

Regen-Braking

Foot off the accelerator, instead of foot on the brake

Normal Braking

Why regenerative braking?

The car uses the motor to slow the car down.

(1) less frictional pressure / less use of brake pads → So they work more

(2) Car takes the energy from motor and it goes right back to the batt.

→ (i) Doesn't increase the % battery normally

(ii) But, it slows down how much the battery gets eaten up.

[2] Low

(less regenerative braking)

* Same response as to putting brake @ stop sign. i.e. the gradual slow down / normal braking.

Stopping Mode

(1) Creep : Car to creep forward.] Almost

(2) Roll : Car to keep rolling.] same

(3) Stop : Complete stop.] Puts vehicle to 0

① When @ higher state of charge] Regen might not work

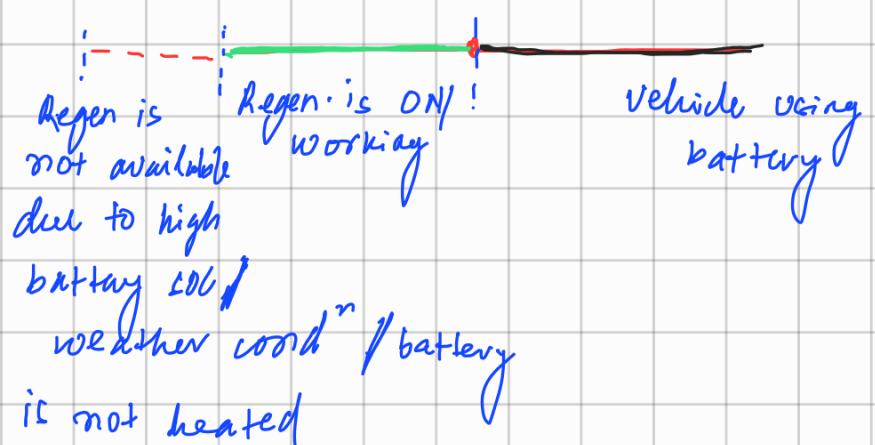
② Battery is cold

Converts KE into electricity during de-acceleration. Regen. Braking

Accel. pedal released → Car slows down → Both wheels → Still moving
Electric motor shifts into regen. mode

And captures this KE which would have lost as heat in a traditional braking

ON THE HUD OF TESLA 3



Battery Configuration in Tesla Model 3

Amount of charge put into the vehicle

Model [Rear Wheel Drive Configuration → 57.5 kWh] Lithium Ion
Performance & Long Range 3s → 75 kWh Lithium Ion

* Battery Voltage : 350 - 355 V DC
(High Voltage)

* Shap. 2796: 4 long - 96 groups - 31 each } Doubtful !!
Loy. 4416: 9 long - 96 groups - 46 each }

* DC Charging : (RWD) 170 kW; } (AWD, Perf) 250 kW

$$P = \frac{V}{U} \times I$$

→ Output speed of charger

PMSM (Permanent Magnet Sync. Motor)

(within rating)

(*) Run at const. speed irrespective of load applied onto them

(*) Rotor ^(inside) → Produces cont. mag field
Stator ^(outside) → produces revolving mag. field (RMF)
field coil of stator is supplied by 3φ AC supply
excited by revolving a revolving field @ sync. speed.

① DC supply - So acts as a permanent magnet.

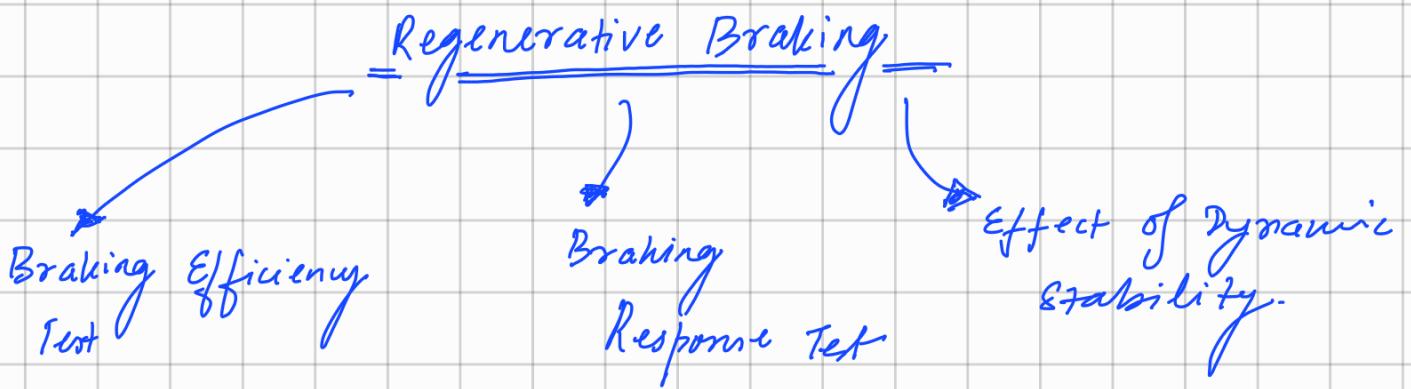
PMSM is not a self-starting motor. Squirrel cage arrangement is used to make the motor start. The squirrel cage revolves due to stator's RMF & once max. speed is reached the rotor is excited.

AC Induction Motor

(Asynchronous)

Stator → Stationary part → 3 coil winding with 3φ AC
Rotor → Rotating part
① motor winding only on stator
(*) Stator & Rotor are stamped with lamination steel.

This induces opposing magnetic field in the rotor.



Dynamic Stability Test

Objective : Evaluate vehicle's dynamic stability & handling characteristics during various dynamic driving maneuvers.