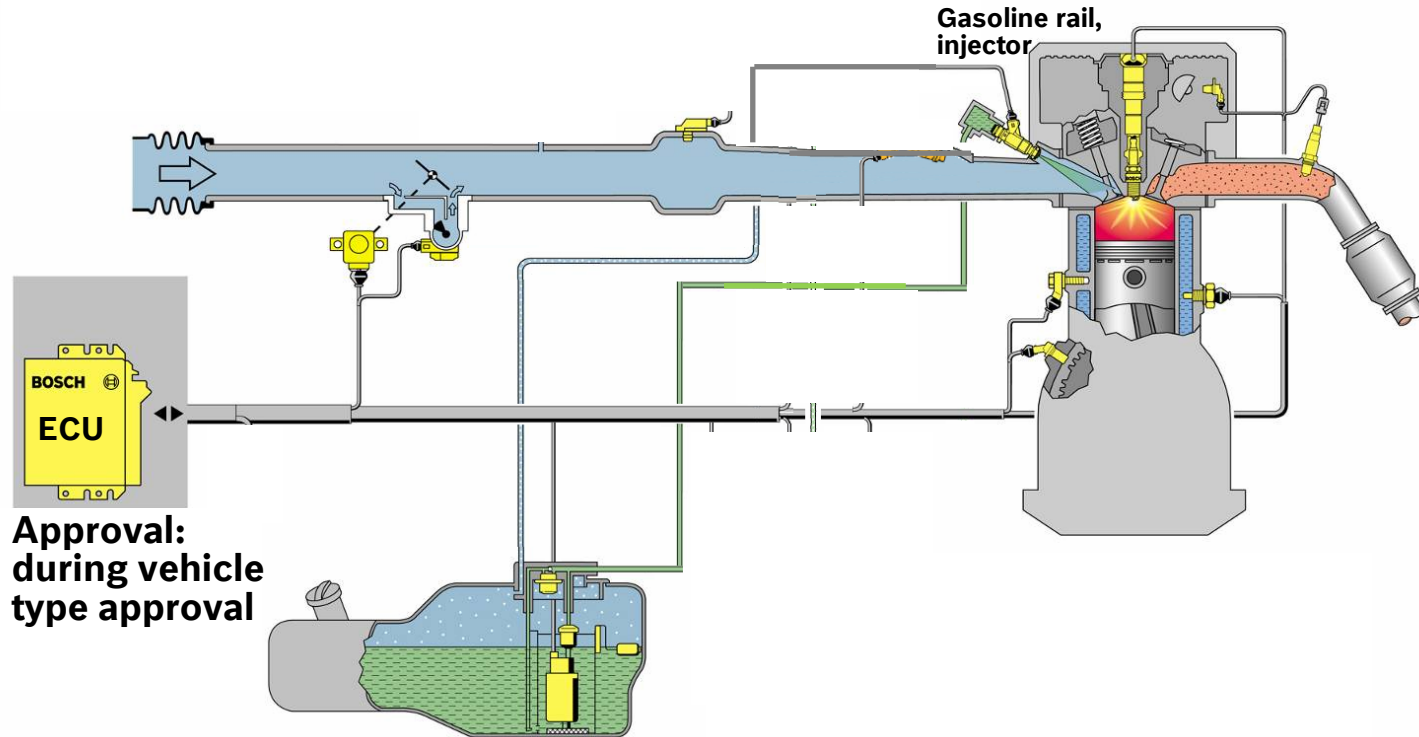


Overview

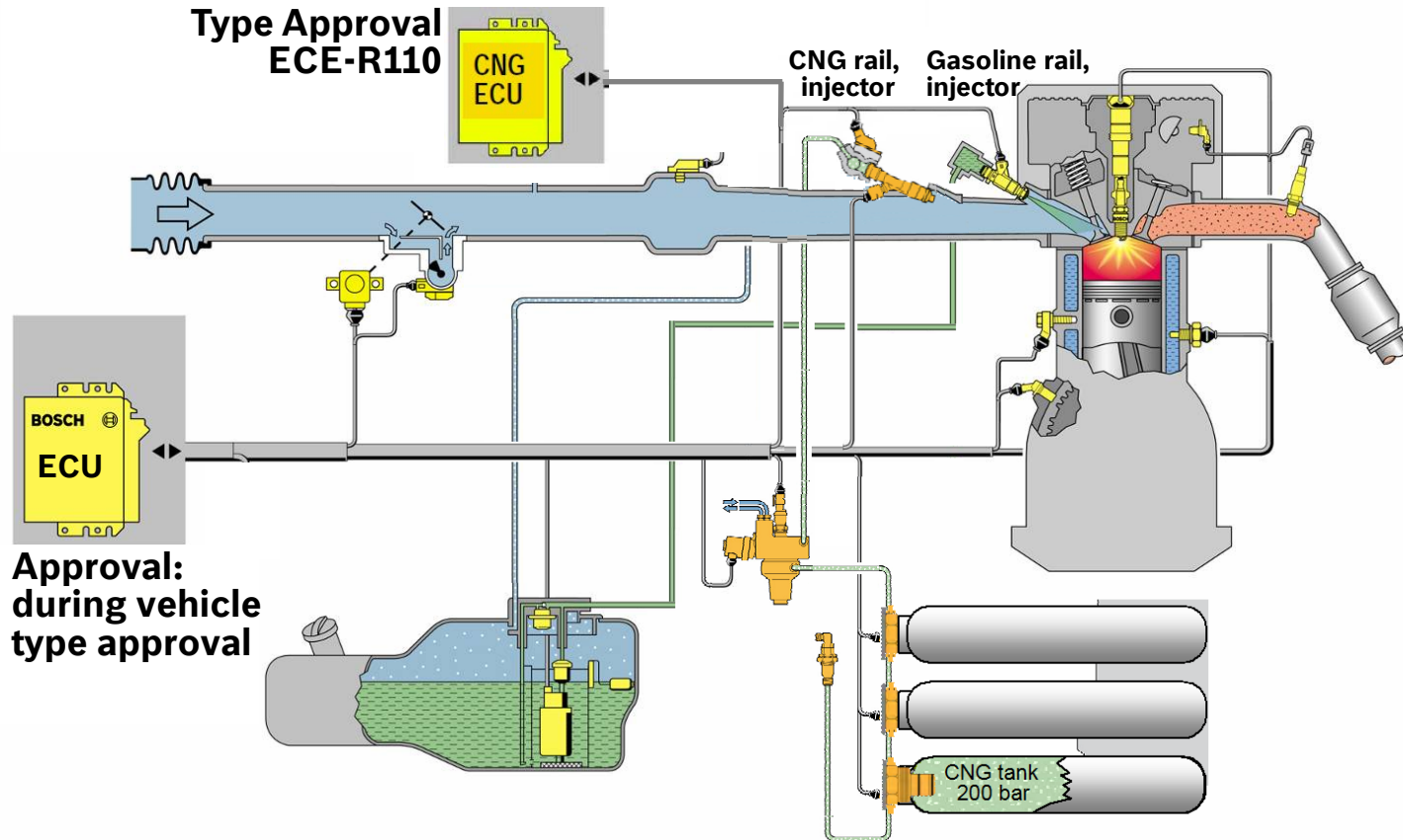
- Type approval engine control unit (ECU)
- CNG tank valve operation in start-stop systems
- Mixed operation gasoline / CNG



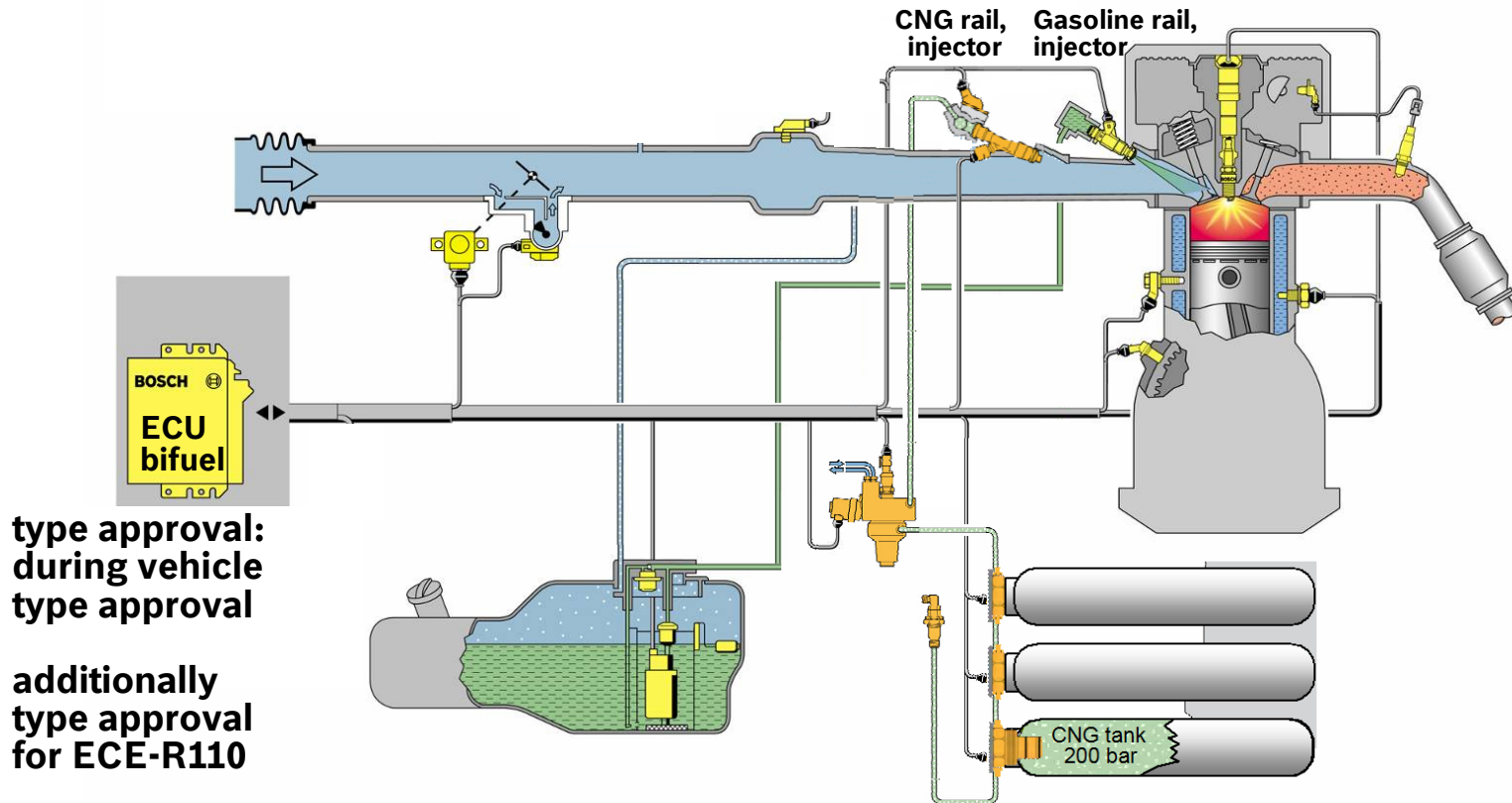
Type Approval Engine Control Unit (ECU)



Type Approval Engine Control Unit (ECU)

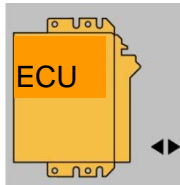


Type Approval Engine Control Unit (ECU)



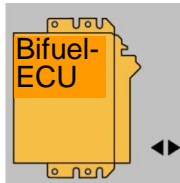
Type Approval of ECU Variants

OEM gasoline / diesel / hybrid (standard case)



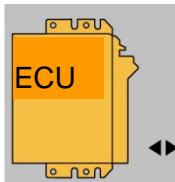
Type approval during vehicle type approval
(includes ECE-R10)

OEM bifuel



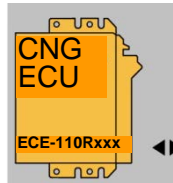
Type approval during vehicle type approval
(includes ECE-R10 and ECE-R110)

OEM gasoline + retrofit CNG



Type approval during vehicle type approval
(includes ECE-R10)

+



Type approval ECE-R110
(includes ECE-R10)

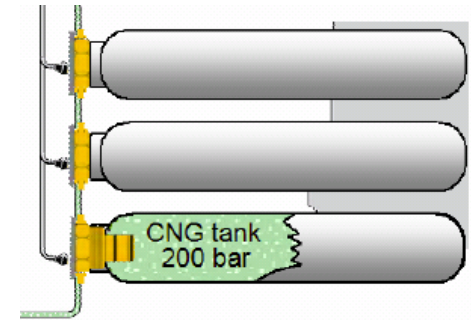
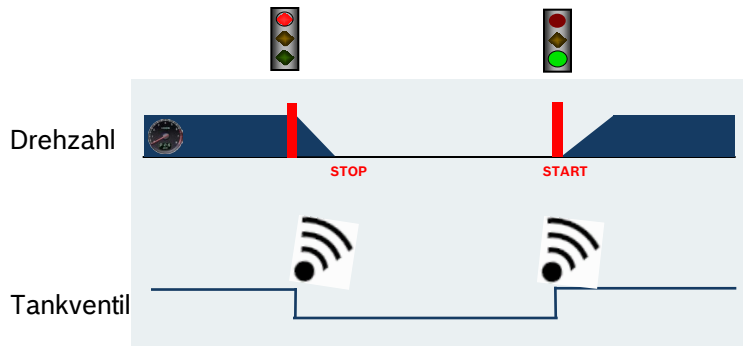
Overview

- Type approval engine control unit (ECU)
- CNG tank valve operation in start-stop systems
- Mixed operation gasoline / CNG

CNG tank valve for start-stop systems

ECE R110 requirement

Closing of tank valve(s) (TV) by stop of the engine



- Start-Stop becomes standard for CO₂ reduction, also for CNG vehicles
- TV will stay open for vehicles without start-stop system during idle
- For start-stop-systems the number of opening/closing cycles is increased by more than a factor of 10

Overview

- Type approval engine control unit (ECU)
- CNG tank valve operation in start-stop systems
- Mixed operation gasoline / CNG

Mixed operation gasoline / CNG

ECE-R 110

→ 17.10.2. Vehicles with more than one fuel system shall have a fuel selection system to ensure that **no more than one fuel at the same time is supplied to the engine for more than 5 seconds.**

→ No safety risk by mixed fuel op.

→ Fuel systems should not be connected → risk of flow of fuel in the other tank

→ Requirement for emission is done of ECE-R83

