

DAC Basic Package: Foundation for the Deployment of Digital Automatic Coupling in Europe

DAC Basic Package

As part of the European DAC Delivery Programme (EDDP), the Programme Board and Supervisory Board agreed on the **DAC Basic Package**¹ at the end of 2023. On 21 November 2023, the EDDP Programme Board confirmed the DAC Basic Package as the minimum technology and functional package for demonstrator trains, pioneer trains and full deployment.

The DAC Basic Package defines the core functionalities and technical components required to enable interoperable automatic coupling, train-wide energy supply, data communication and digital train functions. It provides a common understanding of what is developed and thus the baseline for future extensions of the DAC systems. It defines the minimum scope of standardized and interoperable DAC functionalities for full deployment. It also defined the scope for the Pioneer DAC Trains (PDTs).

The DAC Basic Package consists of the following functions & hardware:

- DAC coupler (mech. & pneumatic & electr.) including energy and data system
- Energy and data lines for train-wide power supply and communication
- Hybrid couplers for locomotives enabling compatibility with the existing screw-coupling system;
- On-Board Units (OBUs) serving as central control units for data processing and data transmission within the train
- Train composition / wagon order detection
- Automated brake test
- Train integrity and train length determination
- Automated uncoupling

DAC Basic Package: Further Clarification

To provide a common understanding of the DAC Basic Package, FP5 and the European DAC Delivery Programme (EDDP) developed a more detailed definition of the functionalities included in the package. The DAC Basic Package consists of five core functions.

1. DAC Coupler Including Energy and Data System

The system comprises:

- Mechanical and pneumatic automatic coupling;
- Manual decoupling of all connections (mechanical, pneumatical and electrical) by emergency release;
- Automatic electrical coupling for power and data transmission;
- One phase 400 V AC electrical power at train level and 48 V DC at wagon level;
- Single Pair Ethernet-based in-train data communication;
- Prevent Coupling via Push-Buttons

The DAC is based on the Scharfenberg Type 10 coupler.

2. Train Composition and Wagon Order Detection

The system automatically detects train composition, wagon order and wagon orientation.

3. Automated Brake Test

The DAC Basic Package includes automated brake testing.

4. Train Integrity and Safe Train Length Determination

The system provides train integrity monitoring and safe train length determination. It enables the train to determine whether all vehicles remain coupled within the train consist and to establish the overall train length in accordance with the required safety requirements.

5. Automated Uncoupling

Automated uncoupling of all connections (mechanical, pneumatical, electrical) at the same time can be

¹ The DAC Basic Package proposal was endorsed by the EDDP Supervisory Board on 25 October 2023 based on the EDDP Programme Board proposal of 12 September 2023.

performed:

- Via the train communication network from the leading locomotive; and
- Locally by push-button operation at wagon level.

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