developing standards for e-PTWs

Japan Automobile Standards Internationalization Center

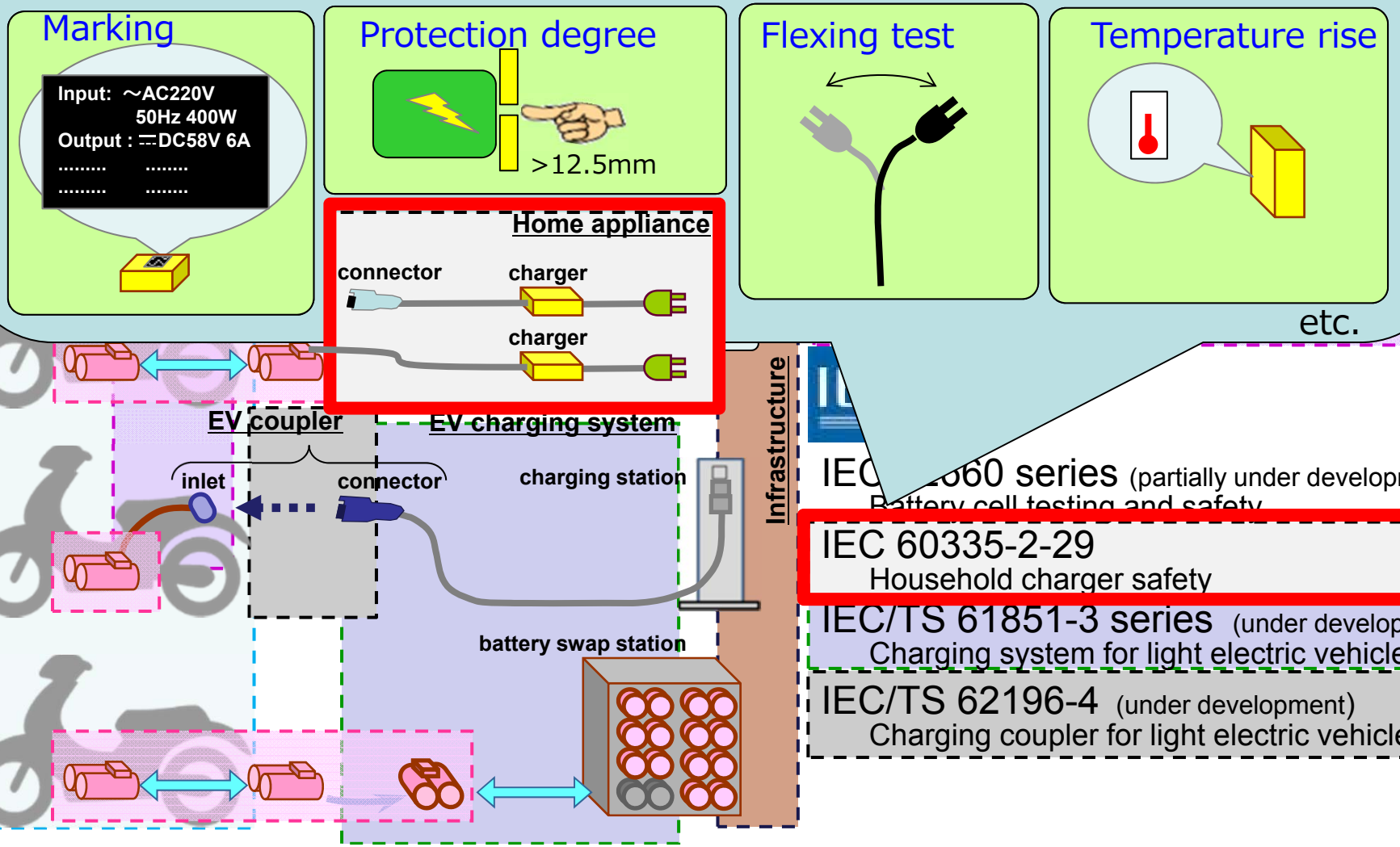


Existing and developing standards for e-PTWs

Japan Automobile Standards Internationalization Center

IEC 60335 series : House hold and similar electrical appliances – Safety –
- …
- Part 2-29: Particular requirements for battery chargers
- …

*Described requirements for consumer electronics



IEC 62660 series (partially under development)
Battery cell testing and safety

IEC 60335-2-29
Household charger safety

IEC/TS 61851-3 series (under development)
Charging system for light electric vehicles

IEC/TS 62196-4 (under development)
Charging coupler for light electric vehicles

Existing and developing standards for e-PTWs

Japan Automobile Standards Internationalization Center

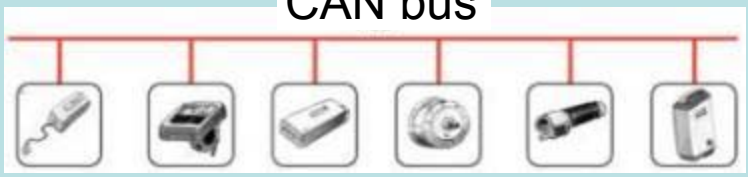
Vehicle

IEC 61851-4 to -7

Communication protocol

This data is going to be managed by a specific company !

CAN bus



Voltage converter (charger) | Human machine interface | EMSC (master) | Motor control unit | Sensor | Battery system

etc.

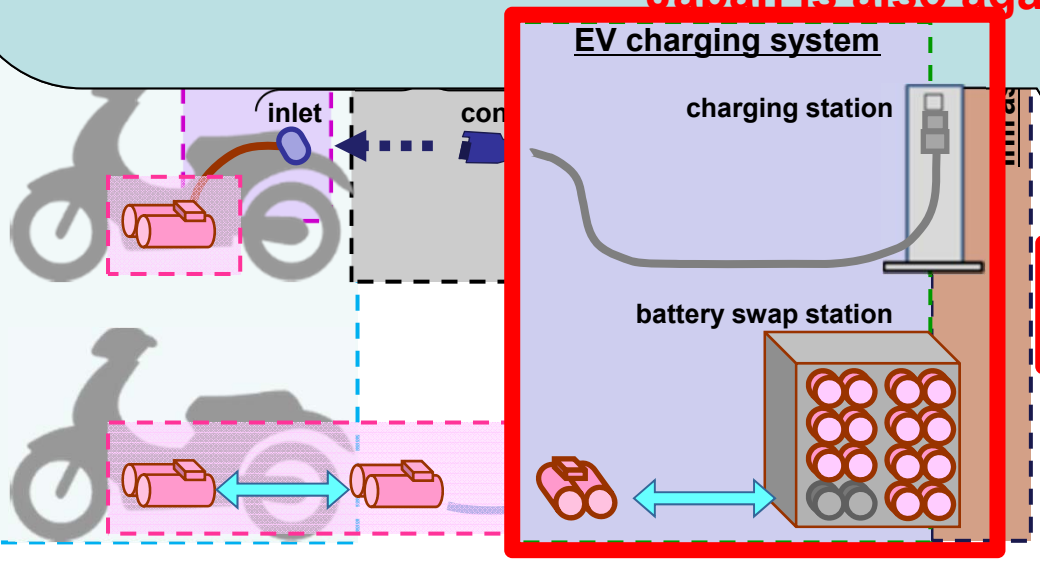
IEC 61851-3-3

Battery pack for battery swap station

Battery design is restricted !

etc.

No agreement has been reached as the contents of the standards are inadequate.
Japan is also against it.



(partially under development)

testing and safety

IEC 60335-2-29

Household charger safety

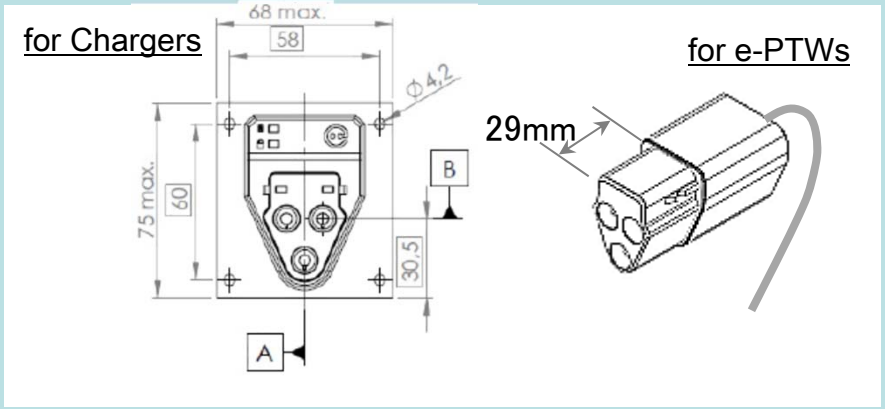
IEC/TS 61851-3 series (under development)
Charging system for light electric vehicles

IEC/TS 62196-4 (under development)
Charging coupler for light electric vehicles

Existing and developing standards for e-PTWs

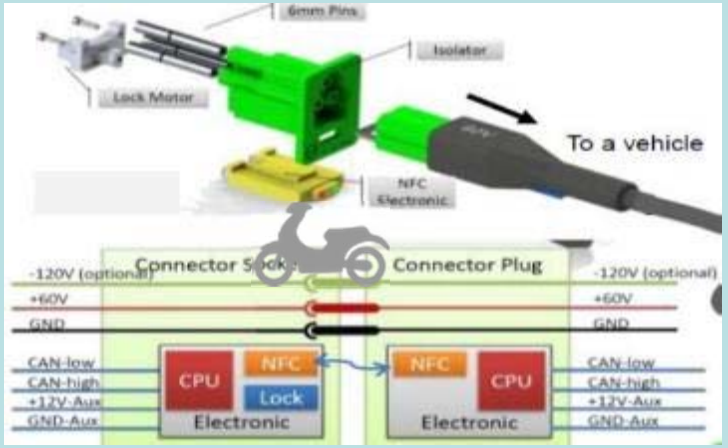
Japan Automobile Standards Internationalization Center

Coupler



Coupler is swelled !
Coupler design is fixed !

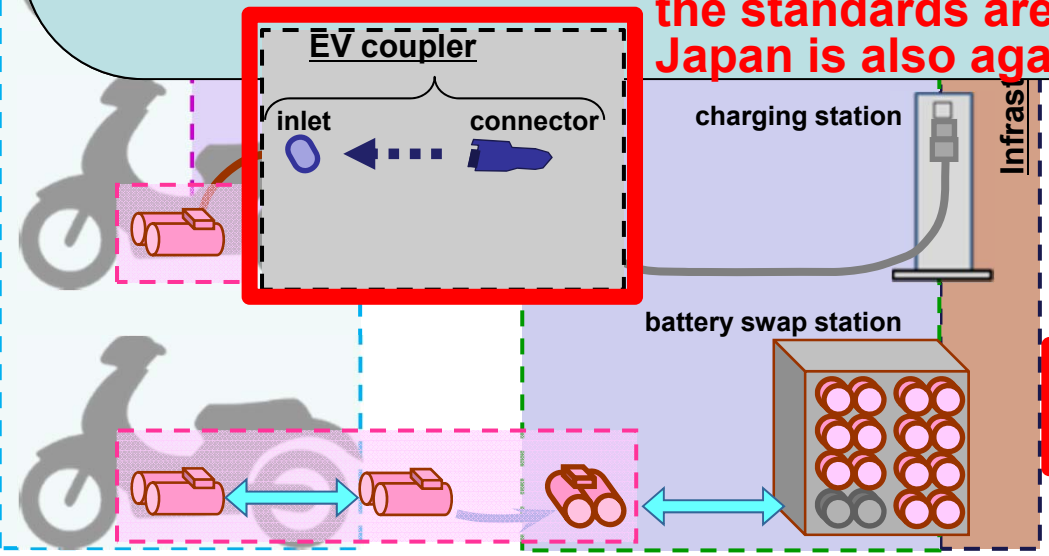
Communication



etc.

NFC -> Communication Reliability OK !?

No agreement has been reached as the contents of the standards are inadequate.
Japan is also against it.



IE tially under development)
and safety
IE 29
d charger safety
IE 61851-3 series (under development)
harging system for light electric vehicles

IEC/TS 62196-4 (under development)
Charging coupler for light electric vehicles

Terima Kasih banyah

DAFTAR HADIR
WORKSHOP STANDARDISASI SEPEDA MOTOR LISTRIK

Hari tanggal :

Pukul :

Tempat : Ruang Rapat Garuda, Badan Litbang Perhubungan

NO	NAMA	UNIT KERJA	NOMOR TELP/HP	TANDA TANGAN
1	Mustamin. Mardjaing	PT INTI	081221153333	
2	Abdul Hapid	LIPI	08122381120	
3	TOGU SITOMBING	DIT. INTAR - Kemenpen	08131057[illegible]	
4	Mulyo Sanyoto	PT INTI	087821038081	
5	Parwito	PT. INTI	081122446[illegible]35	
6	Heru Sutanto	AISI	08128580183	
7	Wahid Lalang	PT Len	081222491822	
8	Andre Meisa Hasitholan	PT LEN	0819330093[illegible]4	
9	[illegible]	PT AHM	081380107818	

10	Hanggoro			
11	Ag Bid. M	AHM	081806688898	
12		Rady BSN	0852 1991 9992	
13	Ferdaus Ario Nurman HARI SASONO	PT. Aen Industri	085647266391	
14		AISI	0811 100 0196	
15	Zulhamid Fandi Y	BSN	085691439633	
16	Bayu Arya Cipto	BSN - PPS	085220737339	
17	Rafry FA	PT AHM	0819 5777 406	
18	hermawan w	Dit Lalu Lintas	08156684387	
19	Yunita	PT. Nipress	0818 730 844	
20	Jose Andi	Dit Sarana Hubdat		
21	Sutaryono			
22		AISI - Yamaha	0270 7867 521	
23				
24				

第 44 回アジア専門家会議（R136）報告

2016/6/23 修正
（案）2016/5/25

日時：2016 年 5 月 24 日（火）9:00~12:00
場所：インドネシア・ジャカルタ　Research and Development Center of Land & Railway Transport Ministry of Transportation 3F 会議室
出席者：Mr. Sigit Irfansyah, Director for Road Transport and Railway R&D Center, MOT
Mr. Mr. Yok Suprobo, Road Transport and Railway R&D Center, MOT
ほか MOT、MOI、AISI　総勢 20 名程度、別紙参照
（日本）長（ホンダ・JASIC)、是則（JASIC ジャカルタ)、戸羽(JASIC)

概要

・冒頭、Director for Road Transport and Railway R&D Center の Mr. Sigit Irfansyah から歓迎の挨拶。
・JASIC ジャカルタ事務所長の是則より、このような機会を設けてくれたことに感謝。R136 は国連で 1958 協定のもとに合意された電動二輪車の国際基準。日本はこの協定に加盟しており R136 についても採用準備を進めているところ。今日は R136 の理解を深める場としたい。
・長氏（ホンダ/JASIC）より R136 の制定背景と技術的な内容詳細についてのプレゼンを行い、質疑応答を行った。

講義内容、質疑詳細

<R136 の制定背景>
・国際基準と規格の調和の重要性にふれたあと今年 1 月に発効した R136 の設立背景について説明。
・電動パワートレーンの二輪車の特性としては高エネルギーのバッテリーを積んでいること、バッテリーの充電を商用電源から供給しているということがある。このような特性から、ユーザーの安全担保のために電気ショック防止と引火、爆発防止等の対策が必要。特にエネルギー量が大きいリチウムイオン電池は電動二輪車に適しているが、可燃性の高い電解液を用いているため、その安全対策を国際基準、規格で定めることが重要。
・R136 のスコープは最高速 6kmh 以上で電力で作動する L カテゴリ車両。要件は 2 つのパートに分かれておりパート 1 は車両としての高電圧安全と機能安全、パート 2 はバッテリー単体の安全要件。おもな要件は P10 に示す通り。
・EV の四輪車と二輪車の主な相違点は、車室の有無、事故時にドライバーが離脱すること、バッテリーと充電器のサイズ、車両体勢のコントロールと停止方法など。R136 は既存の R100 をベースに二輪車特有の状況を考慮して作られた。その結果、P12 で示すようにいくつかの要件は規制強化、追加、変更されている。
・R136 は今年 1 月に発効し、日本も採用を念頭に国内法規の改正を行った。EV の普及とユーザーの安全担保を進めるためにも、L カテゴリの電気安全、バッテリー安全規制は R136 と整合したものとすることが望ましいと考えている。

質疑 1

MOT Sigit 概要はこれで分かったと思うが。P9 で UN/WP29 のスケジュールが出ているが、…（以下インドネシア語。その後、WP29、GR のことをよく知らない出席者に向けて Hari さんがインドネシア語で補足説明）
Q1　今日のこの説明は、R136 について情報共有することが目的か、インドネシア国内で法規制定の際にこれを参考にすることを推奨しているのか。

（※後者であることを想定のうえで、出席者がこの会議の趣旨をあまり理解していないことを懸念して意図的に質問した模様）

A1　相互承認のメリットはさきほど長さんの説明にもあったように行政、業界、ユーザーそれぞれにあるので基準調和を進めることを望んでいる。58 協定は基準の調和だけでなくそれを通じた相互承認も目的としている。電動二輪車の法規化についても同じ考え方で進められた。

Q2　インドネシアで法規化するにあたって国際基準を参考にしたほうがよいということですね

A2　ASEAN MRA では UNR の 19 項目についてまず UN 規則をベースに基準調和を行うこととなっているが、将来的には 19 項目以外のものについても基準調和を進めていくことがのぞましいし、R136 もそのひとつ。

MOT Sigit　R136 と R100 の違いについて特に興味がある。

<R136 の技術的な内容詳細説明（プレゼン P15~）>

・R100 との相違点についてフォーカスして説明。資料中、赤字で表示している箇所が R100 と異なる部分。

質疑２

MOT Sigit　インドネシア国内マーケットを保護するためにはまず standard が必要だと考えている。

Q1-1（Hari さんが通訳）　二輪 EV についてテクニカルな面（技術開発？）から手をつけるのか、法規整備から手を付けるのかどちらが先か悩んでいる。MOI 傘下の機関がインセンティブ政策として 75kW 以下の電動二輪車を国内で推奨し、75kW より大きいものは海外市場に出すという方針をとっている。*国内二輪業界としては、まずローカル基準だけでなく国際基準もリサーチ必要だと考えている。（75kW 以下は国内仕様なので輸出できない）*←この斜体部分は Hari さん本人の独り言が挟まっていると思います　国内産業の保護も考えなければいけない一方で、国際貿易も視野に入れなければいけない。

電動バイクというか電動自転車について。日本でもパワーアシスト自転車があると思うが、ペダルをこいでモーターはあくまでアシストするタイプの二輪車がある。インドネシアではモーターサイクルというとスロットルオープンで動き出すものという区分。インドネシアでは自転車に電気モーターを付けたものを輸出している業者があるが、*業界としては補助的にモーターを使うのではなくモーターを動力源として走るものを普及させたい。*←ここも Hari さん本人の発言が挟まっていると思われます　今の話に関連して、エンジン排気量や出力で区分した基準は日本、UN に限らず存在するのか。

A1-1(JASIC)　EV のカテゴリごとに法規が存在するかという質問と理解。R136 に関してはそういった区分はしていない。高電圧部品を用いるのは出力と関係ないのですべての EV 二輪が対象で安全対策が必要。

A1-2(Indonesia)　これは general requirement for EV motorcycle と理解。だから全部が対象と。

Q2　P18 のコネクタのクライテリアについて。d)で 60V 以下とあるのは設計要件にならないのか？（Hari さんが a~d どれかを満たしていればよいことを説明して解決したもよう）

Q3　パート２　バッテリーの試験対象はどういう単位で行うのか。

A3　バッテリーパックごとの試験。

Q4　パックが複数入っていればそれぞれ試験を行うということか？

A4　複数のバッテリーが独立している場合はそれぞれ試験が必要。

Q5　特に中国産では一つのパックにたくさん入っているものがある。

A5　１パックの中に複数はいっていたらパック全体で試験する。

Q6-1　安全要件が定められていることはわかった。道路交通という点では、EV の最高速、航続距離は

定められているのか。

Q6-2　電動二輪の問題は、重いこと（→航続距離に影響)、価格が高いことも壁。

A6　最高速については日本では警察が規定している。日本では二輪車のサイズにより 30km/h、50km/h、100km/h で区分している。航続距離の要件はなく、測定方法だけ定めている。航続距離はユーザーがニーズに応じて商品を選ぶ要素の一つであり規制はしていない。

MOT Sigit　日本からインドネシアに対して何か質問があればどうぞ。

Q1(JASIC)　インドネシアで電動二輪のインセンティブを考えていると聞いているがどういう内容か。

A1-1(Indonesia)　現状まったく規制がないが、インセンティブによりバッテリーの開発推進につながるなどの効果を期待している。

A1-2(Indonesia, Hari さん通訳)　ある団体が強い要望をだしているが、MOI としてどういうインセンティブを行えばいいか考えているところ。

Q2(Indonesia)　日本ではそういう政策はあるのか？

A2&Q3(JASIC)　過去にはあった。新型電動二輪車に対する補助金があった。(Q3)もうひとつ質問だが、日本では電動アシスト二輪は自転車とみなしていて免許もヘルメットも不要。もしインドネシアで電動二輪を motorcycle に含めるなら免許やヘルメットは必要になるのか？

A3-1(Indonesia)　それを業界としては危惧している。モールなどに行くとかなりの数の電動アシスト車を見かける。ペダルをこがなければいけないタイプの pedal-electric というものだが。現状 MOT では motor vehicle はペダルをこがなくてよい、スロットルオープンで動き出すものを指している。

A3-2(JASIC)　日本ではこがなくていいものは motorcycle に分類される。スロットルオープンだけで動くものは特に高齢者や子供に対し危険。免許、ヘルメットも必要。ブレーキ、ミラー、ランプなどの要件も定めた。

Q4(JASIC)　電動二輪車は中国産なども含めてインドネシアでは市場でどのくらい出回っているのか？

A4-1　非常に少ない。ほとんどないといってもいいくらい。2008 年のジュネーブモーターショーで関係者に会って話をしたが。市場台数が少ない理由の一つはペダルすらないスクーターのような見た目のものもあるので。将来どうなるかはわからないが。日本ではどうか？

A4-2(JASIC)　同じように、日本でも電動二輪車は極めて少ないです。

A4-3(Indonesia)　中国では電動二輪自転車の類が非常に多い。

A4-4(JASIC)　ベトナムには中国産の電動自転車が多いと聞いている。

A4-5(Indonesia)　インドネシアに中国産の車両が入ってくる前に法規制を急ぐ必要があると思っている。

A4-6(JASIC)　ベトナムでは中国からたくさん輸入していると聞いた。静かなことなど原因で事故が多く問題になっていると。バッテリーのリサイクルも問題になっていると聞いている。

Closing

MOT Sagit　今日は詳細な説明で R136 の内容の理解が深まったと思う。

AISI Hari　まずは情報を共有して国内法規化の検討を進めたい。

MOT Sagit　今後も MOT、MOI から JASIC に問い合わせをするかもしれないのでその際は協力をお願いしたい。

（当初、先方の希望で会議室での説明の後、実車を使ったデモンストレーションをする予定であったが、MOT 側で実車が用意できなかったとのことであり、デモンストレーションは中止になった。）

以上