CRV & AVV – AUTOMATIC TRAIN OPERATION (ATO)
DPV – SYSTEM FOR TRACTION VEHICLE DIAGNOSTICS

- **Automatic system for railway vehicle operation**
- **Increase of operational safety**
- **Modular structure for different automation degrees**
- **Algorithms verified by 35 years of operation**
- **System for railway vehicle diagnostics**
- **Readiness for international operation**
- **Input of train weight, number and type of tractive vehicles etc. not required**
- **Cooperation with ERTMS/ETCS**
- **Multilingual model**

General Description
CRV&AVV have been designed for automation of railway vehicle operation.

The basic part of the system is the Central Vehicle Regulator CRV.
It provides regulation of a traction aggregate, speed regulation, brake control, cooperation of the dynamic brake with the automatic brake and multiple controls of the train vehicles.

AVV has been designed for automatic target braking and the energy optimisation of train operation.

DPV has been designed for diagnostics of respective railway vehicle or train set.

Information balise at the track

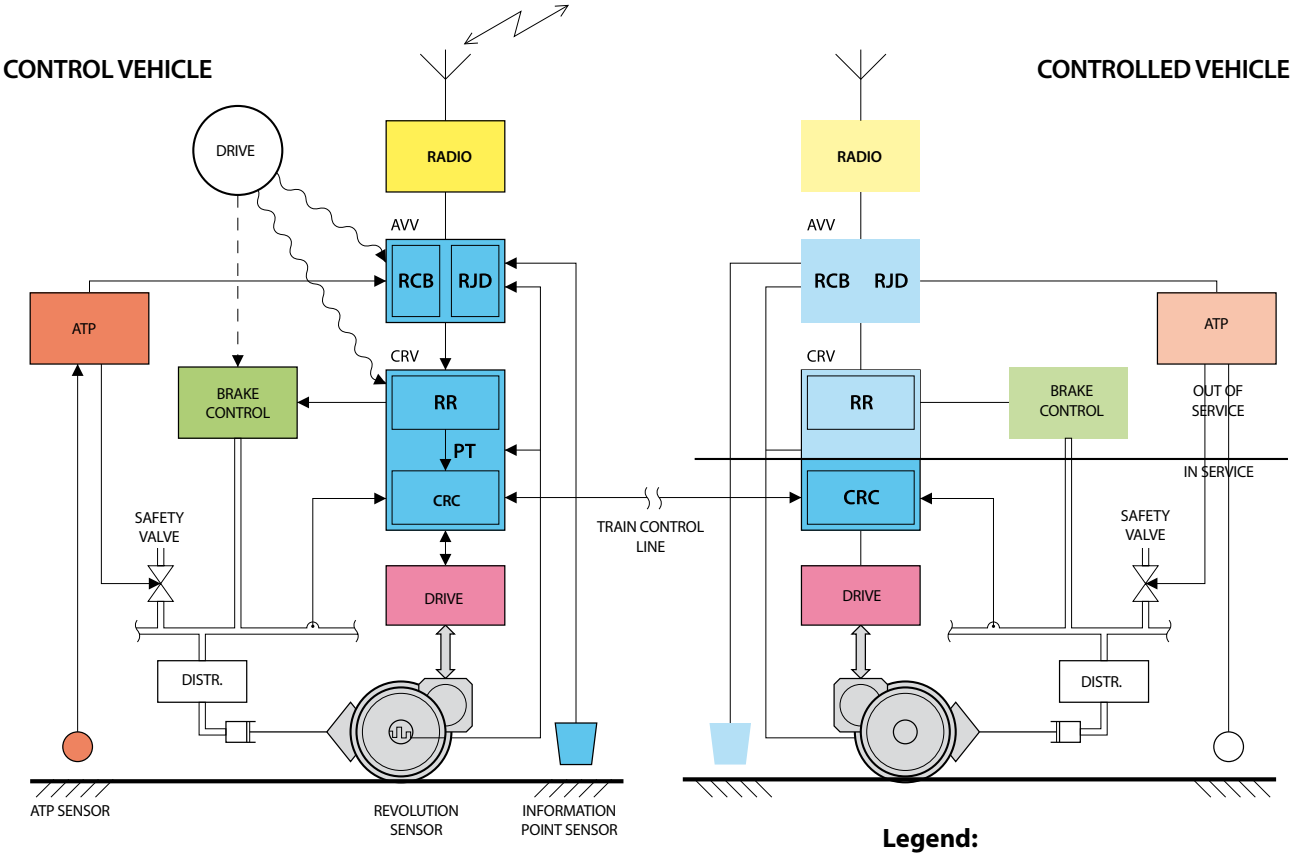
This entire system forms Automatic Train Operation ATO.

Basic Technical Description
CRV – Speed regulator:
- aperiodic achieving of required speed in the earliest possible time
- very precise keeping of required speed (± 1 kmph)
- priority use of dynamic brake, automatic air brake control
- delayed selection of higher speed by set length of train (train departure from the speed limited section)
- keyboard for speed selection
- data transmission from line not required

AVV – Target braking regulator and Running time regulator:
- respecting of line, scheduled and signalised speed
- automatic braking reduced to speed points and to stopping points
- automatic stopping of high precision at platforms of relevant stations and halts
- high level of time keeping along with optimum energy saving during coasting to target
- traction energy saving
- radio transmission of dispatcher´s data commands for train
- requires data transmission from line

DPV – Railway vehicle diagnostics:
- collection, evaluation and display of data from CRV, AVV and from other systems: drive, auxiliary drives, door computers, heating, WC, fire switchboard and others
- transmission of signals to/from additional train carriages
- carriage facility control (interior lighting, information system, doors etc.)
- detection and display of a train set, calculation of length, weight and train braking percentage
- BLACK BOX function for storage of failure messages and selected operating data
- interface for service PC
- multilingual design

Basic Technical Parameters	
Speed keeping accuracy	± 1 km/h
Stopping path accuracy	typically ± 2 m
Arrival time accuracy	typically ± 10 s
Traction energy saving	typically 10 to 20 %
Number of controlled vehicles in train	unlimited



Legend:

RCB – target braking block
RJD – running time control block
AVV – automatic train operationi
RR – speed regulator block
CRC – central control element
CRV – centralize regulator
PT – relative traction

Automatic train operation (ATO)