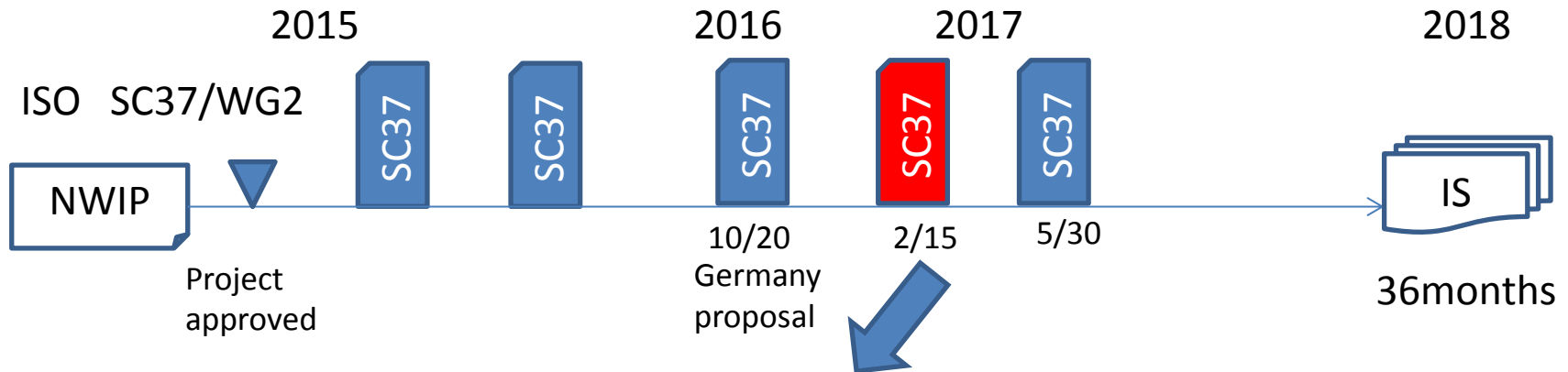


ISO activity

ISO activity

ISO /CD 20762 Determination of power for propulsion of hybrid electric vehicles



WG 2 agreed on that the test procedure 1 (Japan method) and 2 (Germany method) would be combined and that the draft reflecting the results will be balloted as a CD.

CD voting from 9.Mar. to 5.May 2017

May Meeting : WG will propose the DIS vote

DIS Voting from Jun to Nov. 2017

EVE will be able to refer the document which will be published by ISO in Nov. 2017.

NWIP : New Work Item Proposal , CD: Committee Draft ,
DIS: Draft International Standard , IS : International Standard

Test method

Test condition

>the vehicle at a fixed speed

>the RESS of the vehicle shall be charged to the SOC specified by the vehicle manufacturer.

Japan method: TP1

sufficient duration such as 10 s or less when the maximum power can be identified by applying a 2 s moving average filter.

HEV system power = engine net power

+ (RESS measured power - power to DCDC converter)

x conversion efficiency from electrical power to mechanical power

Germany method: TP2

10 s time duration and take the 2 s average torque and speed values at the time between 8 and 10 s.

To measure the power at the gear box output shaft and calculate back the system output by the gearbox efficiency

$$\text{HEV system power} = \frac{\text{HEV system power value at axle/wheel}}{\text{gearbox system efficiency factor}}$$

JAPAN proposal considering over-estimation

JAPAN made the following suggestions to overcome concerns of overestimation for adding all of the measured RESS power.

(1) Power to the d.c./d.c. converter for auxiliaries is around 0,3 – 1,0 kW.

It is subtracted from the RESS measured power since it does not contribute to the propulsion power. The amount of power to be subtracted is specified to 1,0kW or measured value. The 1,0kw can be commonly agreeable as shown by the actual measurements.

(2) The power to be supplied from the RESS to the driving motor is multiplied by the conversion efficiency (for example, 0,85 or the measured value) and converted into the mechanical power.

HEV system power =

$$\text{ICE power} + (\text{RESS measured power} - C_{\text{dcdc}}) \times K$$

C_{dcdc} : power to d.c./d.c. converter for 12V auxiliaries(1,0kW or measured value) [kW]

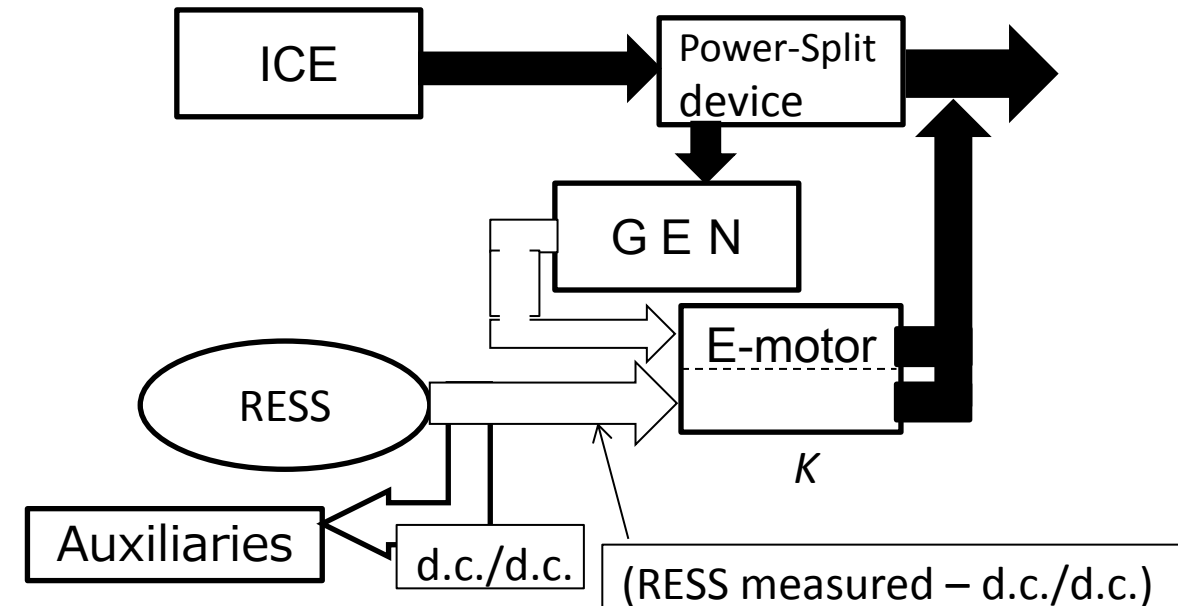
K : conversion factor from electrical power to mechanical power (0,85 or measured value)

Conversion factor is defined as output power of motor divided by input power of inverter.

TP1(Japan method)

Power-Split Type

mechanical
 electrical



Part of RESS converted to mechanical power by motor
 $(\text{RESS measured} - \text{d.c./d.c.}) \times K$

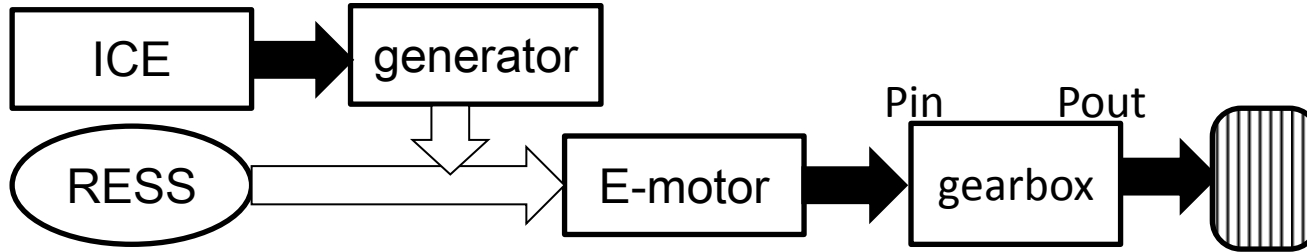
HEV maximum system power = ICE power + (U_{RESS} x I_{RESS} - C_{dcdc}) x K

REESS voltage, current U_{RESS} I_{RESS}
 dc.dc. consumption C_{dcdc}
 INV.MOT efficiency K

TP2 (Germany method)

1) Series hybrid electric vehicle (Series HEV)

$$\eta_{\text{Gearbox (Series Hybrid)}} = 0,98$$

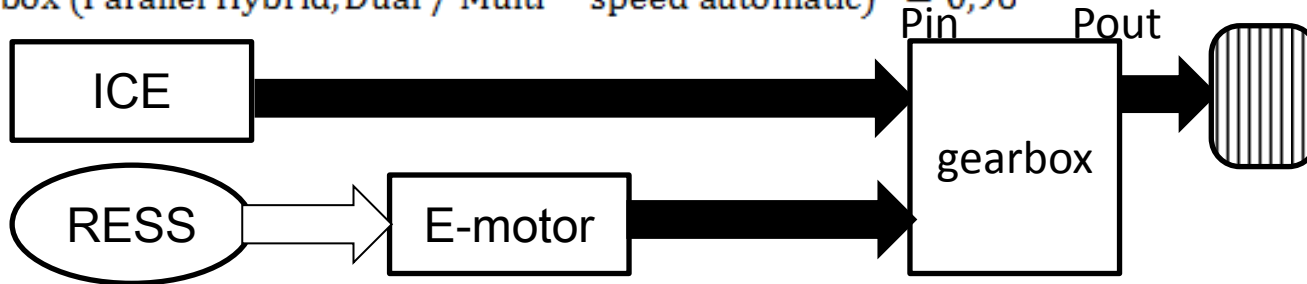


The gearbox system efficiency factor, η_{Gearbox} , indicates the efficiency value for the mechanical power transfer for propulsion from input (P_{in}) to output (P_{out}) of the gearbox system representing .

2) Parallel hybrid electric vehicle (Parallel HEV)

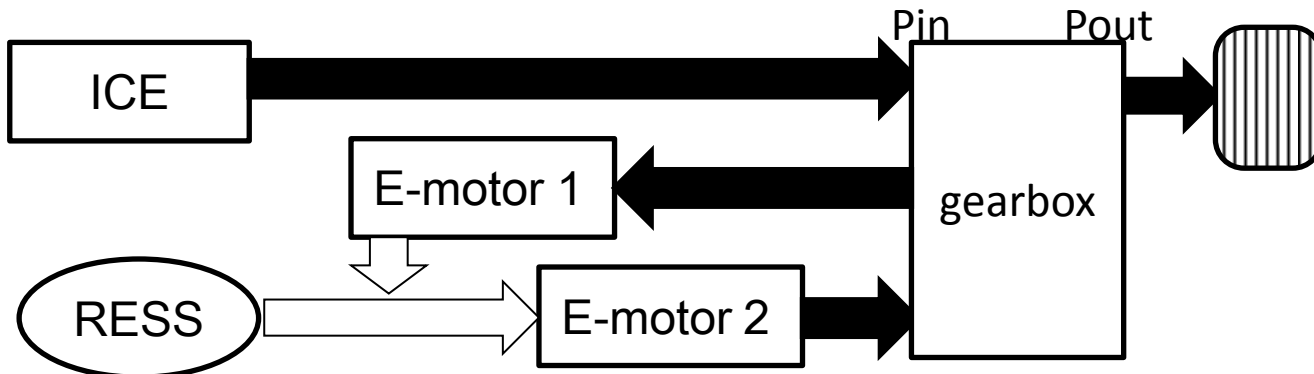
$$\eta_{\text{Gearbox (Parallel Hybrid, Dual - clutch automatic gearbox)}} = 0,97$$

$$\eta_{\text{Gearbox (Parallel Hybrid, Dual / Multi - speed automatic)}} = 0,96$$



3) Power split hybrid electric vehicle (Power split HEV)

$$\text{Gearbox (Power split Hybrid, planetary gear transmission system)} = 0,93$$



Current status

- The technical discussion in SC37 is ongoing.
- The Draft International Standard (DIS) will be consolidated by the DIS Voting from Jun to Nov. 2017.