Park lock device approval

The text reproduced below was prepared by the experts of CLEPA and OICA, addressing the type approval of a park lock device as an alternative to or in combination with the friction parking braking to hold the vehicle.

The modifications to the existing text of the Regulation are marked in **bold** for new or ~~strikethrough~~ for deleted characters.

This document supersedes all of the following documents taken into account the discussions of GRVA-20, GRVA-21 and GRVA-22.

- ECE/TRANS/WP.29/GRVA/2025/13 based on GRVA-20-06 Rev1
- ECE/TRANS/WP.29/GRVA/2025/14 based on GRVA-20-07 Rev1
- GRVA 21-10/Rev1
- ECE/TRANS/WP.29/GRVA/2025/34

I. Proposal

1. UN R13 - amending ECE/TRANS/WP.29/GRVA/2025/13 (for series 12, 13, 14 and 15)

*Insert new paragraph **5.1.4.5.4.**,* to read:

5.1.4.5.4. For vehicles equipped with park lock device:

In the case where such a device is fitted, the manufacturer shall specify on which axle or axles the park lock device ~~is installed~~ acts upon. This information shall be specified on the vehicle in a visible position in indelible form, or made freely available in another way (e.g. handbook, electronic data record).

Paragraph 5.2.1.10., amend to read:

"5.2.1.10. The service, secondary and parking braking systems shall act on braking surfaces connected to the wheels through components of adequate strength.

The parking braking system may use a park lock device as an alternative to or in combination with means acting on the braking surfaces for the purpose of fulfilling the static parking brake requirements as defined in Annex 4, paragraph 2.3.1 and 2.3.2. This park lock device shall consist of components of an adequate strength and shall provide equal effectiveness compared to layouts purely acting on the braking surfaces. After complete engagement of the parking braking system, containing a park lock device, it shall be ensured that the affected wheels do not move.

Where braking torque for a particular axle or axles is provided by both a friction braking system and an electrical regenerative braking system of category B, disconnection of the latter source is permitted, providing that the friction braking source remains permanently connected and able to provide the compensation referred to in paragraph 5.2.7.1.2.1. above.

However, in the case of short disconnection transients, incomplete compensation is accepted, but within 1s, this compensation shall have attained at least 75 per cent of its final value.

Nevertheless, in all cases, the permanently connected friction braking source shall ensure that both the service and secondary braking systems continue to operate with the prescribed degree of effectiveness.

Disconnection of the braking surfaces **or of the park lock device, as relevant,** of the parking braking system shall be permitted only on condition that the disconnection is controlled by the

driver from his driving seat or from a remote-control device, by a system incapable of being brought into action by a leak.

The remote-control device mentioned above shall be part of a system fulfilling the technical requirements of an ACSF of Category A as specified in the 02 series of amendments to UN Regulation No. 79 or later series of amendments."

Paragraph 5.2.1.26.2.3., amend to read:

5.2.1.26.2.3. A break in the wiring within the electric transmission, or an electric failure in the control of the parking braking system shall be signalled to the driver by the yellow warning signal specified in paragraph 5.2.1.29.1.2. When caused by a break in the wiring within the electric control transmission of the parking braking system, this yellow warning signal shall be signalled as soon as the break occurs. In addition, such an electric failure in the control or break in the wiring external to the electronic control unit(s) and excluding the energy supply shall be signalled to the driver by flashing the red warning signal specified in paragraph 5.2.1.29.1.1. as long as the ignition (start) switch is in the "on" (run) position including a period of not less than 10 seconds thereafter and the control is in the "on" (activated) position.

However, if the parking braking system detects correct ~~clamping~~ **engagement** of the parking brake, the flashing of the red warning signal may be suppressed and the non-flashing red signal shall be used to indicate "parking brake applied"

Where actuation of the parking brake is normally indicated by a separate red warning signal, satisfying all the requirements of 5.2.1.29.3., this signal shall be used to satisfy the above requirement for a red signal.

Insert new paragraph 5.2.1.26.5., to read:

"5.2.1.26.5. Special requirements for a Park Lock Device

When the parking braking system, containing a park lock device, has at standstill detected a request to apply the parking braking system, a red warning signal shall flash until the park lock device is completely engaged, unless the parking braking system is preventing further movement of the braked wheels.

Where actuation of the park lock device is normally indicated by a separate red warning signal, satisfying all the requirements of 5.2.1.29.3., this signal shall be used to satisfy the above requirement for a red signal."

2. UN R13-H supplement 1 to 02 series and supplement to the 01 series as well)

*Insert new paragraph **5.1.4.3.3.**,* to read:

5.1.4.3.3. For vehicles equipped with park lock device:

In the case where such a device is fitted, the manufacturer shall specify on which axle or axles the park lock device acts upon ~~is installed~~. This information shall be specified on the vehicle in a visible position in indelible form, or made freely available in another way (e.g. handbook, electronic data record).

Paragraph 5.2.10., amend to read:

"5.2.10. The service, secondary and parking braking systems shall act on braking surfaces connected to the wheels through components of adequate strength.

The parking braking system may use a park lock device as an alternative to or in combination with means acting on the braking surfaces for the purpose of fulfilling the static parking brake requirements as defined in Annex 3, paragraph 2.3.1. and 2.3.2.. This park lock device shall consist of components of an adequate strength and shall provide equal effectiveness compared to layouts purely acting on the braking surfaces. After complete engagement of the parking braking system, containing a park lock device, it shall be ensured, that the affected wheels of the vehicle do not move.

Where braking torque for a particular axle or axles is provided by both a friction braking system and an electrical regenerative braking system of category B, disconnection of the latter source is permitted, providing that the friction braking source remains permanently connected and able to provide the compensation referred to in paragraph 5.2.7.1. above.

However, in the case of short disconnection transients, incomplete compensation is accepted, but within 1s, this compensation shall have attained at least 75 per cent of its final value.

Nevertheless, in all cases, the permanently connected friction braking source shall ensure that both the service and secondary braking systems continue to operate with the prescribed degree of effectiveness.

Disconnection of the braking surfaces **or of the park lock device, as relevant,** of the parking braking system shall be permitted only on condition that the disconnection is controlled by the driver from his driving seat or from a remote-control device, by a system incapable of being brought into action by a leak.

The remote-control device mentioned above shall be part of a system fulfilling the technical requirements of an ACSF of Category A as specified in the 02 series of amendments to UN Regulation No. 79 or later series of amendments."

Paragraph 5.2.19.2.1., amend to read:

5.2.19.2.1. A break in the wiring within the electrical transmission, or an electrical failure in the control of the parking braking system shall be signaled to the driver by the yellow warning signal specified in paragraph 5.2.21.1.2. When caused by a break in the wiring within the electrical control transmission of the parking braking system, this yellow warning signal shall be signaled as soon as the break occurs.

In addition, such an electrical failure in the control or break in the wiring external to the electronic control unit(s) and excluding the energy supply shall be signaled to the driver by flashing the red warning signal specified in paragraph 5.2.21.1.1. as long as the ignition (start) switch is in the "On" (run) position including a period of not less than 10 seconds thereafter and the control is in the "On" (activated) position.

However, if the parking braking system detects correct ~~clamping~~ **engagement** of the parking brake, the flashing of the red warning signal may be suppressed and the non-flashing red signal shall be used to indicate "parking brake applied".

Where actuation of the parking brake is normally indicated by a separate red warning signal, satisfying all the requirements of paragraph 5.2.21.2. below, this signal shall be used to satisfy the above requirement for a red signal.

Insert new paragraph 5.2.19.5., to read:

5.2.19.5. Special requirements for a Park Lock Device

When the parking braking system, containing a park lock device, has at standstill detected a request to apply the parking braking system, a red warning signal shall flash until the

park lock device is in a locked position, unless the parking braking system is preventing further movement of the braked wheels.

Where actuation of the parking brake lock device is normally indicated by a separate red warning signal, satisfying all the requirements of 5.2.21.2., this signal shall be used to satisfy the above requirement for a red signal."

II. Justification

New paragraph 5.1.4.5.4. (R13) and 5.1.4.3.3. (R13H 02 series)

- This paragraph requires the vehicle manufacturer to provide the information to PTI that the vehicle is equipped with a PLD, and to specify which axle(s). This allows PTI centres to apply the proper test method to the type of parking system (friction brake or park lock device).
- The wording is based on existing paragraph in the R13 (5.1.4.5.1.)
- The paragraph number 5.1.4.3.3. of the 02 series should be replaced by paragraph number 5.1.4.2.3. in the 01 series.

1. The introduction of a Park Lock Device into UN R13 and UN R13-H enables to fulfil the static requirements of the parking system:
   - either by the friction brake (as today)
   - or by the Park Lock Device
   - or by a combination of both

2. The requirement now prohibits any rollaway distance once the park lock device is fully engaged. With this requirement the park lock device fulfils the same requirements of para. 2.3.1. and 2.3.2. of annex 4 (UN R13) and annex 3 (UN R13-H) as the conventional parking braking system.

3. If the park lock device is not locked, the driver is warned by a red warning light. In such a case the locked position will be achieved after the release of the service braking system (as today with the position "P" of an automatic gear box)

4. The dynamic requirements of the parking braking system are still applicable.

   5.2.1.2.4. of UN R13 and 5.2.2.4. of UN R13-H reads: *"... The parking braking system shall be so designed that it can be actuated when the vehicle is in motion. This requirement may be met by the actuation of the vehicle's service braking system, even partially, by means of an auxiliary control;")*

5. Example for a Park Lock Device

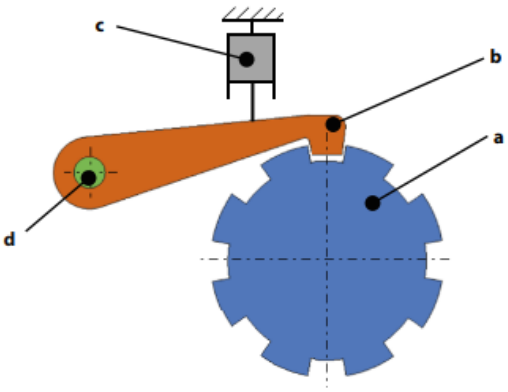

Fig. 2 Schematic illustration of a parking lock; *a)* parking lock wheel, *b)* pawl, *c)* actuator, *d)* pivot connecting the pawl to the gearbox housing

Source

Parking lock integration for electric axle drives by multi-objective design optimization D. Lechleitner1 ·M. Hofstetter1· M. Hirz1 · C. Gsenger2 · K. Huber2
1: Graz University of Technology, Rechbauerstraße 12, 8010 Graz, Austria
2: Magna Powertrain GmbH & Co KG, Frank-Stronach-Straße 3, 8200 Albersdorf-Prebuch, Austria

Note to the Secretariat: