Submitted by the experts from CLEPA

Informal document **GRAV-04-27**

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Agenda item 8(c)

UN R13 and Electro Mechanical Brakes

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UN R13 and Electro Mechanical Brakes (EMB) Introduction

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UN Regulation 13 defines:

- **Transmission** means the combination of components comprised between the control and the brake and linking them functionally. ***The transmission*** ***may be mechanical, hydraulic, pneumatic, electric or mixed***.
- **Control Transmission** - means the combination of the components of the transmission which control the operation of the brakes, including the control function and the necessary reserve(s) of energy.
- **Energy Transmission** - means the combination of the components which supply to the brakes the necessary energy for their function, including the reserve(s) of energy necessary for the operation of the brakes.

→ ***The transmission*** ***may be mechanical, hydraulic, pneumatic, electric or mixed***.

UN R13 was updated in 1990s to account for an electronic "Control Transmission" but still assumes Pneumatic "Energy Transmission" in the service braking system.

- **Pneumatic Energy limitation is shown in two ways**:

  Design Specifications – E.g. Where limits are in kPa.

  Design Limitations – E.g. Where it is assumed air is the medium.

UN R13 and Electro Mechanical Brakes (EMB) Development steps comparison

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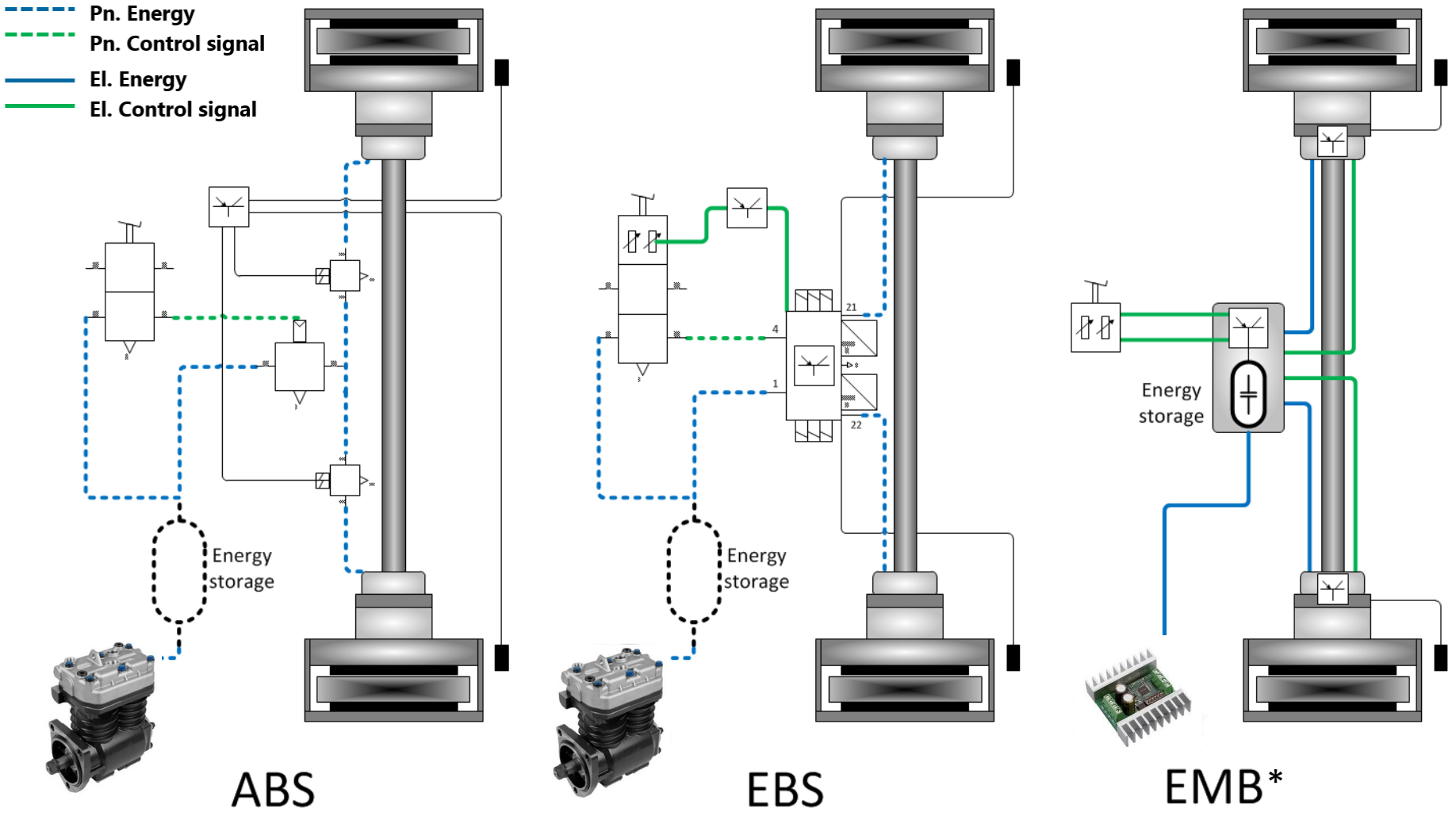

** Other architectures or different Energy storage strategy are possible (e.g. EHB - Electro-Hydraulic Brake, EMB double axle and double battery)*

UN R13 and Electro Mechanical Brakes (EMB) Schematics of brake Systems

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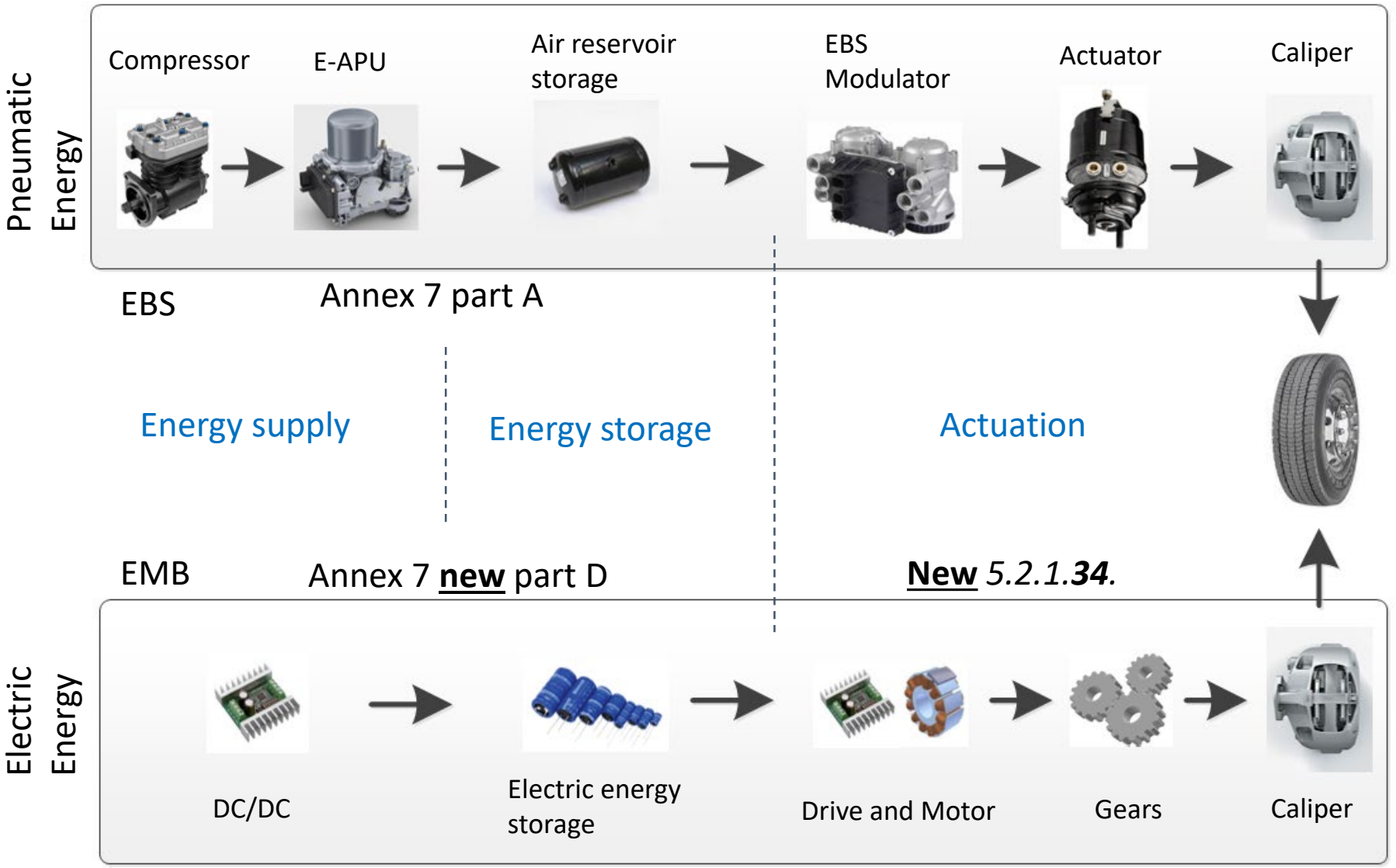

ECE-R13 and Electro Mechanical Brakes (EMB) Main parts to be amended

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2. Definitions

New paragraphs defining **Electric Energy Transmission** (e,g **Energy Source**, **Electrical Storage device**, **Electrical Supply device**)

5.1.4.6 Reference Braking forces

*New paragraph 5.1.4.6.**2**.*
Reference braking forces for electro-mechanical braking system using a roller brake tester shall be defined according to the following requirements.

5.2 Characteristics of Braking Systems.

*New paragraph 5.2.1.**34**.*
Special additional requirements for service braking systems with electric control and energy transmissions.

Annex 7, (provisions relating to energy supply and storage)

*New Part **D***
Electro-mechanical Braking system

UN R13 and Electro Mechanical Brakes (EMB) Summary and outlook

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Expected advantages by introducing Electric Energy Transmission to UN R13

- **Improved energy efficiency in EV´s (vs. air compressor).**
- **Improved braking control.**
- **Elimination of noise from pneumatics.**

A proposal for amending the text of UN R13 is in preparation by the Industry (brake system suppliers supported by vehicle manufacturers)

- **Initial focus on motor vehicles**
- **Inclusion of Electric Energy Transmission in service braking systems**

Comments from the delegates of GRVA are welcome before end of November

Industry will introduce an informal document for GRVA 05 in February 2020