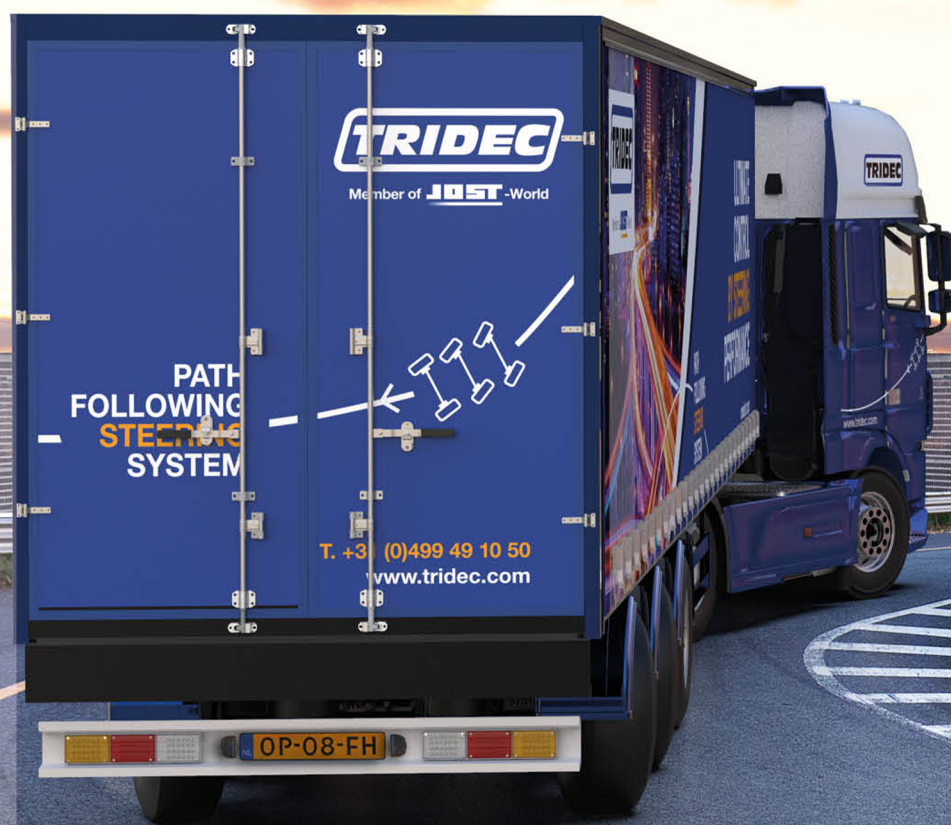


Steering systems and axle suspensions



2200 DL-S/0900 HF-E

Tritronic (2016)

User manual

Release (07/2019)



EG -DECLARATION OF COMPLIANCE

Directive 2006/42/EG, Annex II-B



Manufacturer: TRIDEC, Transport Industry Development Centre B.V.
Address : Ekkersrijt 6030,
5692 GA Son,
the Netherlands
hereby declares that the product:

Model : 2200 DLS/0900 HF-E

Product number : 2200

Commercial name : 2200 DLS/0900 HF-E
to which this declaration refers, is in compliance with the provisions
stipulated in the following guideline:

- 70/311/EEG/R79
- 94/20/EEG/R55
- R10

Quality control by:

**SGS-International Certification Services GmbH,
Rödingsmarkt 16,
D-20459 Hamburg
Germany**

Conducted at Son 13/08/2019, the Netherlands

TRIDEC



Frans Lipman
Director

A handwritten signature in blue ink, appearing to read 'Frans Lipman', is written over a light blue grid background.





HFE-DLS with progressive attachment




Tritronic (2016)

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Foreword

 This guide is intended for drivers and/or other DL-S/HFE suspension and steering system users with a "Compact" control system and contains the necessary TRIDEC information regarding the use of the DL-S/HFE suspension and steering system. This User manual must always be stored in the vehicle.

A separate maintenance, settings and repair manual for service technicians is available on the website: www.tridec.com.

Separate installation instructions for the system are supplied upon delivery of the DL-S/HFE suspension and steering system.

Effective use:

The DL-S/HFE suspension and steering system is not designed to be used independently. It has been designed to be mounted as an external steering system to a trailer/semi-trailer. Any modifications whatsoever could compromise the safety of the system. Both the TRIDEC product guarantee and the homologation shall be rendered invalid if these products are modified without written consent from TRIDEC. All guarantee claims against TRIDEC or suppliers of the DL-S/HFE suspension and steering system shall be declared invalid if the DL-S/HFE suspension and steering system is not installed according to the instructions supplied by TRIDEC.

Prior to putting the system into service, compliance with the applicable national road traffic regulations must be established for the trailer on which the system is installed. The system may only be used in accordance with the manual for the truck and any other trailer manuals.

The diagrams in this manual are only included as examples and are not intended for any other purposes. Images shown may vary slightly from the system supplied.



All safety information is outlined in chapter 9 (see "Safety & environment" on page 51). Safety risks are depicted using pictograms in all other chapters.

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1 Description

The following paragraphs contain information about the components that make up the DL-S/HFE suspension and steering system and how the system works.

1.1 Product variants

The DLS-HF-E series from the TRIDEC product range can be supplied as the following version(s), that is, the:

- DLS wheel suspension with an HF-E2 steering system

A steering system consists of:

- one fifth wheel unit
- one attachment
- one or more steering rods
- two or more track rods
- one or more steering knuckles
- one or more axle lines with independent wheel suspension

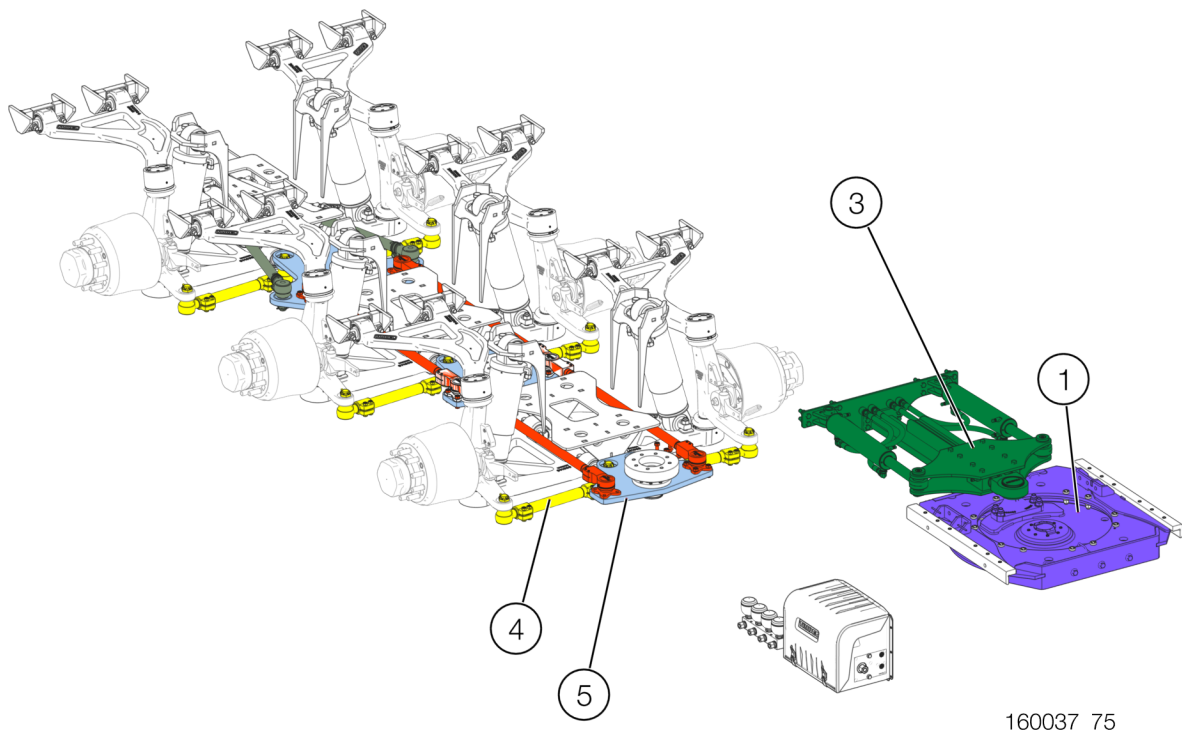


Figure 1-1

Aligned with the chassis width of the semi-trailer, several width variants of the fifth wheel unit (1) can be supplied. The length of the track rods (4) has been aligned to the required track width for the chassis. The fifth wheel unit has a linear/progressive attachment (3) and is fixed to the chassis by means of brackets. A linear steering system has a different steering behaviour than a progressive steering system. Roughly speaking, the semi-trailer with a progressive steering system

steers up to a towing angle (the angle between the tractor unit and semi-trailer) of 35° sharper than a semi-trailer with a linear steering system (see "Danger zones for other road users" on page 52). The angle tightening of the wheels is subject to a maximum. Every steering lever (5) is fixed to the chassis on a welded flange by means of a screwed connection. The steering levers are connected to the steering knuckles through the track rods. Every HF-E steering system has two hydraulic cylinders that are installed on the chassis of the semi-trailer. These are driven by the cylinders on the attachment (3). The steering motion is transferred by means of the steering rods (6) to the steering levers (5).

The independent wheel suspension (DLS) consists of the following in relation to each wheel:

- An upper supporting arm
- A lower supporting arm
- A steering knuckle
- A cylinder
- A stub axle (with brake drum)

The steering of the semi-trailer is realised through a hydraulic circuit. This hydraulic circuit includes a steering control unit and an accumulator. Depending on the application, the DL-S/HFE suspension and steering system can be supplied with:

- Manual pump
- Compact system
- Tritronic system

The hydraulic circuit can only be expanded with additional functions in relation to the compact and Tritronic systems. Examples are extra ramps and height adjustment. In relation to the three versions, there is an option to turn the wheels in the straight position in emergency situations by using the manual pump function.

1.2 Operation

Below, the operational principle of the different DLS HFE systems is described. These steering systems minimise the path followed by tractor unit semi-trailer combinations when taking bends. The stability when driving in a straight line again is realised by giving wheels a caster structurally.

1.2.1 DL-S/HFE suspension and steering system

A DL-S/HFE suspension and steering system is mainly used on semi-trailers and low-loading trailers.

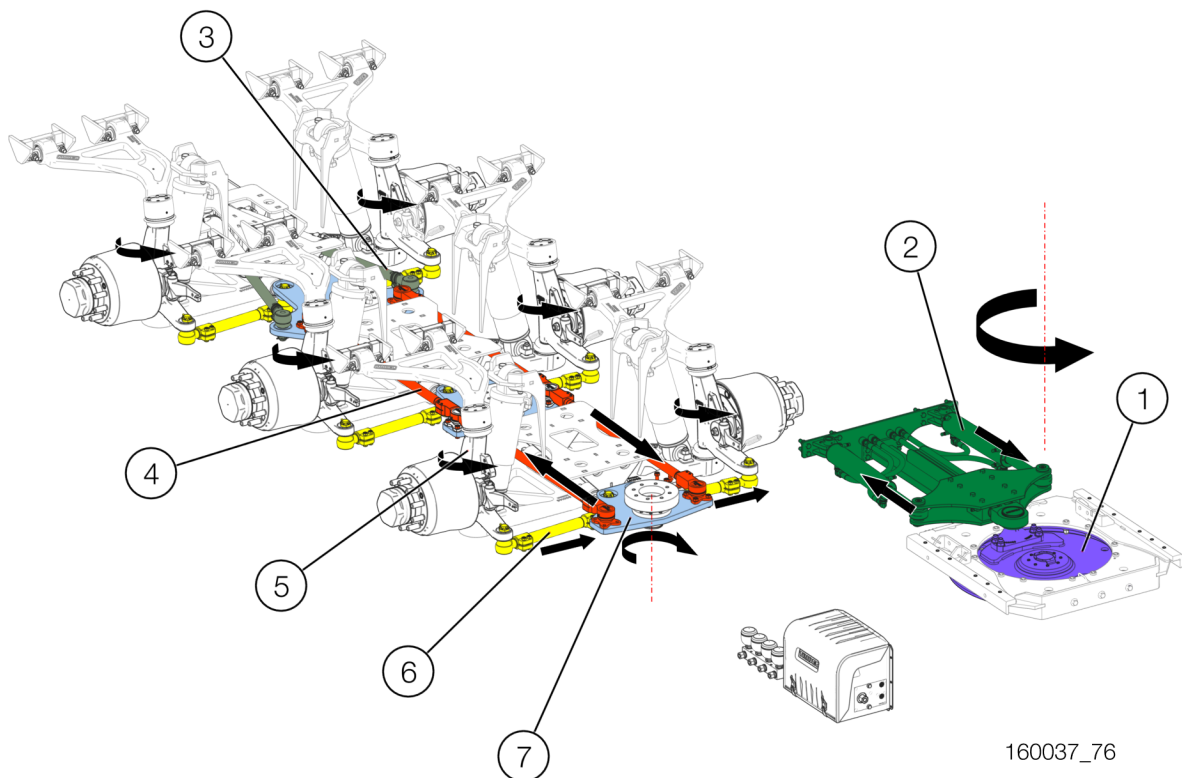


Figure 1-2

When the coupled tractor unit takes a bend to the left, the cylinders on the attachment (2) start to move because the slewing ring (1) on the fifth wheel unit starts to rotate anticlockwise. The cylinders on the attachment are connected to the cylinders (3) on the semi-trailer and move the steering rods (4) in the indicated direction. The steering levers (7) rotate clockwise and therefore the track rods (6) move in the indicated direction. The steering knuckles (5) rotate around their axis (in this example, anticlockwise). The direction in which the wheels steer will depend on the way in which the cylinders on the attachment are connected with the cylinders on the semi-trailer and how the electronic control has been configured.

1.2.2 Tritronic

A trailer with a hydraulic steering system or other hydraulic functions can be operated externally using the Tritronic system.

This makes it possible to adjust the steering angle of the wheels on the steered axes while manoeuvring a truck with a trailer. That makes manoeuvring much easier. Once manoeuvring is complete, the wheels can be automatically returned to the driving position.

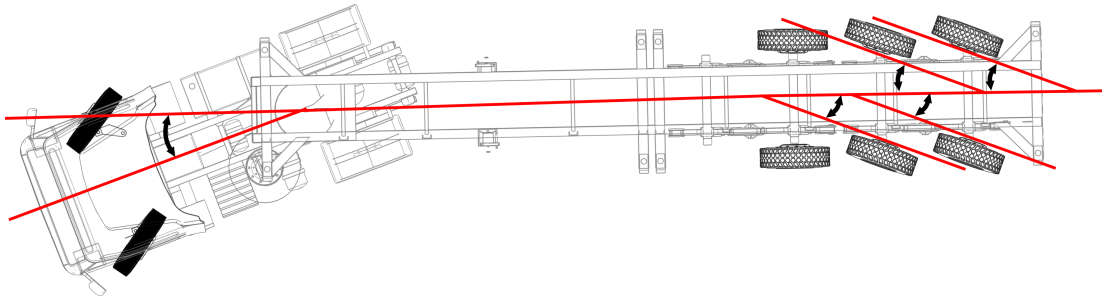


Figure 1-3

The angles of the trailer wheels are constructively fixed and depend on the angle of the truck relative to the centre line of the trailer.

In order to make external steering possible, the Tritronic system programme must run the so-called "Configuration procedure". The Tritronic system detects the angle made between the truck and the centre line of the trailer and the associated wheel angles of the trailer during this procedure. These values are stored in the steering programme.

If necessary, it is possible to configure practical vertical positions for the trailer.

This could include minimum and maximum ride-heights. Once configured, the chassis can be steered to the set positions by pressing a shortcut on the remote control.

A number of other hydraulic and electrical functions can be configured and directed in this manner.

1.2.2.1 Components

 The Tritronic system consists of the following main components:

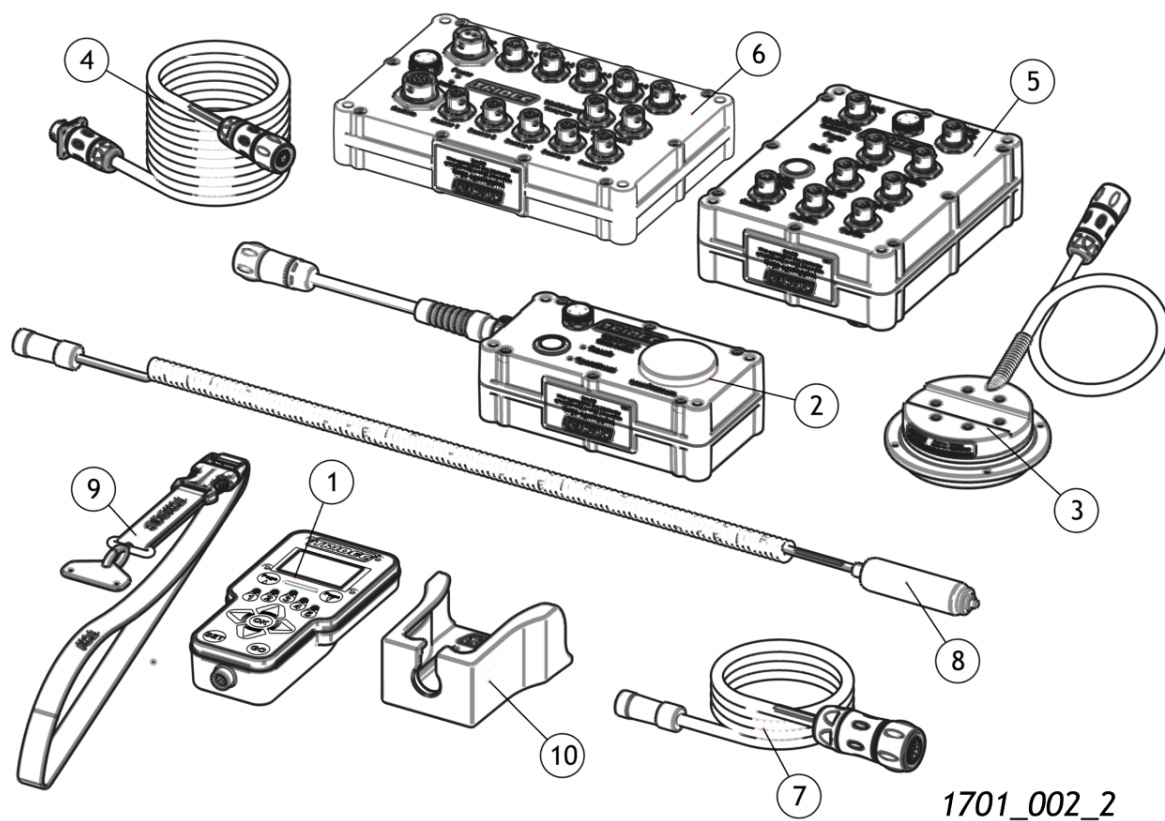
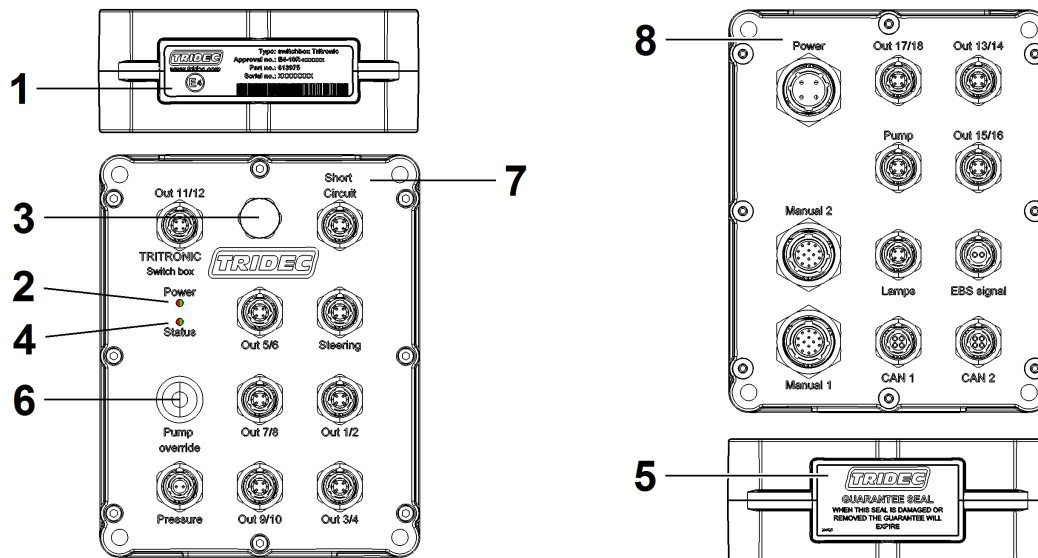


Figure 1-4

1. Remote control
2. Selector switch
3. Angle sensor
4. Cables
5. Switch box
6. Computer
7. Synchronisation cable
8. Charging cable
9. Keycord
10. Bracket

1.2.2.2 Switch box





The diagram below shows items that are relevant to the user.

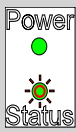
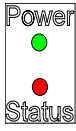
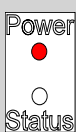


1701_081

Figure 1-5

1. Model sticker: The part and serial number are found on the sticker.
2. Status LED: "Power" (see table below)
3. Climate membrane: Prevents internal formation of condensation by allowing for the exchange of air.
4. Status LED: "Status" (see table below)
5. Guarantee seal: This seal may not be removed or reused.
6. Button: Pump override. The hydraulic pump can be turned on using this button.
7. Front of switch box.
8. Back of switch box.

		The guarantee is rendered invalid if the seal is broken or removed.
		Please note!: The climate membrane does NOT contain a fuse.

System mode		Colour "Power" LED	Pattern	Colour Status LED	Pattern	Description
Normal		Green	Continuous	Green/Red	Green/Red (1x/sec)	Connection with computer active
Mal-function		Green	Continuous	Red	Red Continuous	Programme error
Reversed		Red	Continuous			Power cables connected incorrectly

Cleaning

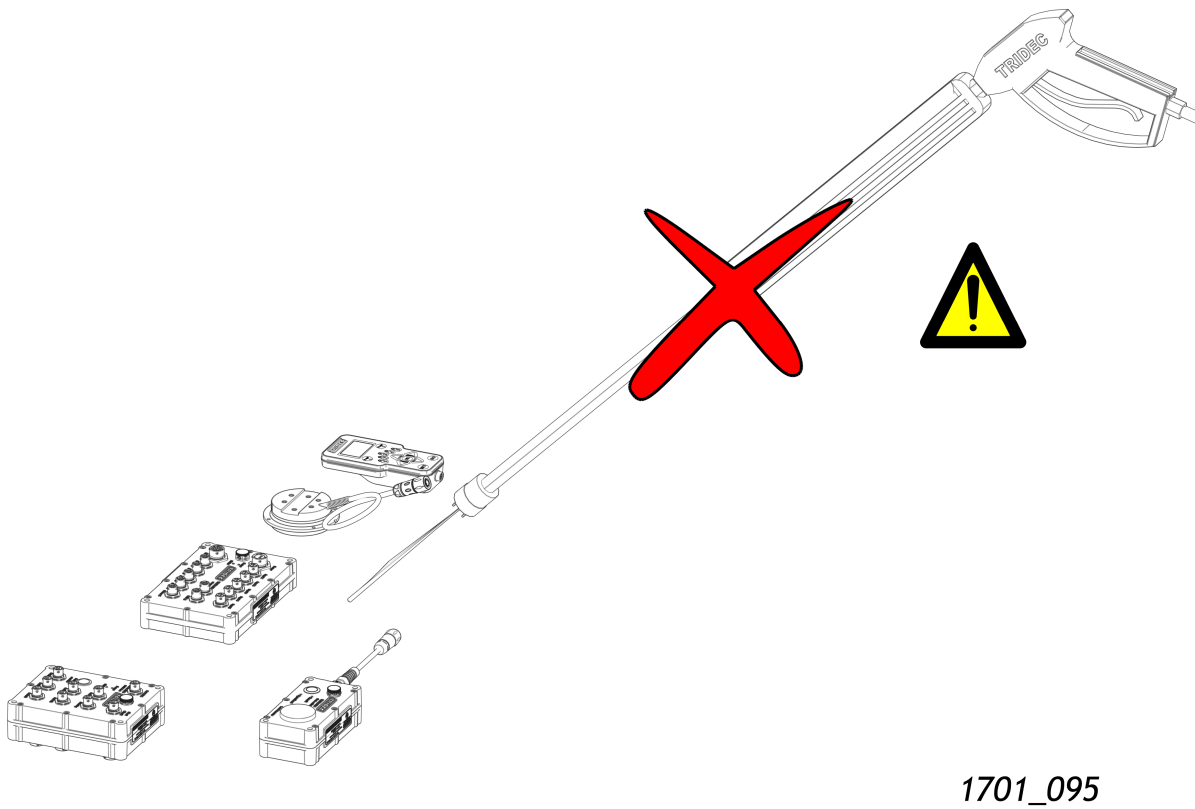
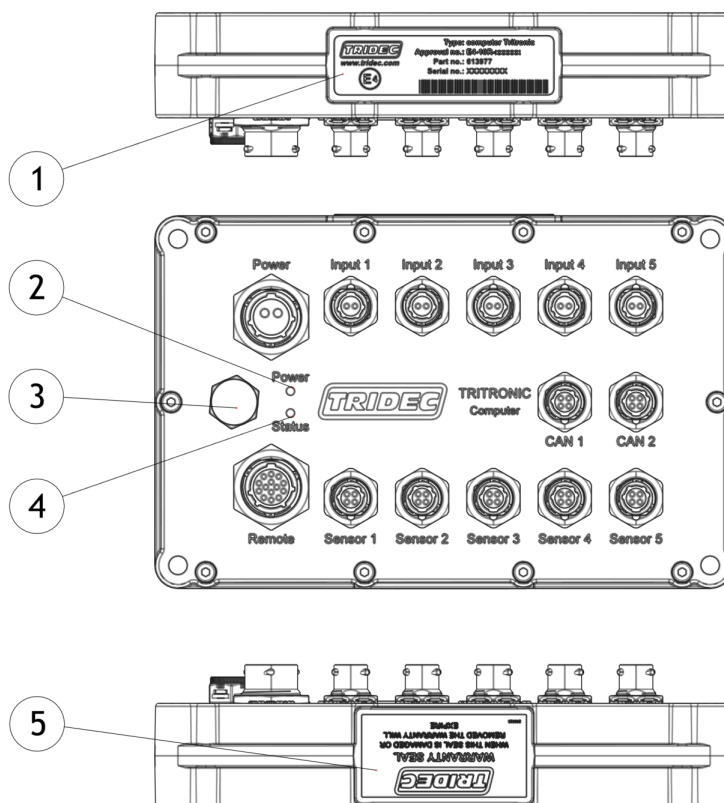


Figure 1-6

1.2.2.3 Computer







The diagram below shows items that are relevant to the user.



1701_080_1

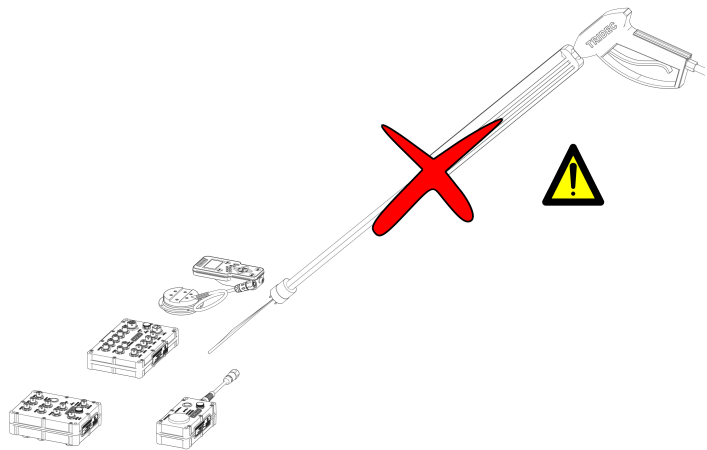
Figure 1-7

1. Model sticker: The part and serial number are found on the seal.
2. Status LED: "Power" (see table below)
3. Climate membrane: Prevents internal formation of condensation by allowing for the exchange of air.
4. Status LED: "Status" (see table below)
5. Guarantee seal: This seal may not be removed or reused.

		The guarantee is rendered invalid if the seal is broken or removed.
		Set the selector switch to "Transit mode" when driving on public roads.
		Please note!: The climate membrane does NOT contain a fuse.

System mode		Colour "Power" LED	Pattern	Colour Status LED	Pattern	Description
Normal		Green	Continu-ous	Green/Red	Green/Red (1x/sec.)	Computer active
Malfunction		Green	Continu-ous	Red	Red Continuous	Programme error
Reversed		Red	Continu-ous			Power cables connected incor-rectly
Con-nections/Service		Green	Continu-ous	Green	Green/Red (1x/sec.)	The switch box and the com-puter are com-municating
		Green	High fre-quency blinking	Green	Continuous	No com-munication with switch box

Cleaning



1701_095

Figure 1-8

1.2.2.4 Selector switch

The Tritronic system has two programmes: "Transit" and "Operational". These can be activated by using the selector switch and/or the remote control. If the Tritronic system is not being used on public roads, then the "Transit" option **must** be activated.

When in "Transit" mode, the following programme functions are active or possible:

- the predetermined automatic functions (e.g. automatic ride-height).
- functions that should be available as per client request.

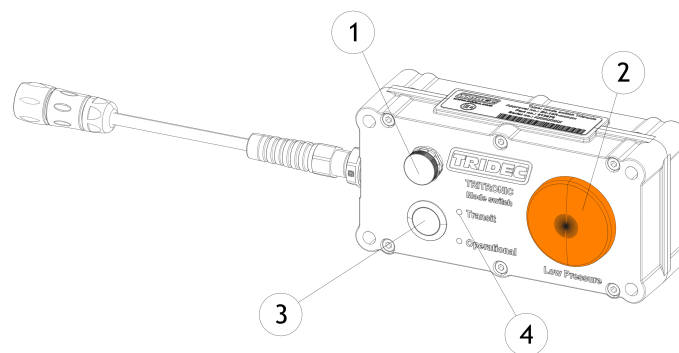
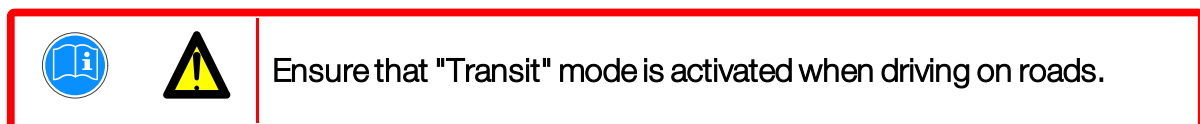
If using the remote control in "Transit" mode, a message will appear on the screen if a function is not available.

There is an antenna in the selector switch for the "blue tooth" connection.

When in "Operational" mode, the user has the following options:

- the Tritronic system programme can be configured.
- all steering functions can be used.

The diagram below shows items that are relevant to the user.



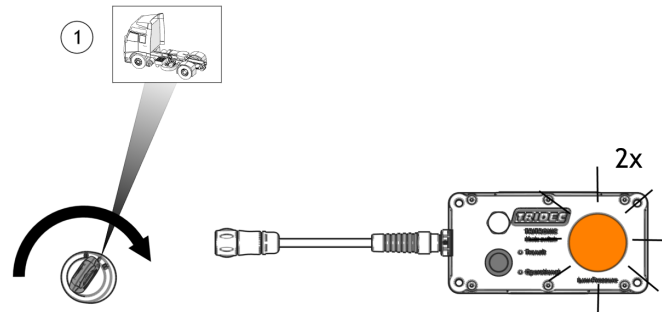
1701_067_1

Figure 1-9

1. Climate membrane:
This membrane prevents internal formation of condensation by allowing for the exchange of air. Do not cover this membrane (no fuse).
2. "Low pressure" light:
The pressure in the hydraulic system is too low.
3. Switch:
This switch can deactivate the desired programme, "Transit" or "Operational".
4. LED:
The LED indicator shows which utilisation area of the programme is active.

2 Operating the Tritronic system

In order to operate the Tritronic system, the truck's ignition switch must be turned to the accessory position. If this is the case, the "low pressure" light on the selector switch will blink twice.



1701_133

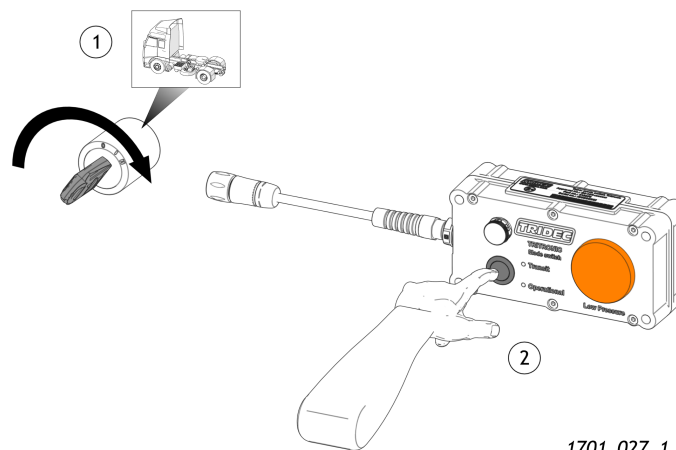
Figure 2-1

After configuration, the Tritronic system is ready for use. The menu functions can now be used. It is also possible to store personalised settings (ride-height, position of the chassis relative to the axles). The chassis can be moved to the pre-set position using the shortcut. Operating the Tritronic system is described in the following paragraphs.

2.1 Using button for programme selection

Procedure:

1. Turn the truck's ignitions switch (1) to the "I" position (accessory position). The programme last used, "Transit" or "Operational", will be reactivated.
2. Press the button (2) 1x in order to activate the "Transit" or "Operational" programme. The blue LED next to the activated programme will light up.



1701_027_1

Figure 2-2



The "Transit" programme **MUST** be activated when driving on public roads.

2.2 Operating the remote control

The Tritronic system is an external steering system that can be used to operate the hydraulic and electrical functions of a trailer. Steering is done by means of a remote control.

For example, if the trailer has been equipped with a hydraulic steering system for the wheels, the wheels can then be steered using the remote control. Automatic functions can be activated by using shortcuts. For example, by activating the function (see "Alignment" on page 22) using the shortcut, the wheels of the trailer / semi-trailer will be turned to the angle that corresponds with the angle of the truck to the trailer / semi-trailer.



Steering the trailer using the Tritronic system relies on the EBS signal.

Steering and/or alignment is **NOT** permitted if the brakes or the handbrake is engaged.

Steering and/or alignment is **NOT** permitted if the trailer is stationary and laden or decoupled.

Key behaviour

The keys or key combinations can be programmed with either a touch or a timer function.

Keys or key combinations with a touch function need to be kept pressed for at least 2 seconds in order to activate the hydraulic or electrical function. After releasing the key, movement will continue until the position has been achieved.

Key or key combinations with a timer function need to be kept pressed for at least 2 seconds in order to activate the hydraulic or electrical function. After releasing the key, movement will continue for the amount of time programmed. A message will be displayed.



The user should experiment with the keys or key combinations in order to become more familiar with their behaviour.

2.2.1 Main menu

The function menus displayed on the screen are order specific. The following diagrams are examples only.

The following diagrams show a possible main menu with the associated functions.

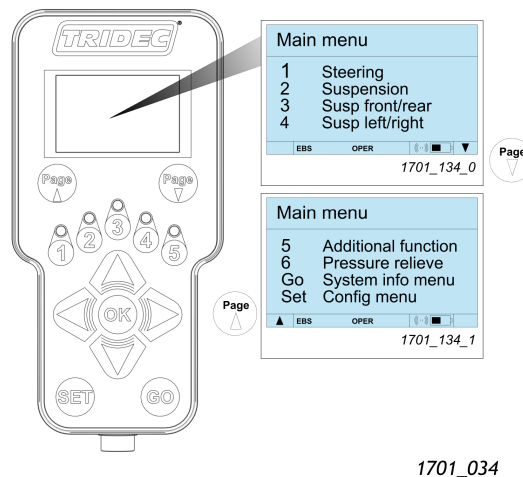



Figure 2-3

1. Briefly press the numeric key (1-4) that corresponds with the desired function for activating the menu. The LED above the key will light up.
2. Briefly press the key  in order to make the other functions in the main menu visible.
3. Briefly press on the numeric key 5 in order to activate the corresponding menu. The LED above the key will light up.

Follow the steps below to activate the other menus:





1. Keep numeric keys 1, 2, 3 or 4 pressed in to activate the 6th, 7th, 8th or 9th functions.

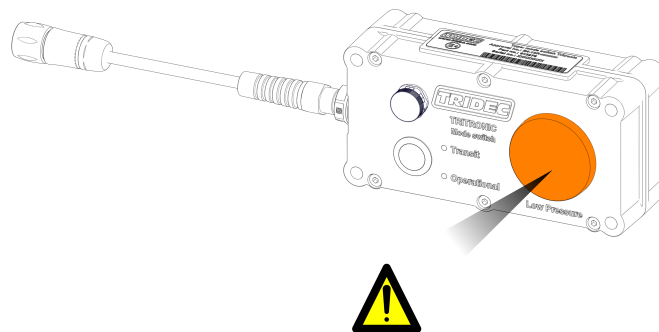


The LED above the relevant numeric key will light up and start blinking.

2.2.2 "Low pressure" light



The "low pressure" light will blink 2x when the truck's ignition switch is turned to position "I" (accessories position). The light will burn continuously if the oil pressure in the hydraulic system is too low. The light will not burn if there is sufficient oil pressure in the system.

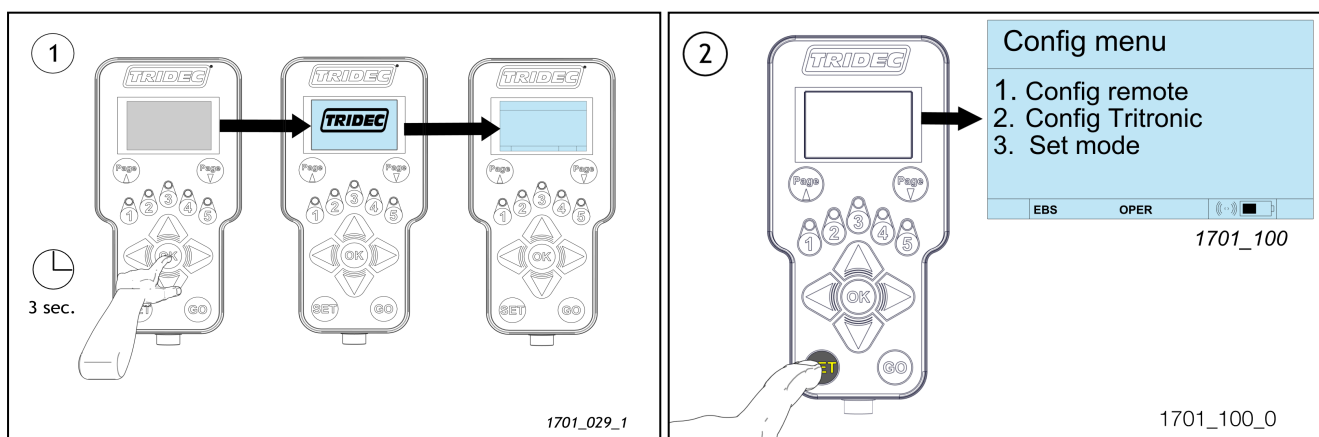
 	<p>Danger!: Do not drive the vehicle if the "low pressure" light is burning continuously. Check the oil levels in the generator. If the "low pressure" light is allowed to burn continuously, other individuals could be put in danger. It could also lead to system damage.</p>
 	<p>Note!: The "low pressure" light must always be visible from the cabin!</p>

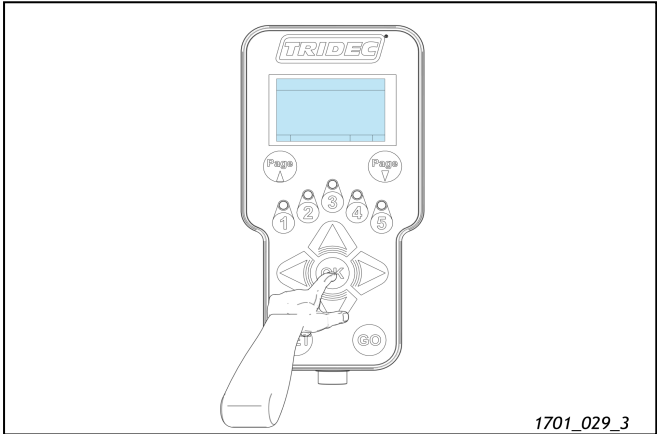
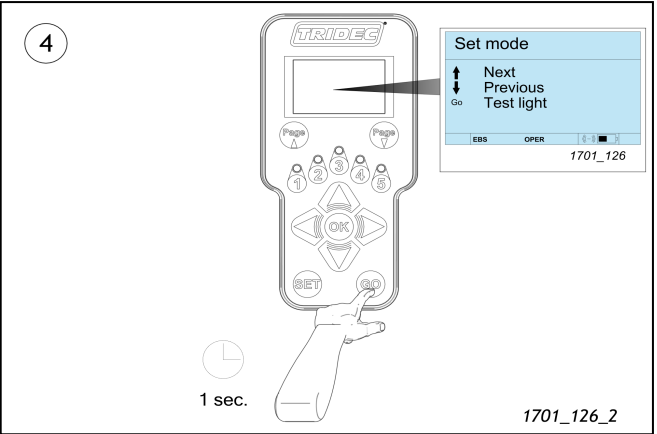
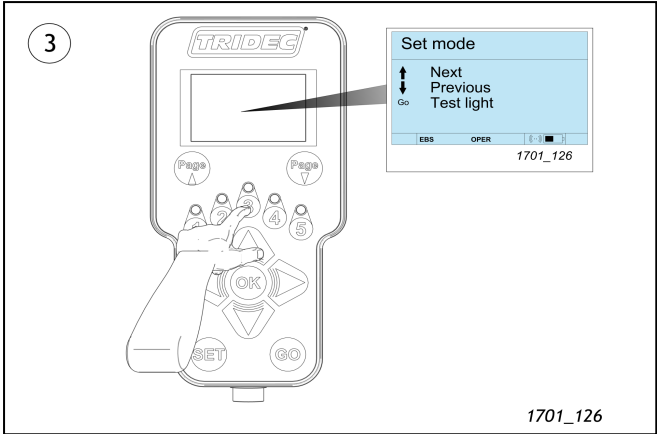


1701_068_1

Figure 2-4

1. Execute the following steps to test if the "low pressure" light is working.
2. Press  to return to the previous screen.
3. Press  repeatedly to return to the main menu.



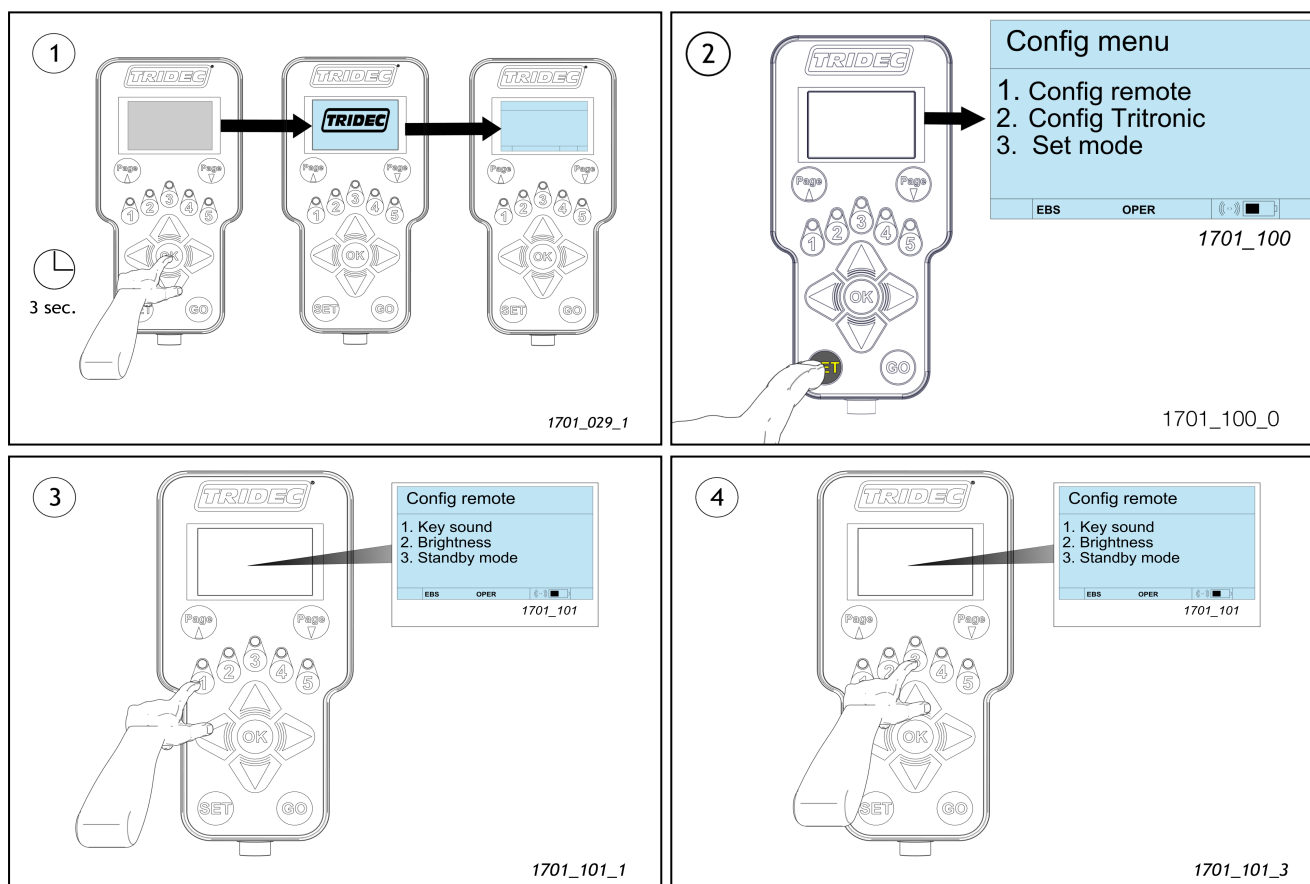


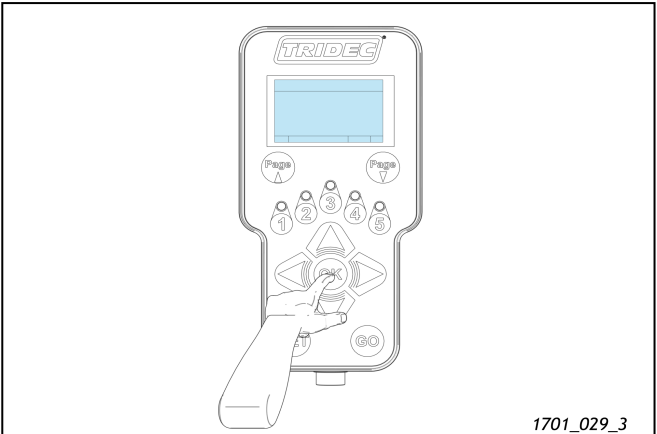
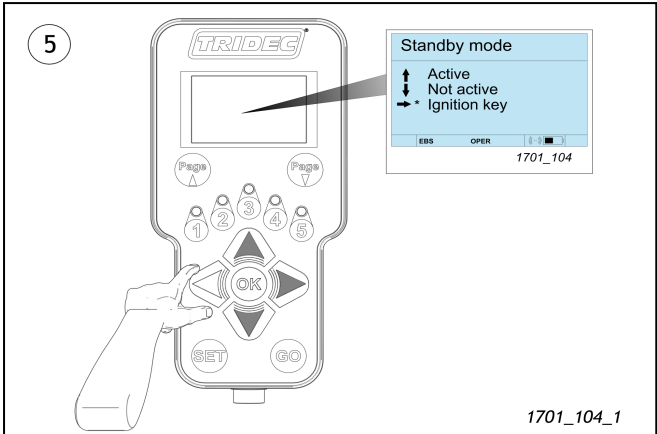
2.2.3 Standby mode

Procedure:

1. Follow the steps below to configure the standby options. The symbol * indicates which "standby" option is active.
2. Press **OK** to return to the previous screen. Press **OK** repeatedly to return to the main menu.





Active	The screen will turn off after two minutes.
Not active	The screen will remain on.
Ignition key	The screen will turn off after 2 minutes if the ignition switch is turned to "0" or is removed. The screen will remain on if the ignition key is turned to "Acc" or "I".

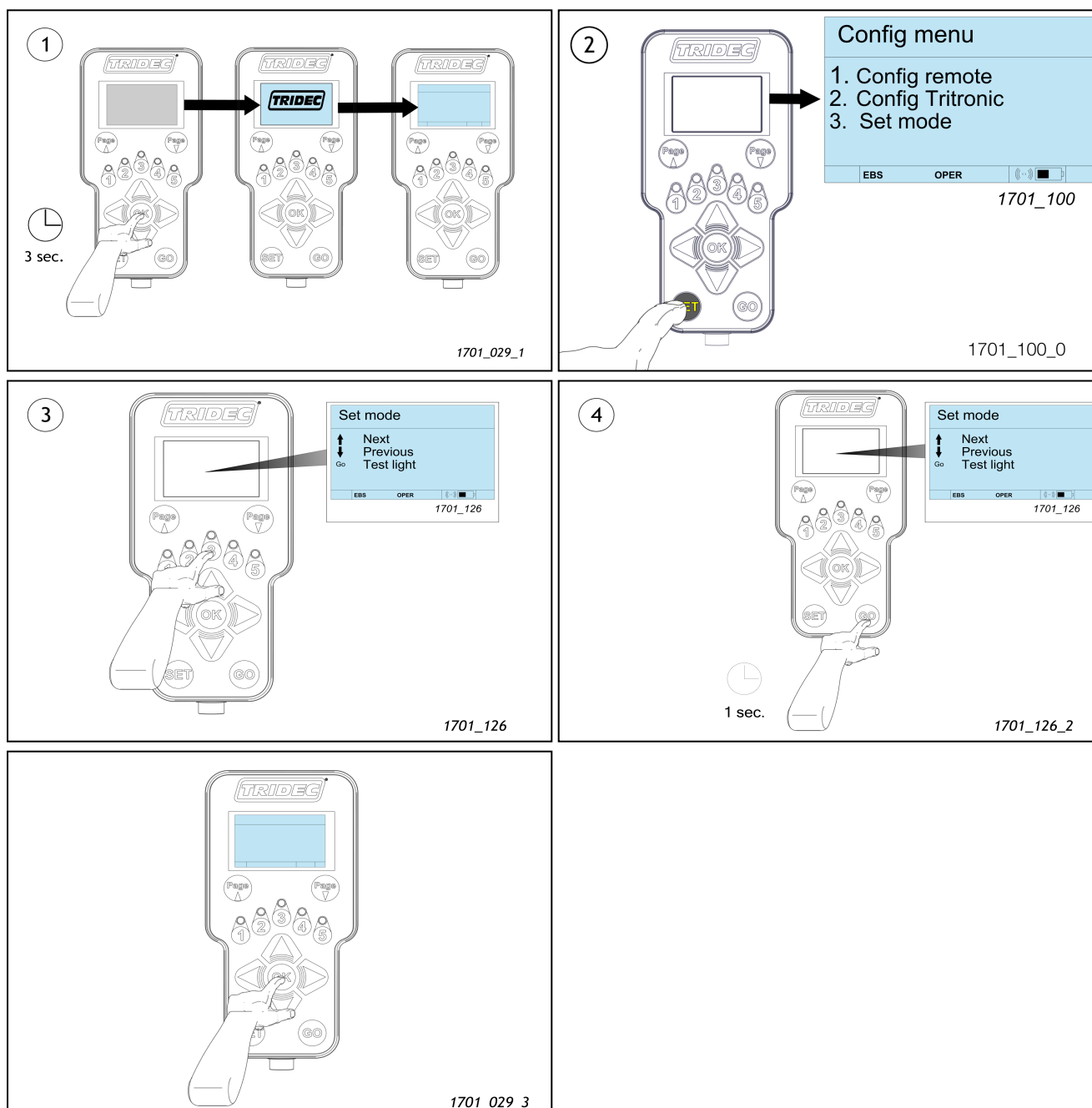




2.2.4 Programme selection using the remote control

Procedure:

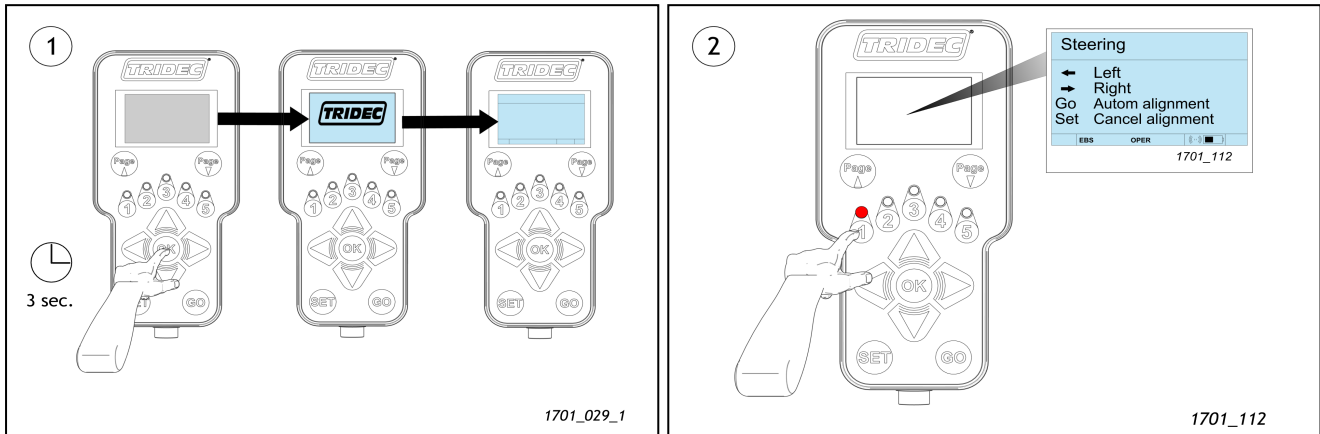
1. Follow the steps below to activate the **"Set mode"** menu.
2. Press  or  for 3 seconds in order to activate the programme **"Transit"** or **"Operational"**. Depending on the selection, the screen will display either the text **"TRAN"** or **"OPER"**. The LED next to the programme on the selector switch will light up blue.
3. Press  to return to the previous screen.
4. Press  repeatedly to return to the main menu.



2.2.5 Steering left and right

Procedure:

1. Follow the steps below to steer the wheels using the remote control.



2. Press ◀ or ▶ to steer the wheels left or right.



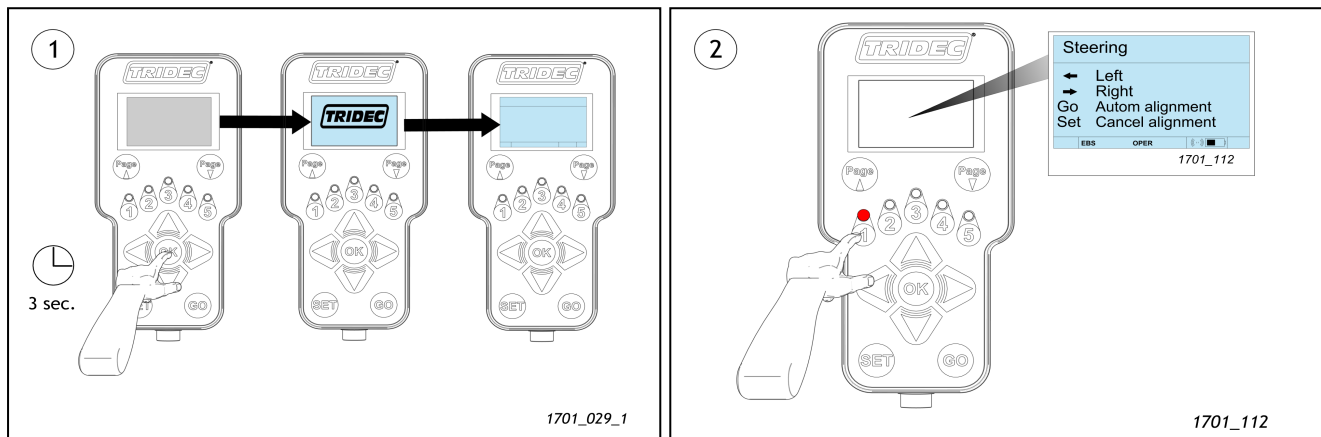
The Tritronic system can be optionally expanded to include signal lights (see "Signal lights on page 1"). These lights burn in different situations. For example, one of the lights will burn if the steering angle of the wheels on the trailer is more than 3° greater than the pre-set angle.

2.2.6 Alignment

Here, alignment is understood to mean that the wheels of the trailer / semi-trailer are automatically turned back to the configured angle that corresponds to the angle of the truck in relation to the trailer / semi-trailer.

Procedure:

1. Follow the steps below.



2. Drive slowly.
3. Press **GO** to start automatic alignment.
(Press **SET** in order to stop alignment while running.)

The following information will be displayed on the screen:

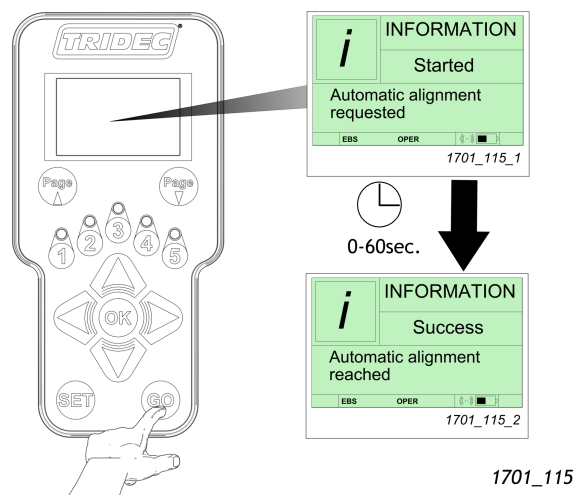


Figure 2-5



Automatic alignment will stop if the speed increases to a higher level than that programmed into the EBS computer. An error message will be displayed.



Automatic alignment is possible up to a maximum of 40° between truck and trailer / semi-trailer. An error message will be displayed for angles greater than 40° and automatic alignment will not be possible.

4. *Repeat steps 1 to 3 if an error message appears.*

3 Remote control



For safety reasons, moving parts must remain in the field of view of the operator when using the remote control.

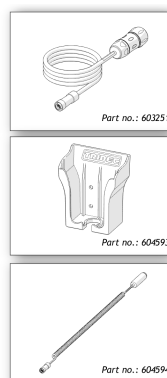
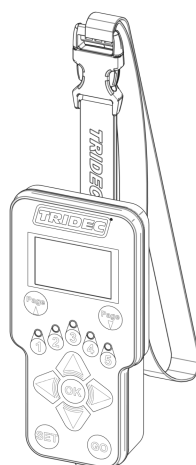


NEVER operate the remote control while driving on a public road.

The remote control is a part of the Tritronic system. The Tritronic system can be operated with the remote control by means of a wireless connection ("bluetooth") or via the synchronisation cable.



If configured, the remote control will be put into "Standby mode" when not used for 2 minutes. (see "Standby mode" on page 18).



1701_088

Figure 3-1

The remote control consists of the following components:

- A synchronisation cable to connect the remote control to the computer.
- A holder.
- A loose charging cable. This can be used to make a connection between the remote control and a 12V or 24V socket.
- A "keycord".

The truck's ignition switch should be turned to the accessories position when using the remote control.

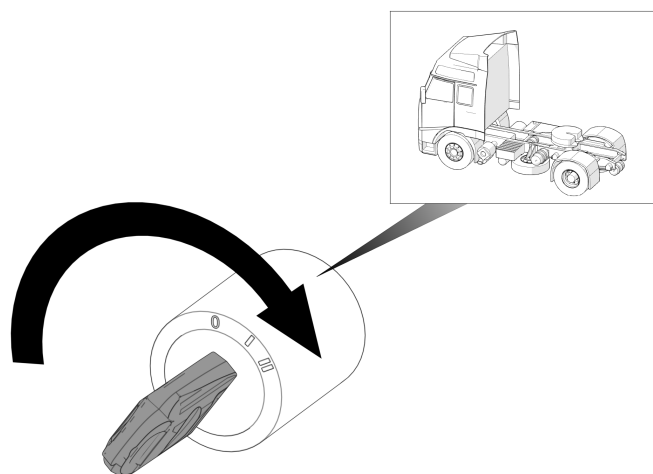
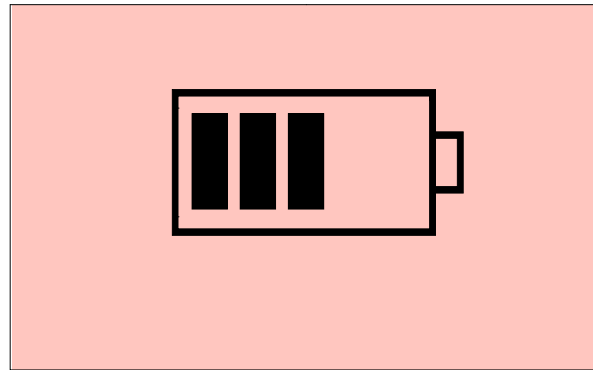


Figure 3-2

3.1 Replacing batteries

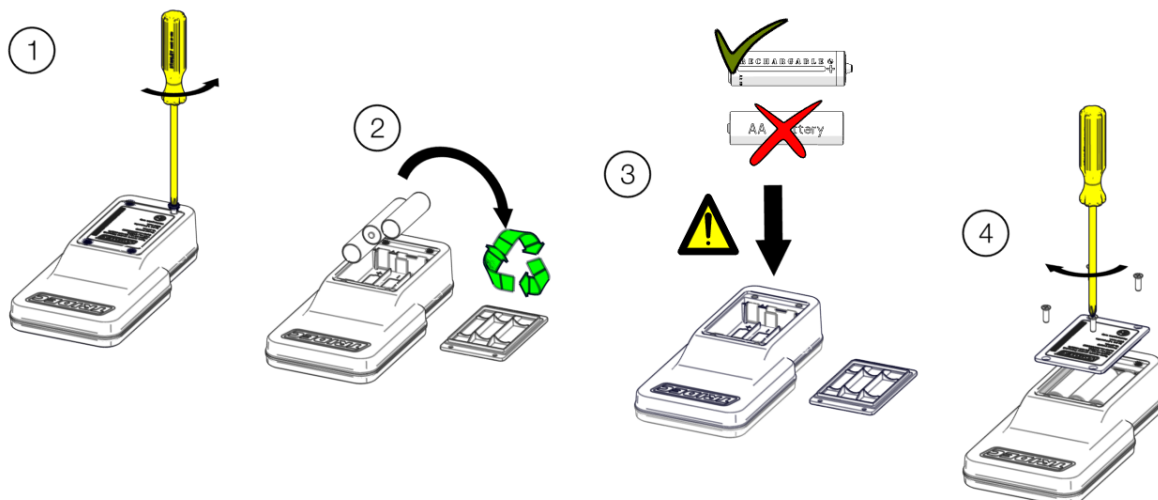
The following message will appear at the bottom of the screen when the batteries have reached the end of their lifespan.



1701_131_4

Figure 3-3

Batteries may only be replaced with rechargeable NiMH (Nikkel Metal Hydride) AA size batteries with a recommended capacity of 2000 mAh. Batteries should be removed if the remote control will not be used for an extended period of time. Do not place completely discharged batteries into the remote control. The system does not have sufficient capacity to charge them.



1701_089

Figure 3-4

Charging the batteries

The batteries in your remote control can be charged in the following ways:

- By using the charging cable. It has a plug that can be connected to the 12V or the 24V socket in the cabin.
- By using a synchronisation cable that can be connected to Tritronic system computer.



The batteries will not be overcharged if the remote control is left connected to a power source for an extended period of time.

The following information will appear on the screen if the remote control has been connected to a power source (max. 24V).

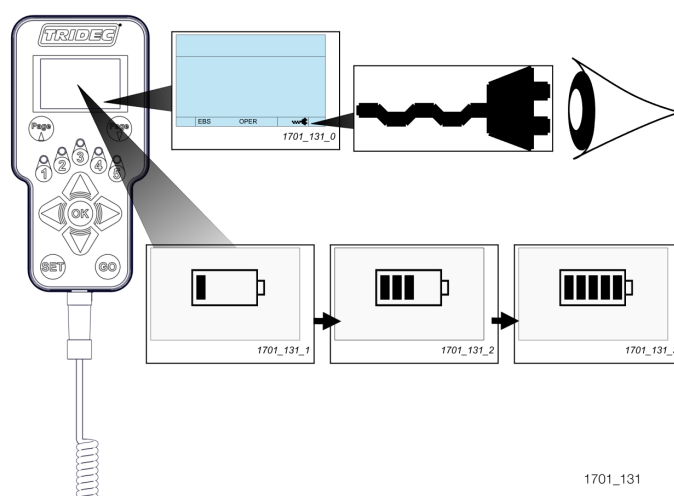
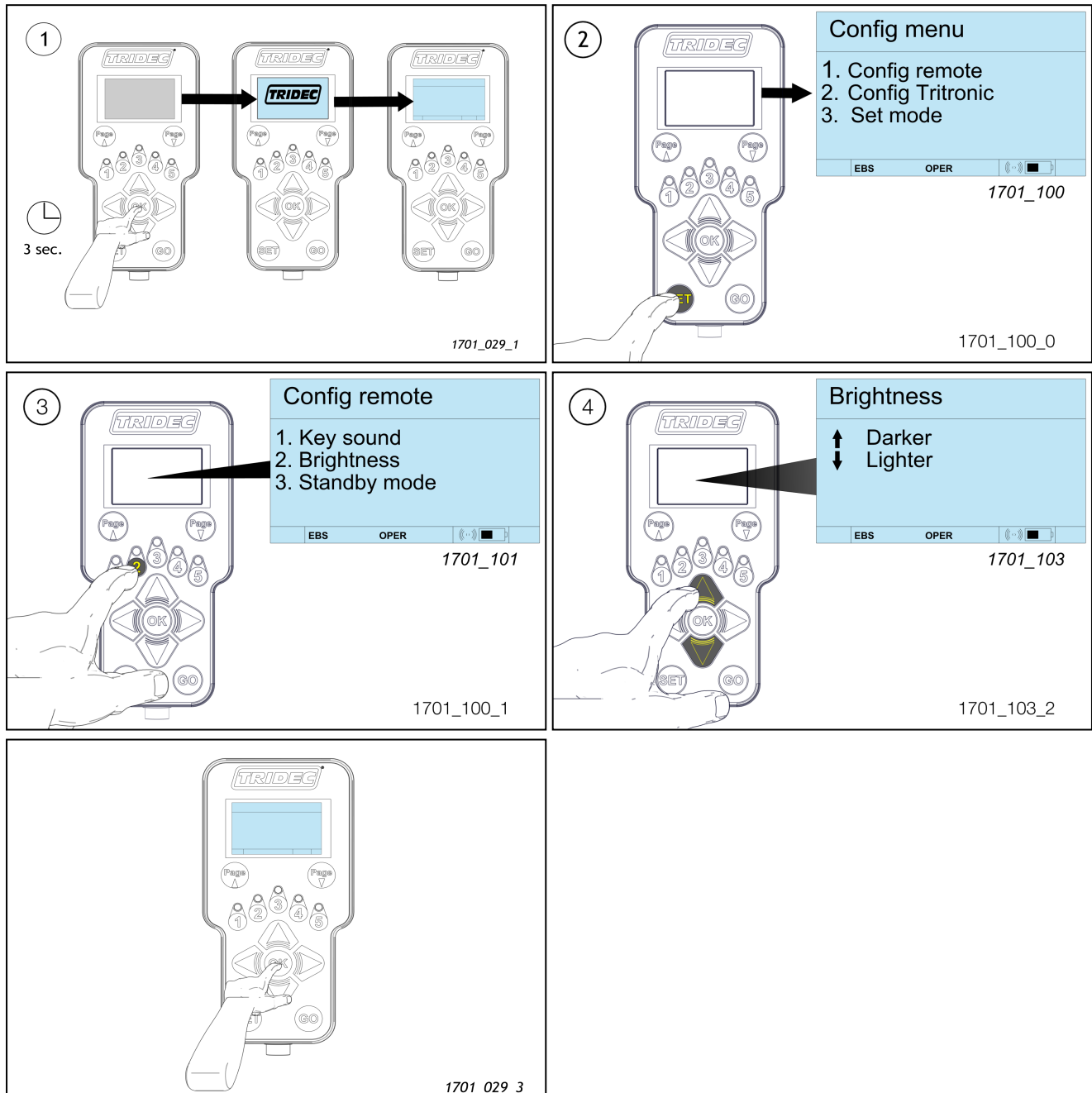


Figure 3-5

3.2 Screen brightness

1. Follow the steps below to set the screen brightness.
2. Press **OK** to return to the previous menu. Press **OK** repeatedly to return to the main menu.



3.3 Configuring language

The remote control's standard start-up language is order specific. Other languages can be manually configured.

Procedure:

1. Follow the steps below to change the language settings (turn the remote control off).

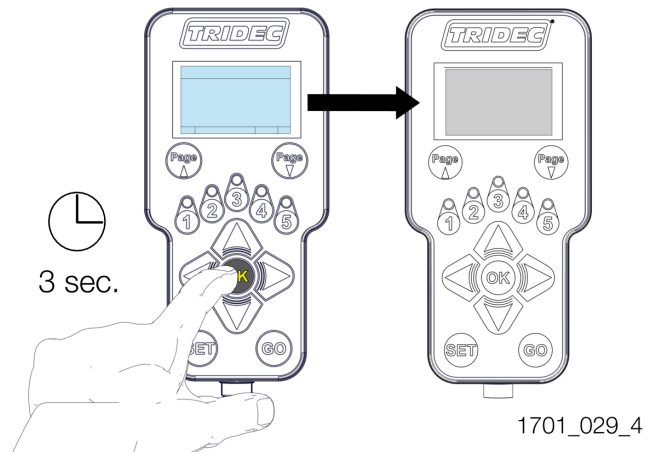


Figure 3-6

2. Press the following key combinations to activate the desired language.

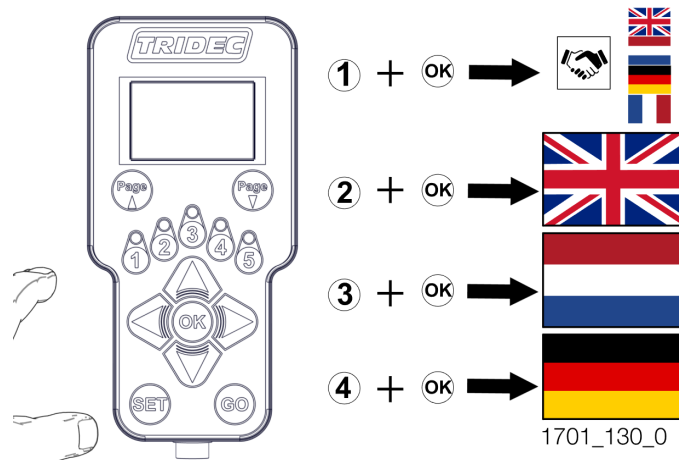
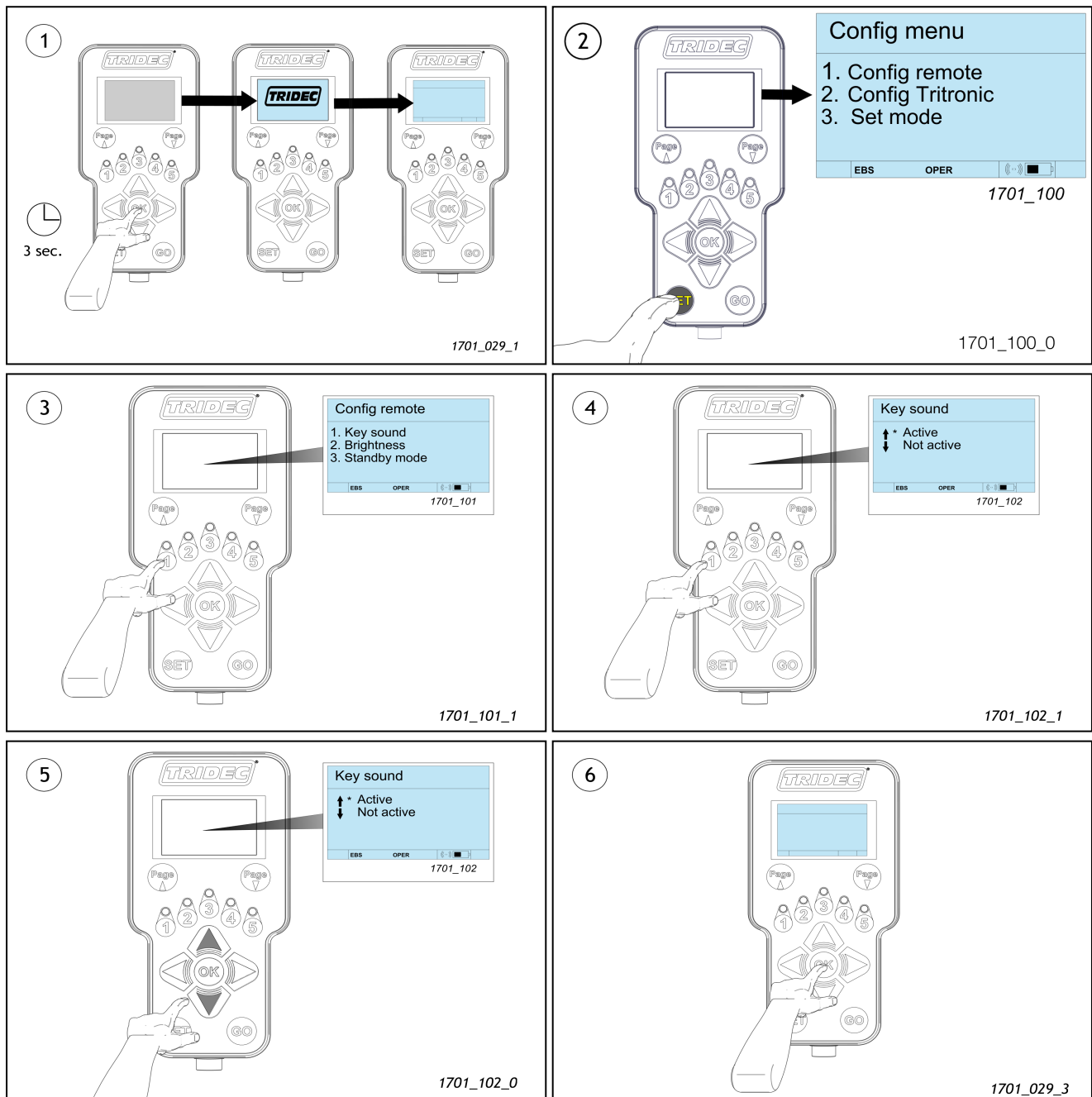


Figure 3-7

3.4 Configuring key sounds

1. Execute the following steps in order to turn the key sound on or off.
The symbol "*" indicates if the key sound is active or not.
2. Press **OK** to return to the previous screen.
(Press **OK** repeatedly to return to the main menu.)



3.5 Function keys

In addition to a screen, the remote control also has a number of keys. Use these keys to activate functions or to select menus.

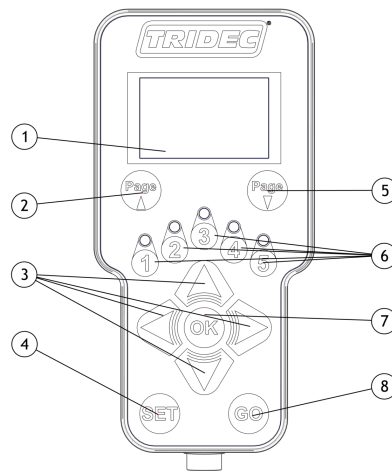


Figure 3-8


No.	Item	Description
1	Screen	See overview of icons on the screen.
2	Page up	Navigate to the top of the menu list.
3	Function key	Activate selected functions.
4	"Set"	Selection from the "Config Menu". May deviate.
5	Page down	Navigate to the bottom of the menu list.
6	Numeric keys	Order specific menus are linked to the numeric keys. Example: 1 is the "Steering" menu, 2 is the "Suspension" menu, etc.
7	OK	Turning the remote control on and off. Go back to the previous menu in the menu structure. Confirmation of message.
8	GO	Menu selection "System info" or activation of automatic functions.

3.6 Connection with computer

The remote control can be connected to the computer in two ways:

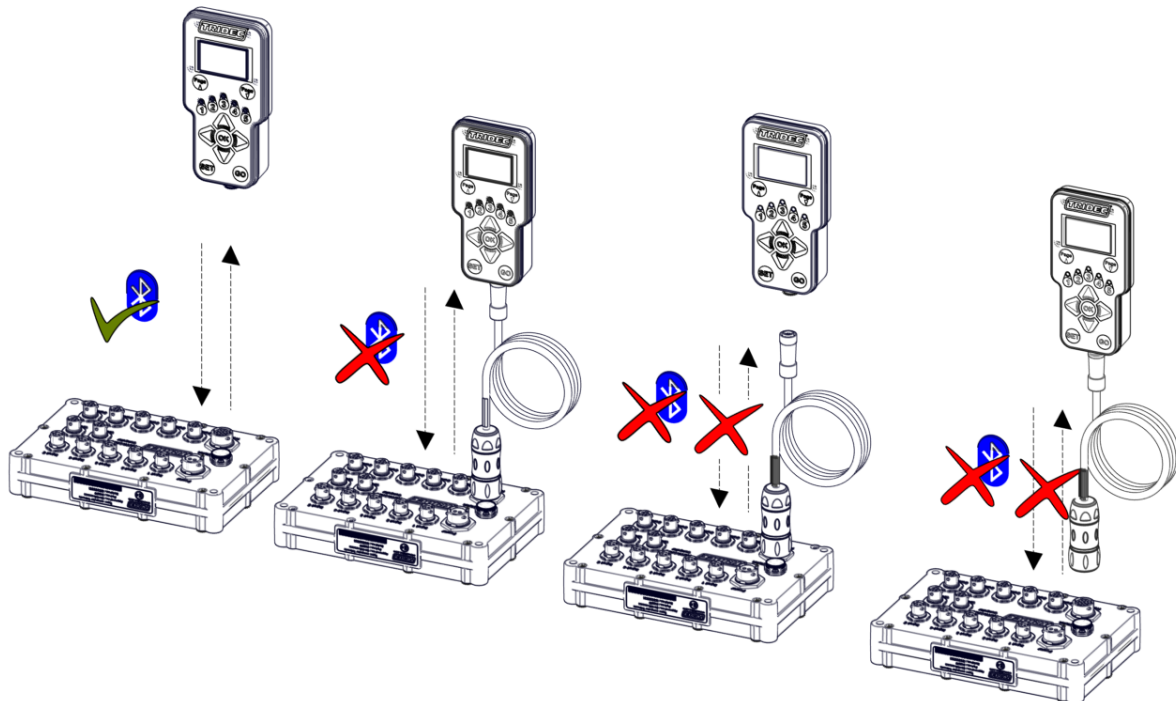
1. Wireless via "blue tooth".
2. Via the synchronisation cable.

The icon (•) will be displayed if there is a "bluetooth" connection between the remote control and the computer.

If the remote control is connected with a cable, then this icon  will be displayed on the screen.



If you have no signal, stand near the selector switch with the remote control to test the "bluetooth" connection. The range is normally 100 m direct line of sight.



1701_092

Figure 3-9

4 Optional functions

Additional operational functions can be added to the Tritronic system programme. The number of optional operational functions is determined by the hydraulic and electrical options which have been fitted to the trailer. The functions are therefore order specific.

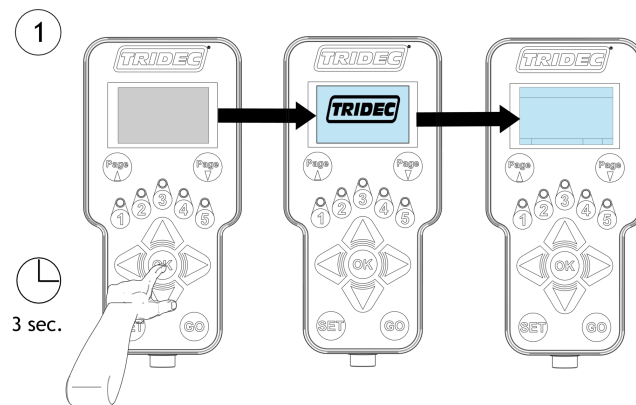
Some examples:

- Hydraulically operated ramps
- Hydraulically operated loading flap
- Hydraulic lifting of an axle
- Rotary beacon

4.1 Activating optional function


Procedure:

1. Follow the steps below.



1701_029_1

Figure 4-1

2. Briefly press the numeric key (1-4) that corresponds with the desired function for activating the menu. The LED above the key will light up.
3. Press  to scroll through the menu.
4. Briefly press on the numeric key 5 to activate the menu. The LED above the key will light up.
5. Keep numeric keys 1, 2, 3 or 5 pressed in to activate the 6th, 7th, 8th, 9th and 10th functions



The LED above the relevant numeric key will light up and start blinking.

6. Press the key or key combination to activate the desired function.

5 Information and error messages and warnings



Important: When using optional functions, error and information messages and warnings may be displayed. In such cases, refer to the semi-trailer manufacturer's operator manual.



Ignoring messages may result in damage to the system!

5.1 Information messages

Status messages

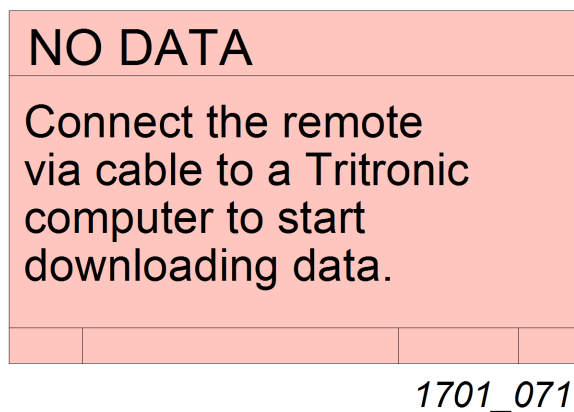
Messages may appear on the screen when the system is in operation. These messages inform the user of the status (see image) of an active function. The screen will light up in green momentarily. The message will disappear automatically after 10 seconds.



1701_032

Figure 5-1

1. Press  to dismiss the message.

No data*Figure 5-2*

This message will display after the remote control has started up if the remote control is not synchronised.

Procedure

1. Follow the steps below.

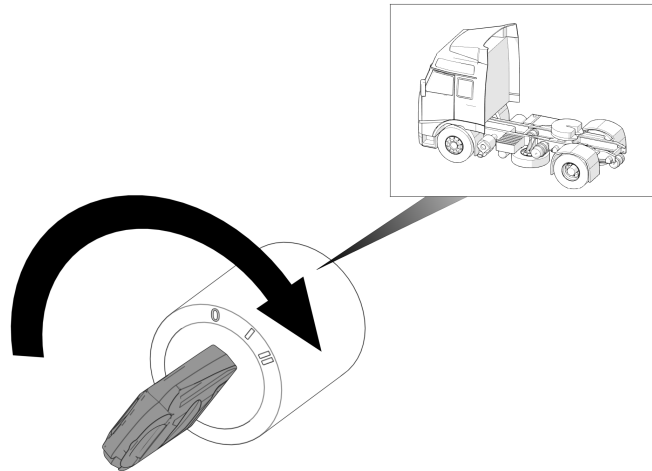


Figure 5-3

2. Follow this step to synchronise.
The message will disappear from the screen after synchronising.

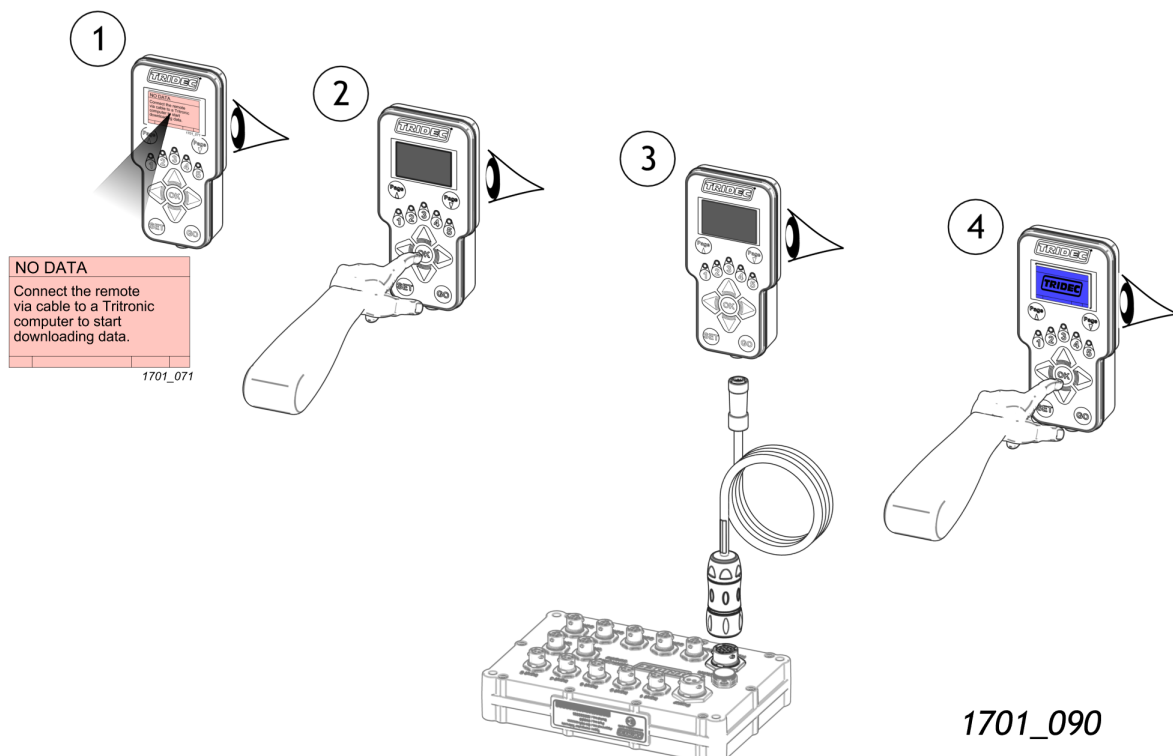






Figure 5-4

3. Check if all functions are working properly in a suitable testing area. Adjust if necessary.





Not conducting this check could lead to dangerous situations!

5.2 Error messages

		Important: When using optional functions, error and information messages may be displayed. In that case, consult the trailer manufacturer manual.
		Ignoring messages could cause damage to the system!

An error message will appear on the remote control as soon as the programme detects a malfunction (see diagram). The screen will light up in red and a short beep will sound.

1. Press  to dismiss the message.

		The screen will continue to light up in red until the error has been resolved. Consult the error code table.
---	---	--

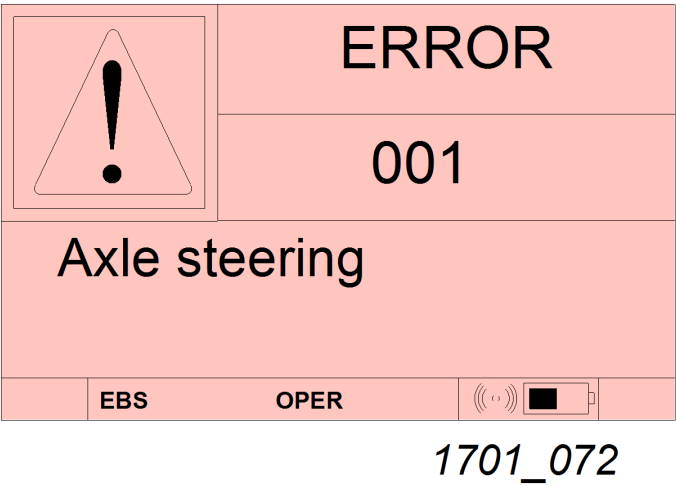


Figure 5-5

Code	Message	Solution
000	UNKNOWN	Contact TRIDEC
001	Axle sensor steering	Check axle sensor and cable
002	Kingpin sensor steering	Check kingpin sensor and cable
003	Suspension sensor rear right	Check suspension sensor rear right
004	Suspension sensor rear left	Check suspension sensor rear left
005	Level sensor	Check level sensor and cable
006	Command cylinder blocked	Manual action/ remove blockage
007	Fuse malfunction of internal power supply	Contact TRIDEC
008	Fuse malfunction of internal neutral	Contact Tridec
009	Incorrect CAN connector switch box	Swap CAN connectors in switch box.
010	Automatic alignment taking too long	Repeat alignment. Release the brake. Disengage handbrake.
011	Automatic alignment failed	Repeat alignment
012	Steering configuration taking too long	Repeat configuration
013	Loading ramps not released	Press release button
014	Brakes engaged	Release brakes
015	Command blocked. Digital 3 displayed	Remove blockage digital input 3
016	Command blocked. Digital 4 displayed	Remove blockage digital input 4
017	Command blocked. Digital 5 displayed	Remove blockage digital input 5
018	No Steering configuration set	Set steering
019	Incorrect password Press OK	Enter correct password
020	No suspension configuration set	Set suspension
021	Kingpin and axle sensors	Check kingpin and axle sensors
022	Left and right suspension sensors	Check left and right suspension sensors and cables
028	Low pressure	Check system pressure level

Code	Message	Solution
029	Ride-height not achieved	Try again. Release the brake. Disengage handbrake.
030	Self-levelling not achieved	Try again. Release the brake. Disengage handbrake.
031	Towing angle too great	Reduce the angle between vehicle and trailer
032	Speed too high	Reduce speed / check ABS/EBS signal
033	Suspension sensor front right	Check suspension sensor front right and cable
034	Suspension sensor front left	Check suspension sensor front left and cable
035	Tritronic power supply too low	Check computer power supply min. 12V max. 24V
036	Switch box power supply too low	Check switch box power supply
037	No communication with switch box	Check the cable between computer and switch box
038	Lowest position not reached	Release the brake and try again.
039	Incline drive not achieved	Try again
040	Not in operational mode	Switch to operational mode
041	System in debug mode	Check if the switch box is connected to the computer. Remove the system from debug mode by restarting. Press OK
046	As overbeladen	Verlaag de massa tot de maximaal toelaatbare as massa.
047	Dissel overbeladen	Verlaag de massa tot de maximaal toelaatbare dissel massa

6 Emergency operation

If the remote control is not working, all trailer functions connected to the Tritronic system can still be activated. The manner in which this is done depends on whether there is a power source available or not.

6.1 Valves overview

There is a valve overview within the valve housing. This overview is put together order specific. The figures show an example of such an overview.

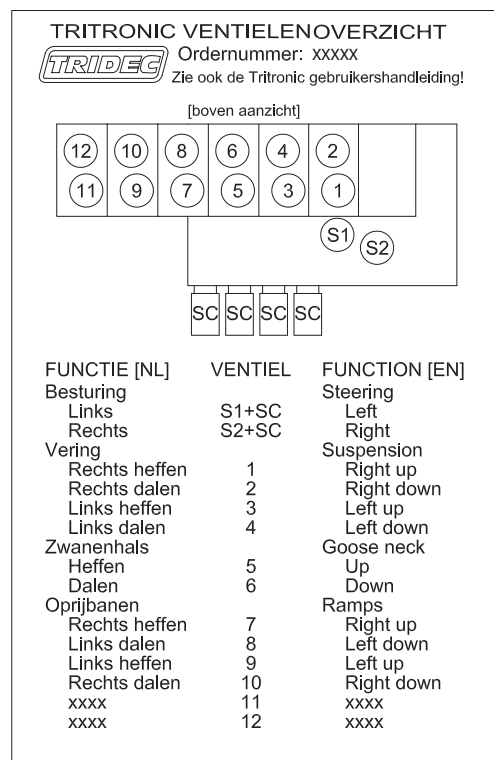


Figure 6-1

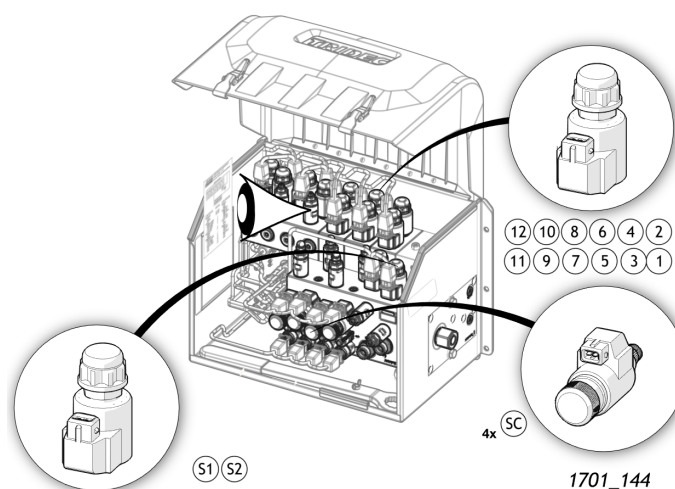


Figure 6-2

6.2 Manual operation with power source



Please note!: Manual steering of the wheels is **ONLY** permitted when the trailer is coupled. This is done to prevent unwanted movement in the front of the trailer.



Please note!: Manual steering is **NOT** permitted if the brake or hand-brake is engaged.

Steering wheels

1. Follow the steps below to steer the wheels.

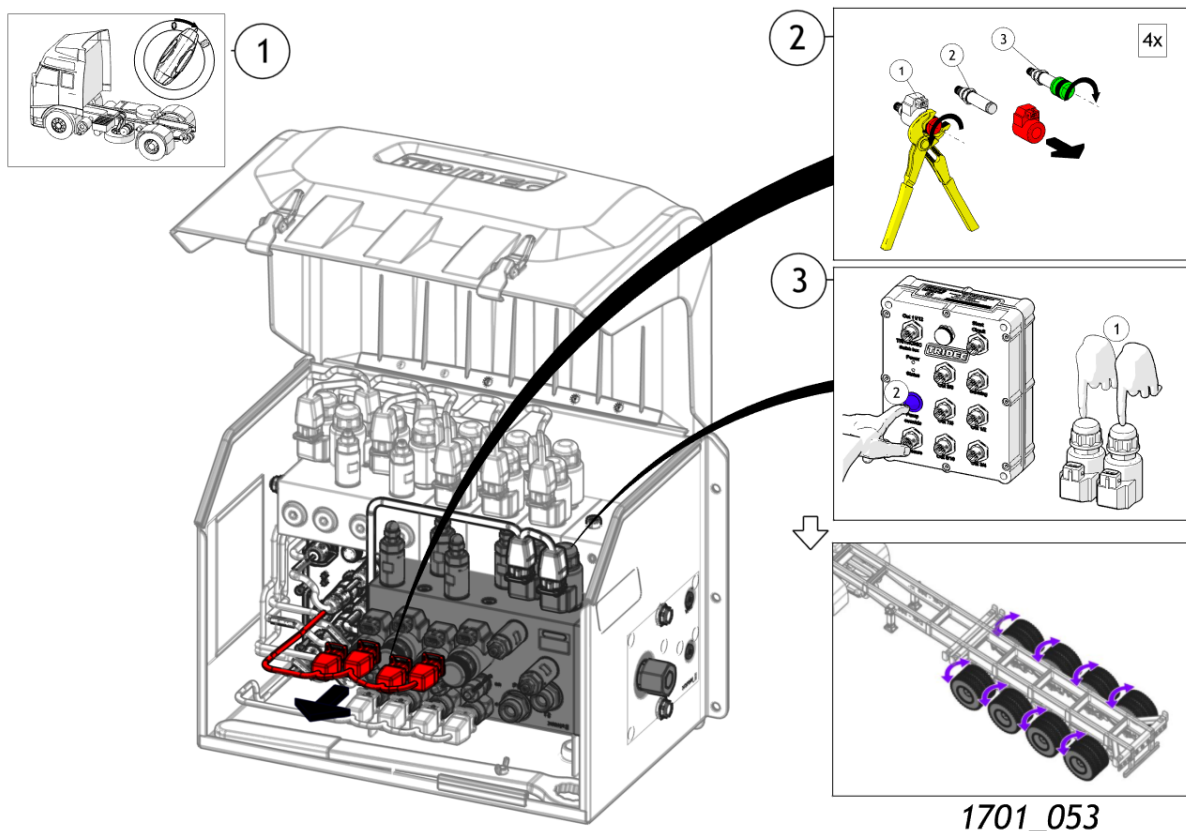


Figure 6-3



Please note!: The wheels must be returned to the driving direction after manual operation is complete!

2. Reinstall everything in reverse order. Do not forget the O rings!!!



Danger: Do not drive until all parts have once again been installed!

Procedure:

1. Follow the steps below to set the height of the chassis.



Consult the diagram in the hydraulics cabinet for the function assignments of the 4 buttons!

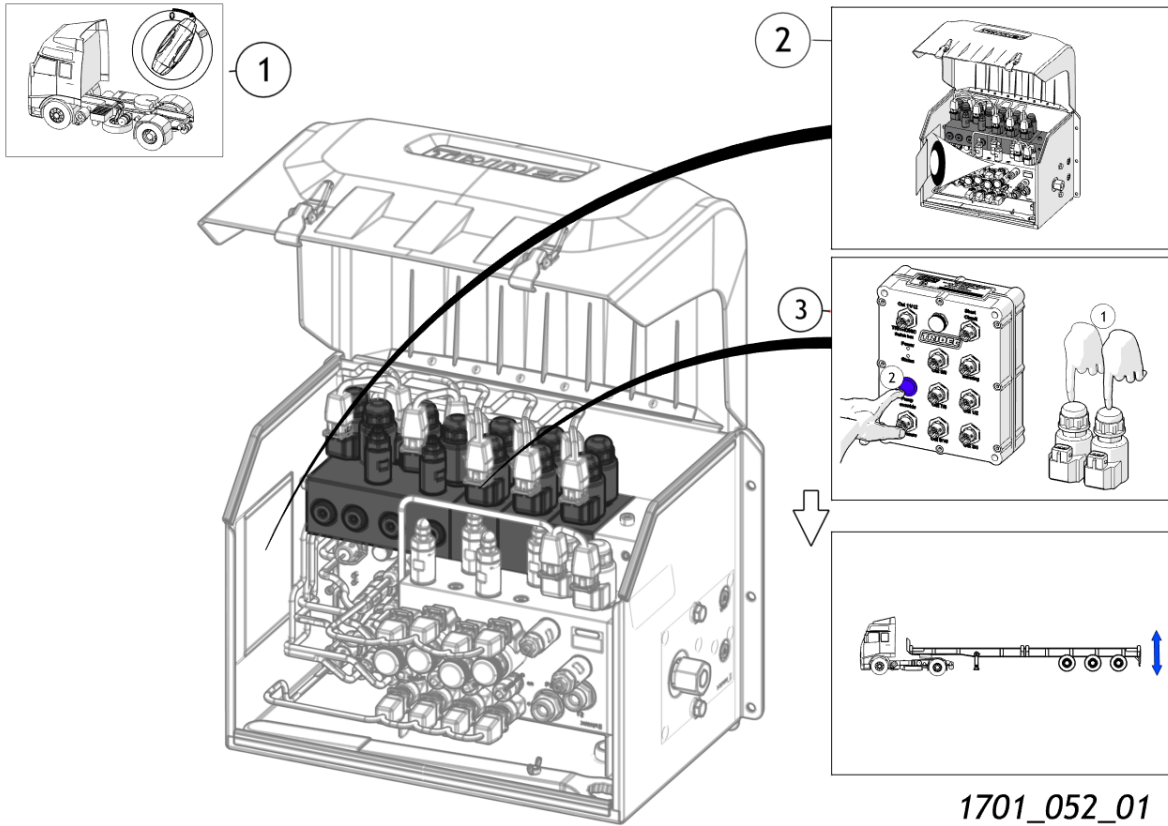






Figure 6-4



Ensure that no one is in the vicinity of the trailer when operating the height control!

6.3 Manual operation without power source

It is possible to execute the hydraulic functions even if the remote control is not working and there is no power source.

		Please note!: Manual steering of the wheels is ONLY permitted when the trailer is coupled. This is done to prevent unwanted movement in the fifth wheel plate.
		Please note!: Manual steering is not permitted if the brake or hand-brake is engaged.

6.3.1 Steering wheels

Procedure:

1. Follow the steps below to steer the wheels.

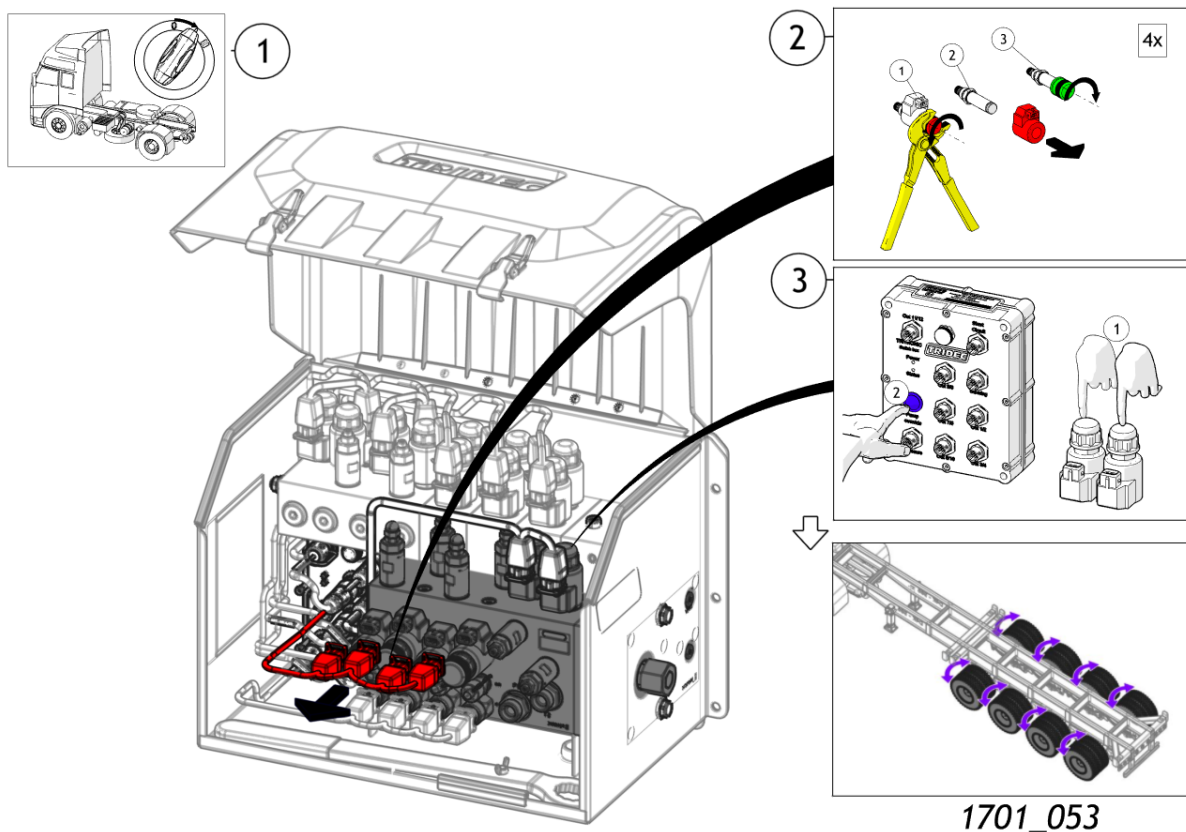




Figure 6-5

		Please note!: The wheels must be returned to the driving direction after manual operation is complete!
---	---	--

2. Reinstall everything in reverse order. Do not forget the O rings!!!

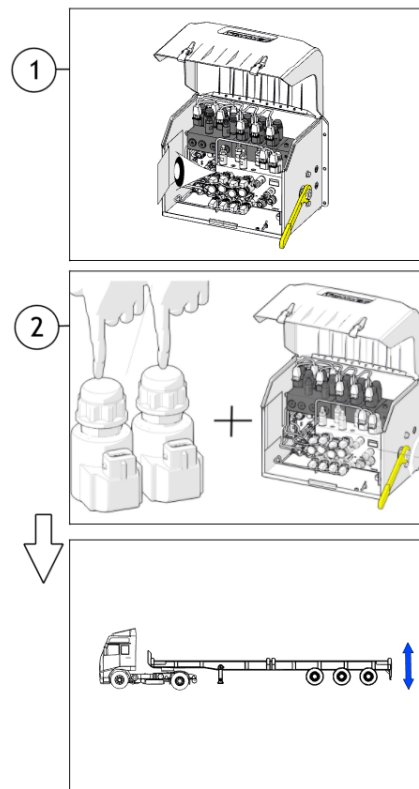
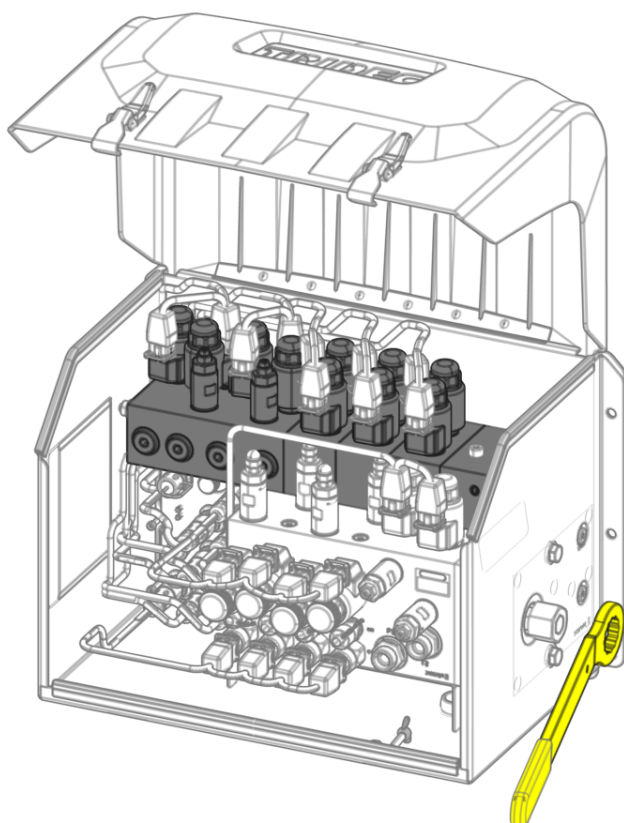


Danger: Do not drive until all parts have once again been installed!

6.3.2 Height control

Procedure:

1. Follow the steps below to set the height of the chassis.



1701_057

Figure 6-6



Ensure that no one is in the vicinity of the trailer when operating the height control!




Please consult the trailer manufacturer's manual regarding operating all other hydraulic functions of the trailer.

7 Putting into service

The following paragraphs contain information regarding putting the DL-S/HFE suspension and steering system into service.

7.1 Vehicle registration and delivery

 All associated documentation (vehicle registration certificate, CE declaration, user guide, service manual) for the relevant DL-S/HFE suspension and steering system should be handed to the client upon delivery of a trailer with a DL-S/HFE suspension and steering system.



The vehicle may not be used until compliance with the applicable national road traffic regulations has been established for the trailer on which the DL-S/HFE suspension and steering system is installed.



The national road traffic regulations are specific to each country. Contact the national inspection authority in the relevant country for the necessary information.

Subject	Action
Vehicle Registration Certificate	Submit the vehicle registration certificate to the national inspection authority of the country in which the trailer will be registered. The specifications and approval numbers necessary can be found on the vehicle registration certificate.
Warning sticker	Ensure that the warning sticker has been placed in such a way that it is clearly visible to the driver.
CE declaration of compliance	Store the CE declaration with the vehicle documents in accordance with applicable guidelines.
User guide	Provide the client with the DL-S/HFE suspension and steering system user guide. Instruct the client to keep the user guide with the trailer.
Maintenance and repair manual	Provide the client with the DL-S/HFE suspension and steering system maintenance and repair manual. This manual contains the necessary information needed for the workshop to maintain the system.

Table-1 Client documents

7.2 Coupling and uncoupling

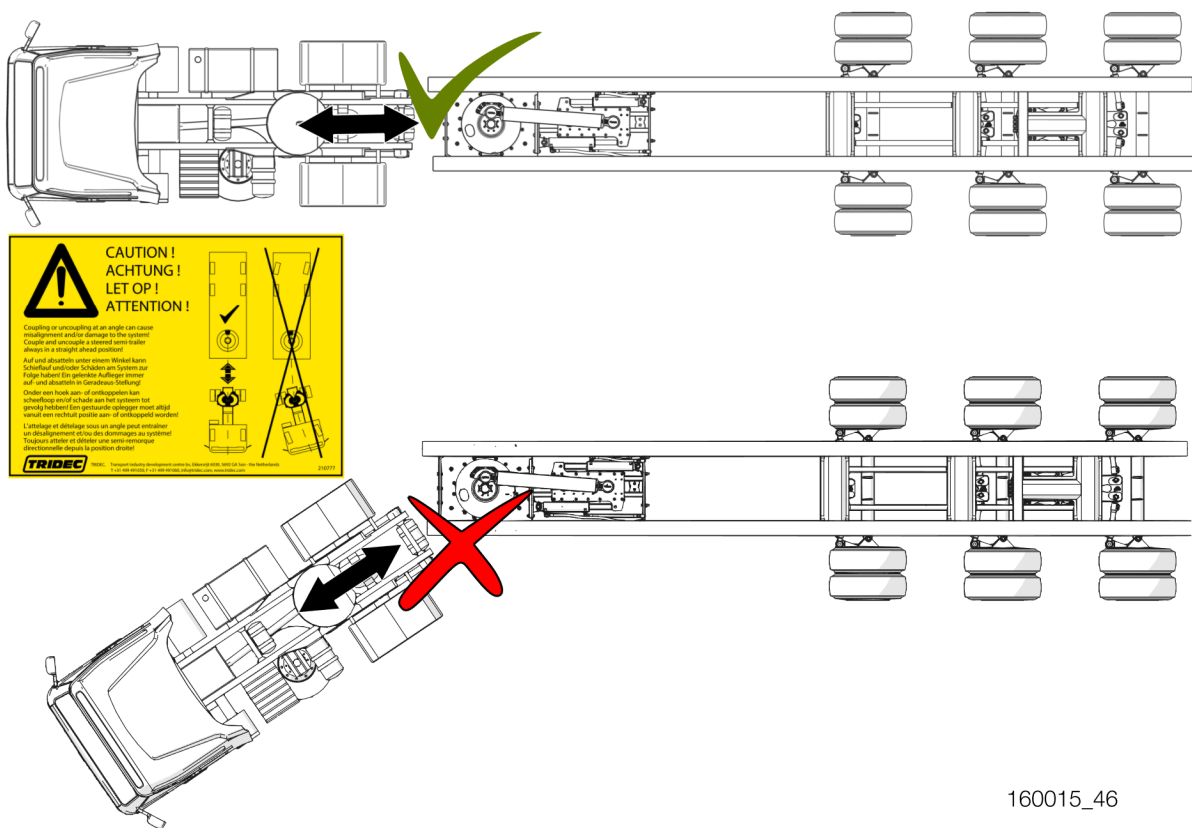


Figure 7-1

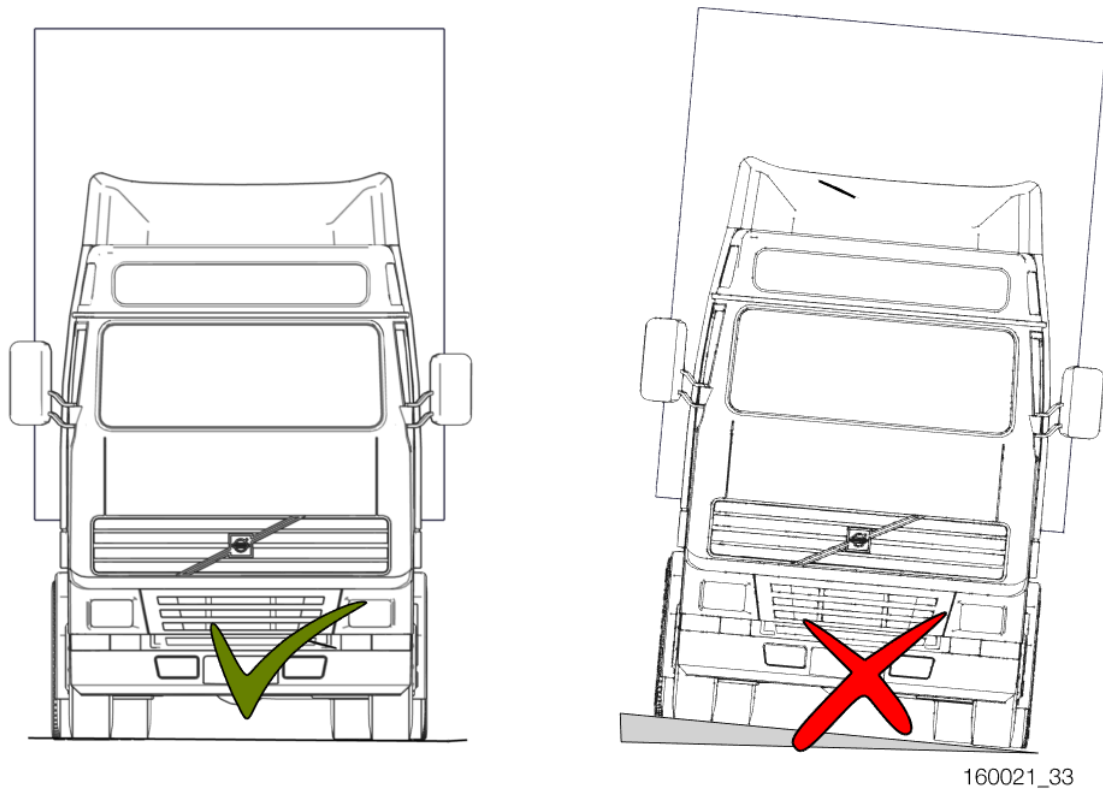


Figure 7-2



Ensure that both the tractor unit and semi-trailer are on the same horizontal surface when coupling and uncoupling.



NEVER park the semi-trailer with steered wheels.



Do not couple or uncouple when there are people or animals in the immediate vicinity of the semi-trailer and tractor unit.

7.3 Use of a steered semi-trailer

The steering behaviour of an unsteered semi-trailer deviates from the steering behaviour of a steered semi-trailer. The centre of rotation (A) of a steered semi-trailer is closer to the tractor unit. This has an impact on the turning radius (C) and the required space on the road. Manoeuvring through narrow streets is simpler with a steered semi-trailer/trailer.

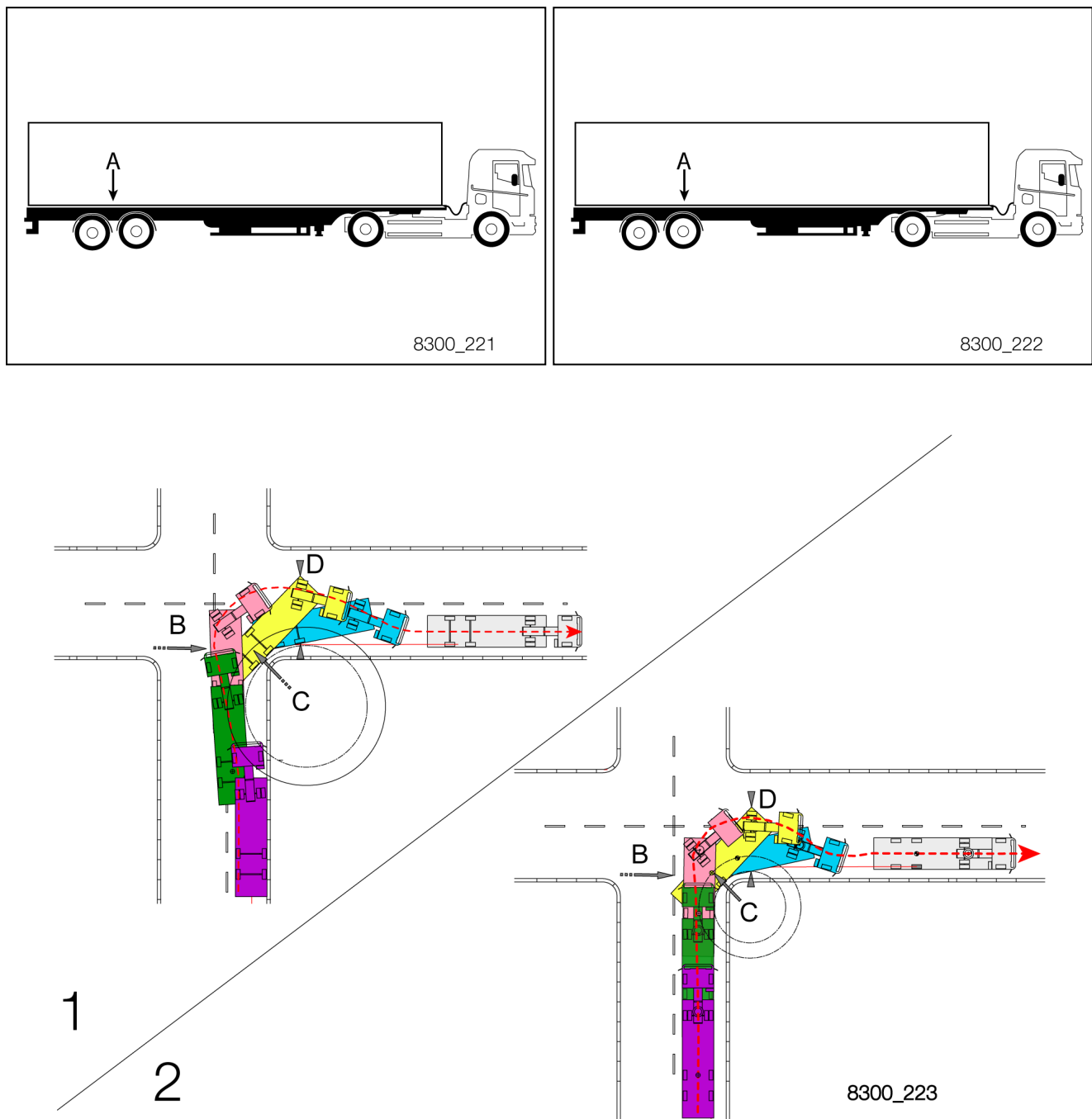


Figure 7-3

- | | |
|--|---|
| 1. Steering behaviour of an unsteered semi-trailer | 3. B = Required space for the semi-trailer swinging out |
| 2. Steering behaviour of a steered semi-trailer | 4. C = Turning radius of a semi-trailer |
| | 5. D = Required space on the carriageway |

The different phases during driving in a bend are shown using colours. The red dotted line shows the described path of the tractor unit and the semi-trailer. The figure (see Figure 7-3) shows that the unsteered semi-trailer has a larger turning radius and therefore needs more space on the carriageway to take a bend.



When taking a bend, the rear side (B) of a steered semi-trailer swings out further than the rear side of an unsteered semi-trailer.




If you do not have any experience with a steered semi-trailer, TRIDEC recommends gaining experience at a site to practice before you go on a public road with your tractor semi-trailer combination.

8 Safety & environment

The following paragraphs contain information regarding safe use of the DL-S/HFE suspension and steering system. It also describes what should be done when the DL-S/HFE suspension and steering system reaches the end of its lifespan.

8.1 Safety while operating

 Operating a trailer with a DL-S/HFE suspension and steering system installed may involve some possible risks. Consult the relevant regulations (for example: road traffic regulations, company procedures, health and safety regulations) which are applicable to the country where the trailer will be used.



General instructions for operating a trailer with a DL-S/HFE suspension and steering system:

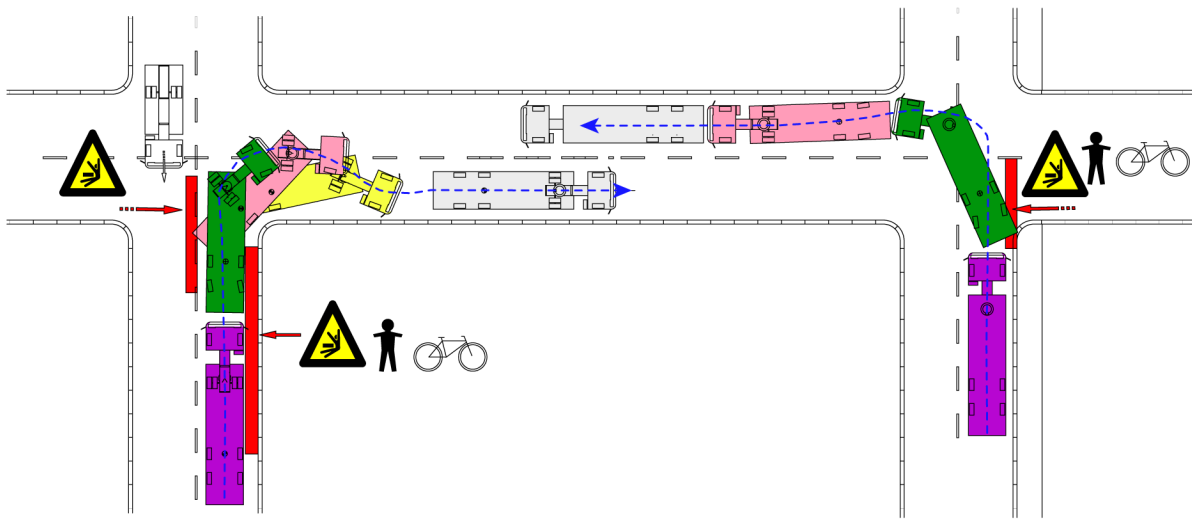
- **NEVER** use or put a trailer with an installed DL-S/HFE suspension and steering system on public roads until compliance with the national road traffic regulations has been established for the entire trailer.
- Read the user guide **BEFORE** coupling and using a trailer with a DL-S/HFE suspension and steering system.
- Execute the daily inspection **BEFORE** coupling and using a trailer with a DL-S/HFE suspension and steering system.
- The truck driver is **ALWAYS** responsible for the use of a trailer.
- **NEVER** drive with a trailer if a signal lamp is lit.
- Only steer the trailer using the DL-S/HFE suspension and steering system if there are **NO** people in the immediate vicinity of the trailer's moving parts.

The nature of possible dangers and restrictions during use are depicted below in the pictograms.



8.1.1 Danger zones for other road users

When a tractor unit with a semi-trailer takes a bend, more space on the carriageway is used. This means that the other road users such as, for example, oncoming vehicles and cyclists will have less space to manoeuvre. The driver of the tractor unit must be fully aware of this and pay extra attention.



8300_062

Figure 8-1

The red areas (see Figure 8-1) indicate where there is a potential danger for other road users when a tractor unit with a steered semi-trailer takes a bend. The red areas demand extra attention during the manoeuvre.

8.2 Environment



The DL-S/HFE suspension and steering system must be dismantled and disposed of in accordance with local and national regulations once it has reached the end of its lifespan, regardless of the cause.

Contact your local or national public services, waste management authority or the supplier you purchased the product from for more information regarding locations where the materials can be collected for recycling.

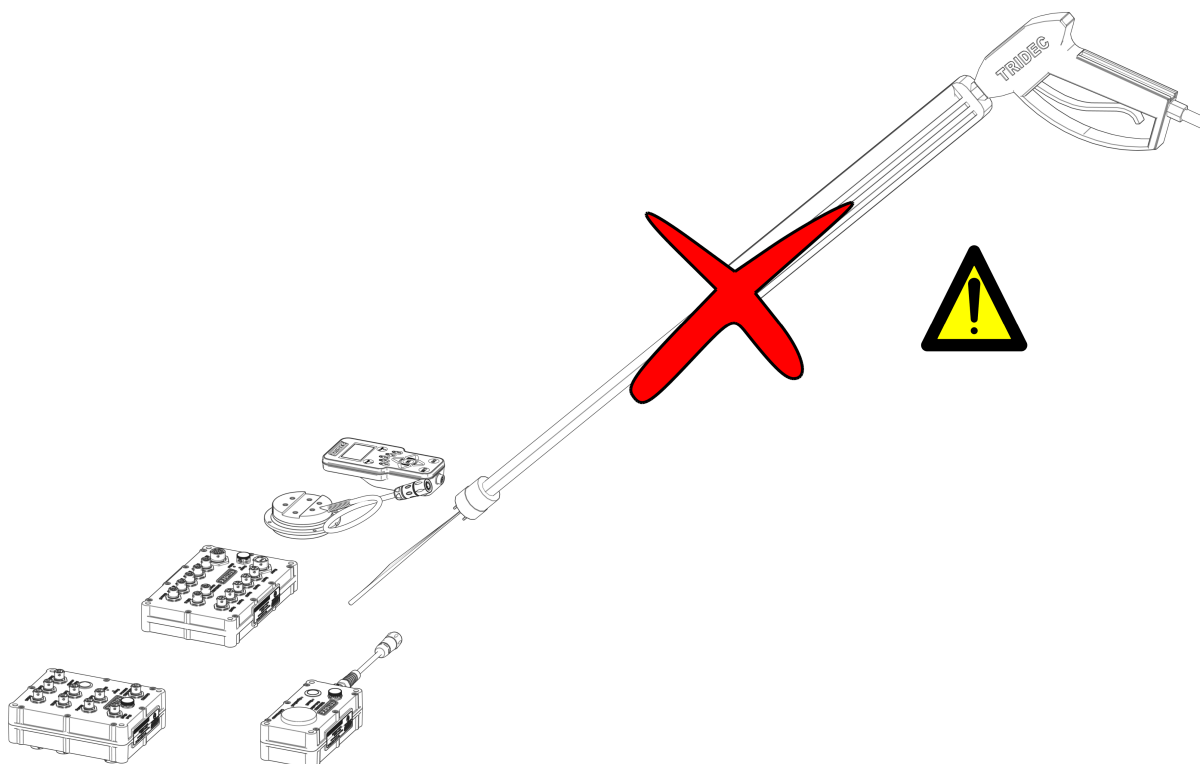
9 General information

The following paragraphs contain information regarding the delivery, storage and guarantee of the DL-S/HFE suspension and steering system .



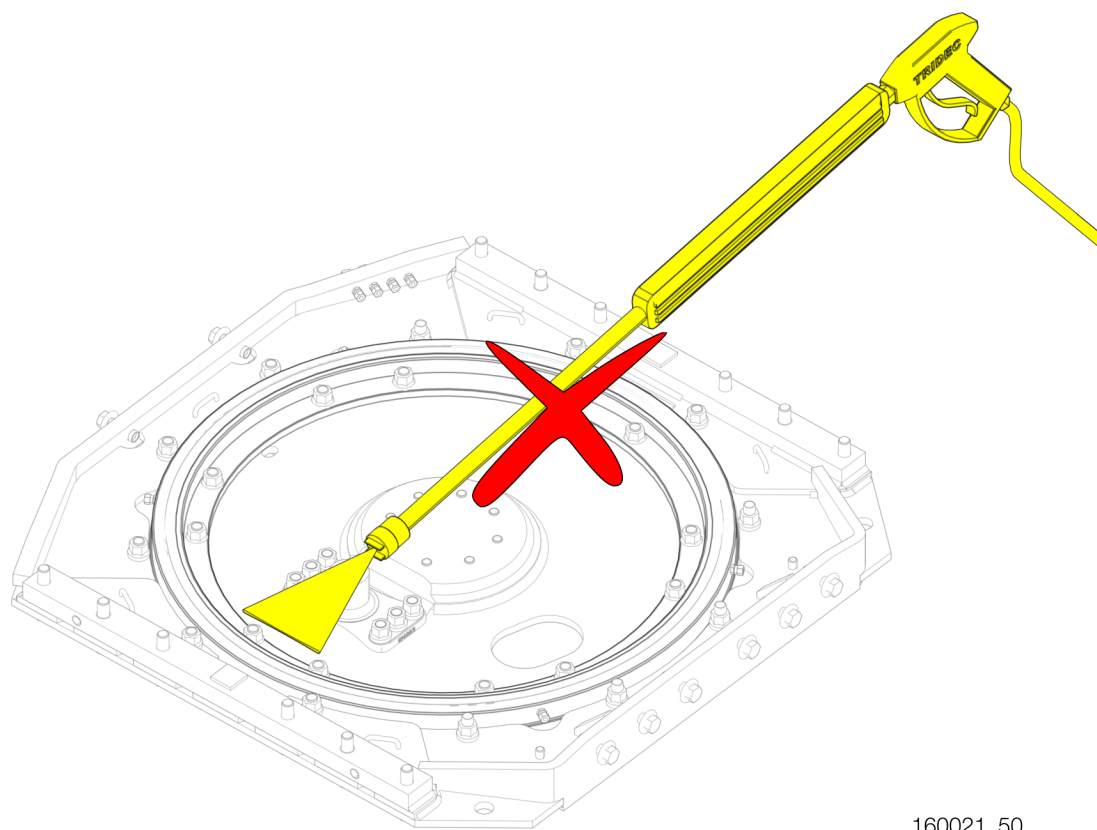
Read the following paragraphs when products are delivered!

9.1 Cleaning



1701_095

Figure 9-1



160021_50

Figure 9-2

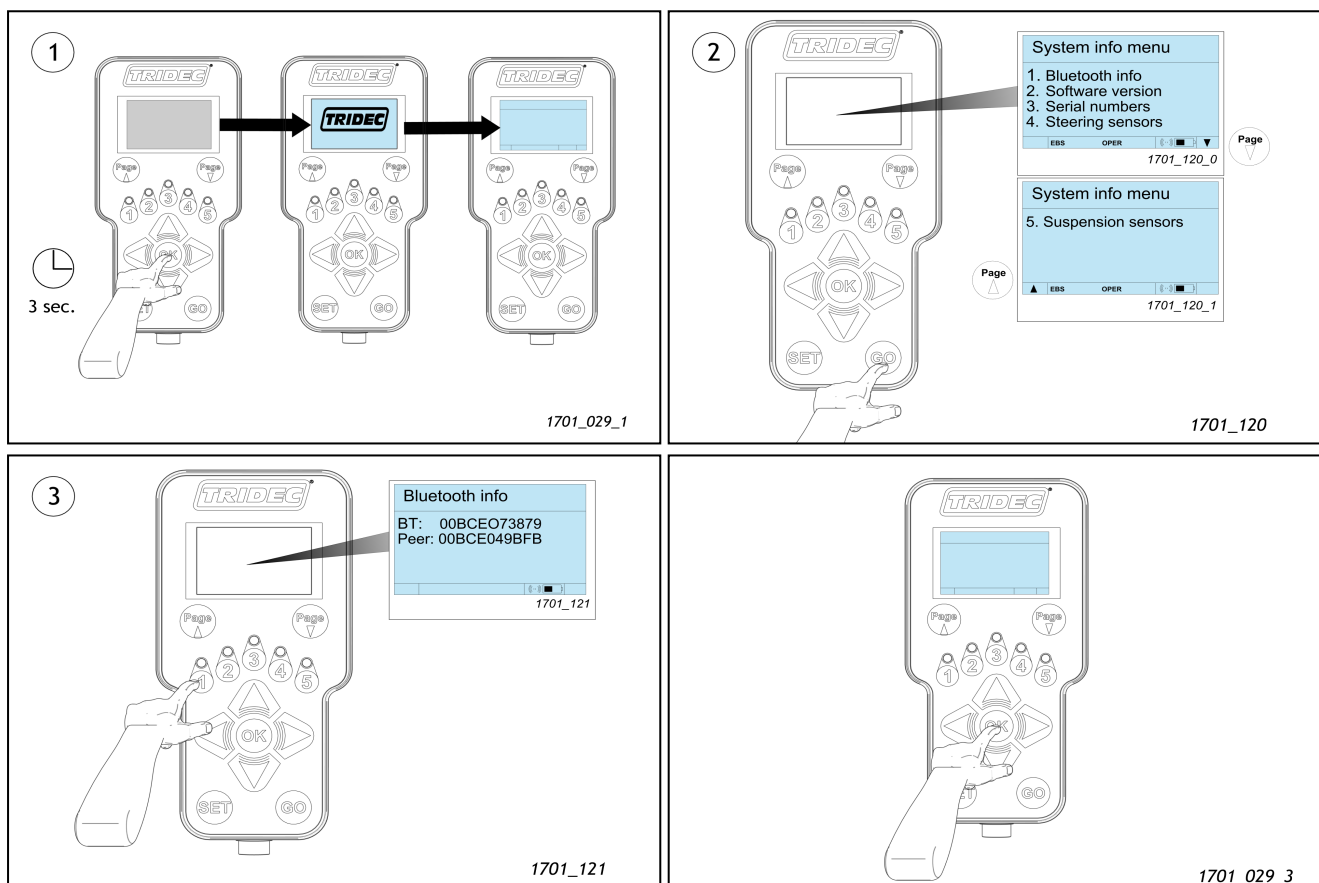
9.2 System information

You can find information regarding the "bluetooth" connection, programme version and the order number in the "System information menu". It is also possible to view readings of the steering and suspension sensors.

9.2.1 Bluetooth

Procedure:

1. Follow the steps below to request information regarding the "bluetooth" connection.



2. Press **OK** to return to the previous screen.
Press **OK** repeatedly to return to the main menu.

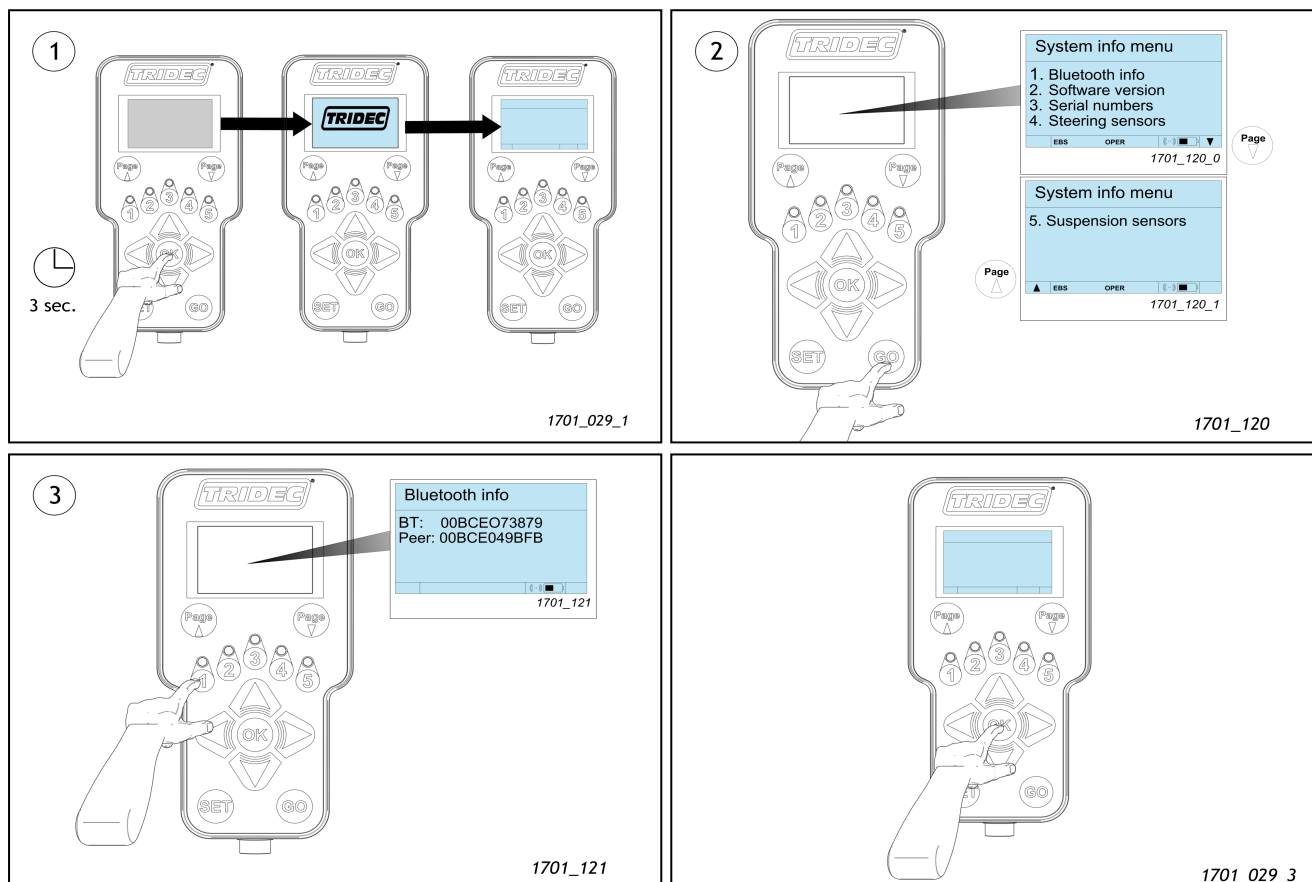
9.2.2 Software versions

Procedure

1. Follow the steps below to request the software versions for the system components.



This information may be of use with service queries.

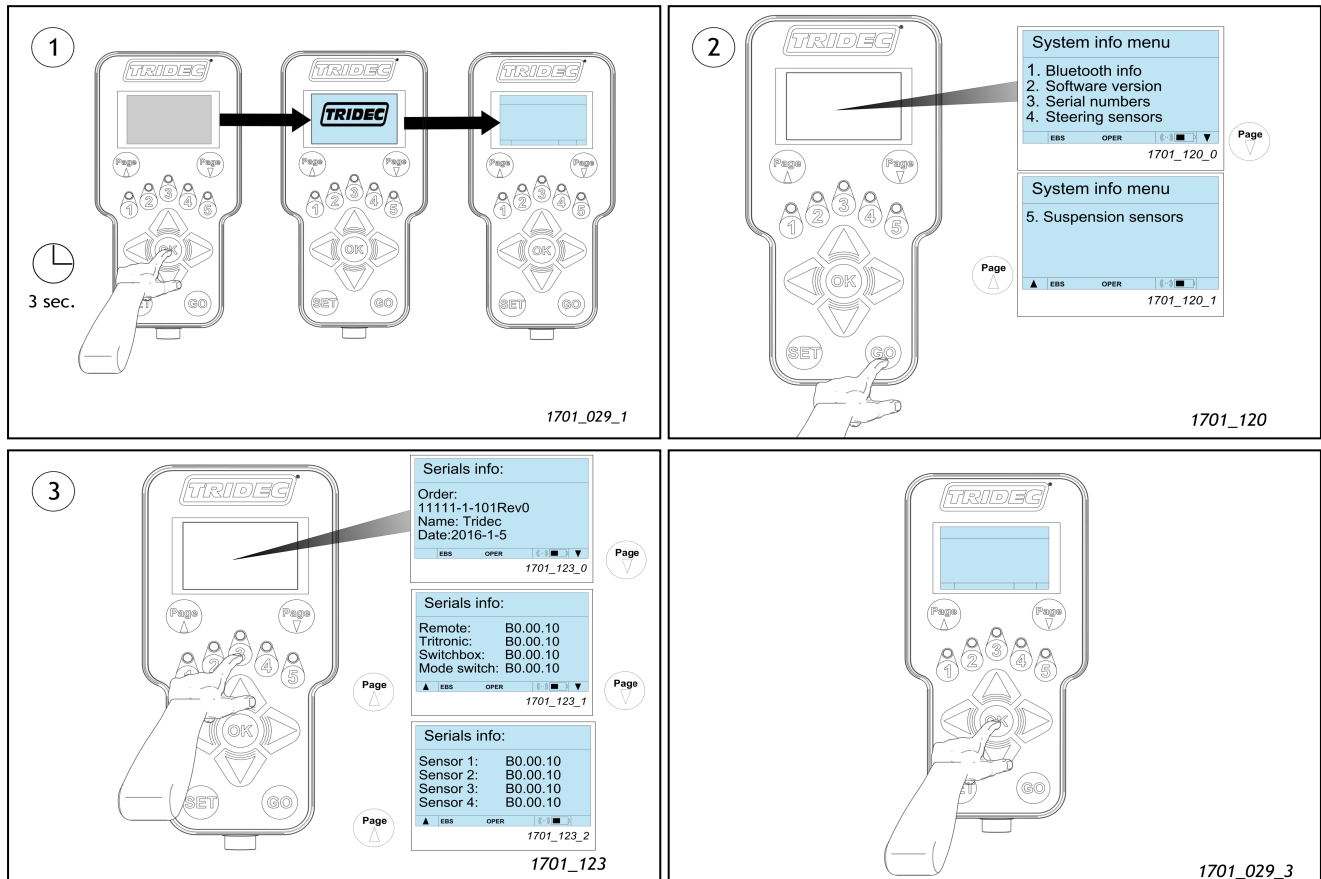


2. Press **OK** to return to the previous screen.
Press **OK** repeatedly to return to the main menu.

9.2.3 Serial and order number

Procedure:

1. Follow the steps below to request the component serial numbers and the order number.



2. Press **OK** to return to the previous screen.
(Press **OK** repeatedly to return to the main menu.)



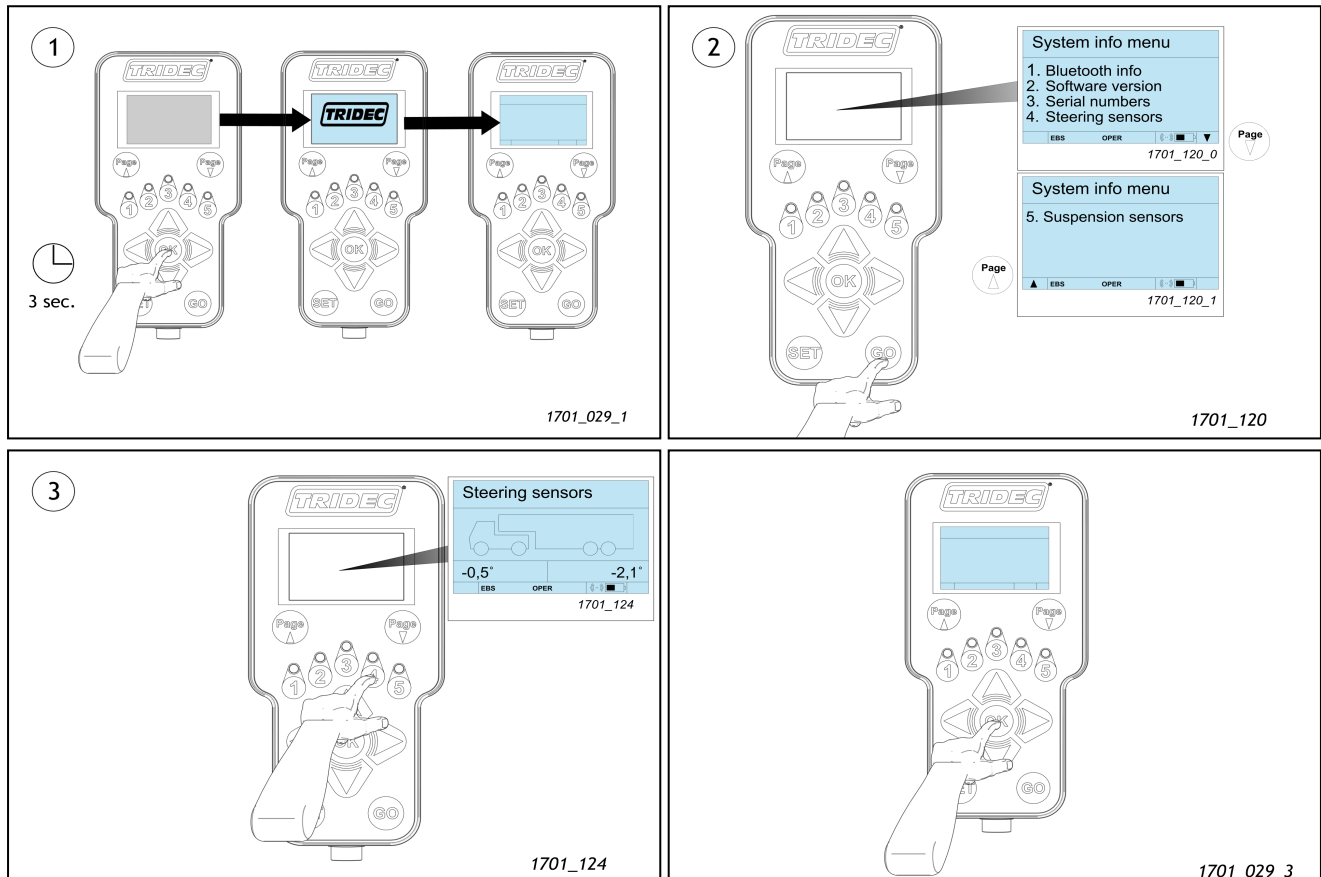
This information may be useful for service queries.

9.2.4 Steering sensors

The values in the "Steering sensors" menu display the actual deflection between the truck and the trailer and the deflection of the wheels on the steered axle respectively.

Procedure:

1. Follow the steps below to request the relevant information.
2. Press **OK** to return to the previous screen. Press **OK** repeatedly to return to the main menu.



9.3 Pictograms

The following pictograms are used in this user guide:

















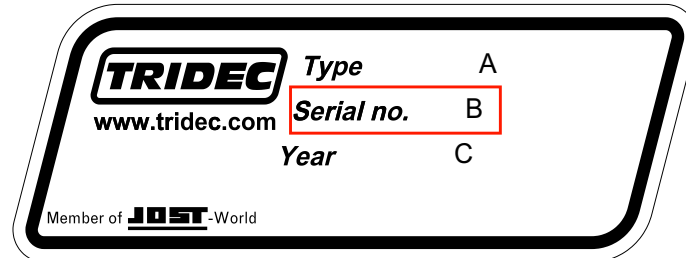
Description	Description	Description
 Important message!	 Tip	 Delivery information.
 Danger of becoming trapped!	 Read this information before you start!	 Information regarding use!
 Provisions set by TRIDEC.	 Recycle	 Alignment tool
 Tyre pressure	 Driving direction	 False
 Important restriction!	 Chance of damage to the system!	 Parts
 Lubricate		

Table-2 Pictograms

9.4 Type indication

Products manufactured by TRIDEC (see 9.4), are given an identification sticker.



8300_007

Figure 9-3

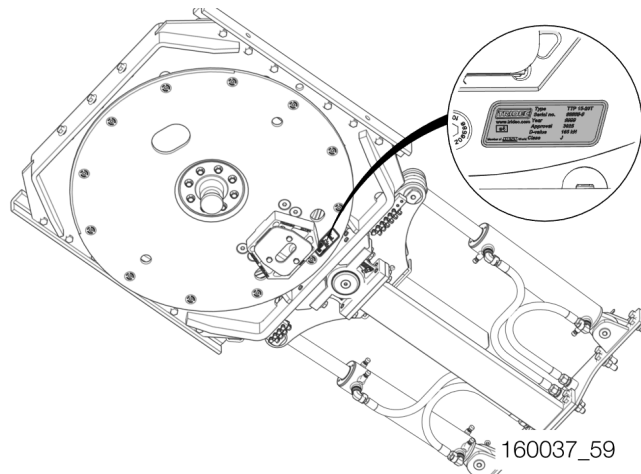


Figure 9-4

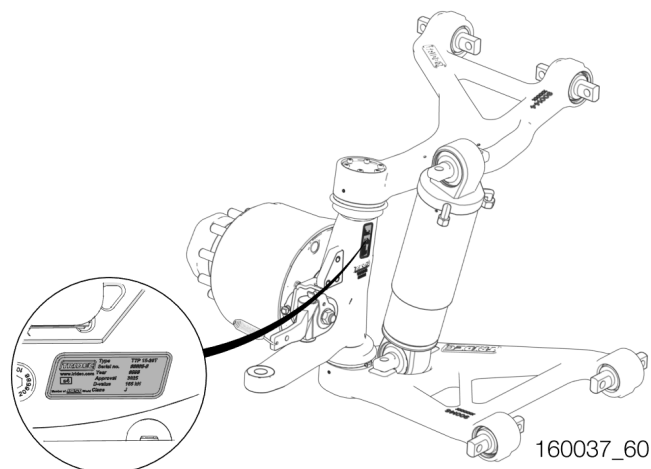


Figure 9-5

The sticker provides essential information for ordering replacement parts. All product-specific information can be obtained by referencing the serial number on the sticker.

- Type: coding for the product version.
- Serial no.: the order number (required when ordering parts).
- Year: year of construction.



Never remove the sticker affixed by TRIDEC!



The serial number is required for obtaining the correct service information and for ordering parts.

The meaning of the type coding on the sticker is given in the table below (example).

SE 15 10 S TD G	Description
S	Steering system
E or T/D/V	Number of axles under the semi-trailer (E=1, T=2, D=3, V=4 or 5)
15/20 or 26.5	Maximum load (tonnes) on the fifth wheel unit (1 tonne = 1000 kg)
10	Number of steered axles (00=0, 10=1, 20=2, etc.)
S/T	Turntable type S=1200 T=1110
TD	Type of steering system
G/K/T	Type of fifth wheel unit (G= bolt connection K= extra-low version)
XXXXX-X-XXX	Serial number

Table-3 Type indication

10 Maintenance periods


		
Maintenance when commissioning		
Slewing rings	Lubricate the slewing rings	see the service manual

Table-4 Maintenance


		
Maintenance after 10,000 km or after 2 months at most		
Slewing ring	Lubrication	see the service manual
Kingpin	Retighten bolts and nuts	see the service manual

Table-5 Maintenance


		
Maintenance every 25,000 km or every three months. (Under extreme conditions* every 10,000 km or every 1.5 months.)		
Fifth wheel unit	Lubricate at all grease nipples.	

Table-6 Maintenance

*If used in countries where it rains often and a lot and/or where a lot of salt is gritted in the winter on the roads such as in the UK, Ireland, Denmark, Norway, Sweden and Finland.

*If the vehicle is regularly cleaned using chemicals.


Maintenance after 100,000 km or after 12 months at most

Slewing ring	Measure the axial/radial clearance.	see the service manual
Steering wedge	Free movement and wear	see the service manual
Kingpin	Wear	see the service manual
Ring plate	Deformations	see the service manual

Table-7 Maintenance

10.1 Daily maintenance

The DL-S/HFE suspension and steering system is basically maintenance free. TRIDEC, however, recommends that the visual checks below be performed before any use;






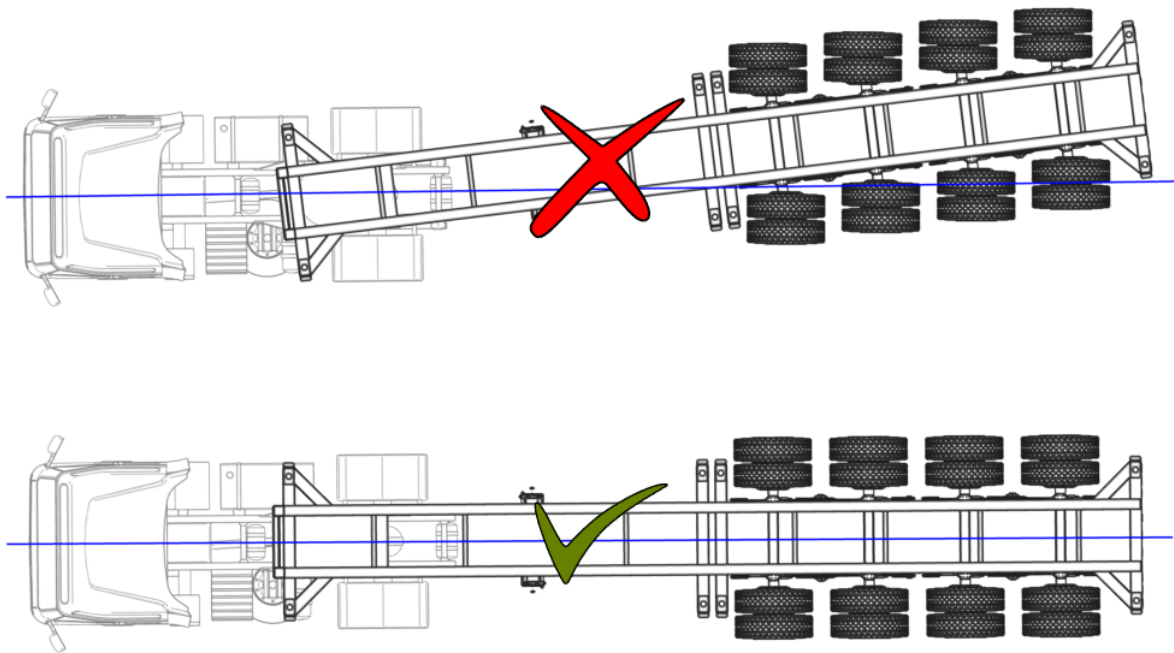
	Check	Action
	 Check for missing or loose bolts and nuts.	Tighten loose bolts or nuts using the correct tightening moment. If required, install new bolts and/or nuts.
	Check the semi-trailer for damage that may have an impact on the driving behaviour.	Contact the service workshop if there is damage.
	 Check that the semi-trailer/trailer follows the tractor unit in a straight line (see Figure 10-1).	Check for damage to the steering system and align the semi-trailer.

Table-8 Maintenance



160021_46

Figure 10-1

10.1.1 Lubricant

Lubricate a DL-S/HFE suspension and steering system using a lubricant that meets the NLGI class 2 specification. If a central lubrication system has been connected, a grease type may be used that meets the NLGI class 0 or NLGI class 2 specification. Verify this using the manual of the central lubrication system.



Only use lubricants that are prescribed by TRIDEC in a DL-S/HFE suspension and steering system. Other lubricants are **NOT** permitted.

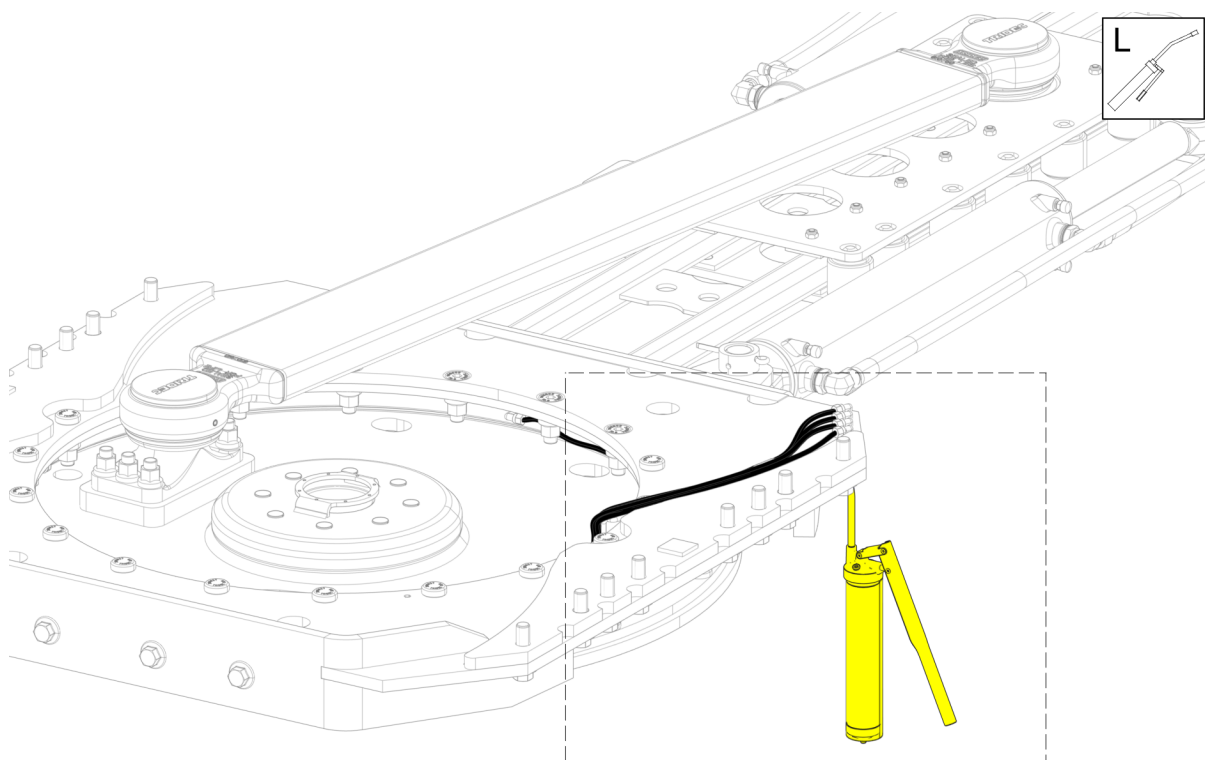


Caution! Replace lubricants of a DL-S/HFE suspension and steering system within the maintenance period set by TRIDEC.

Procedure

1. Uncouple the semi-trailer and lift the wheels of the steered axle(s) so that they no longer are in contact with the ground.
2. Turn the ring plate from left to right when lubricating the slewing ring to distribute the grease uniformly over the slewing ring.
3. Remove the surplus grease that comes out from under the seal of the slewing ring.

Lubrication points



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Figure 10-2

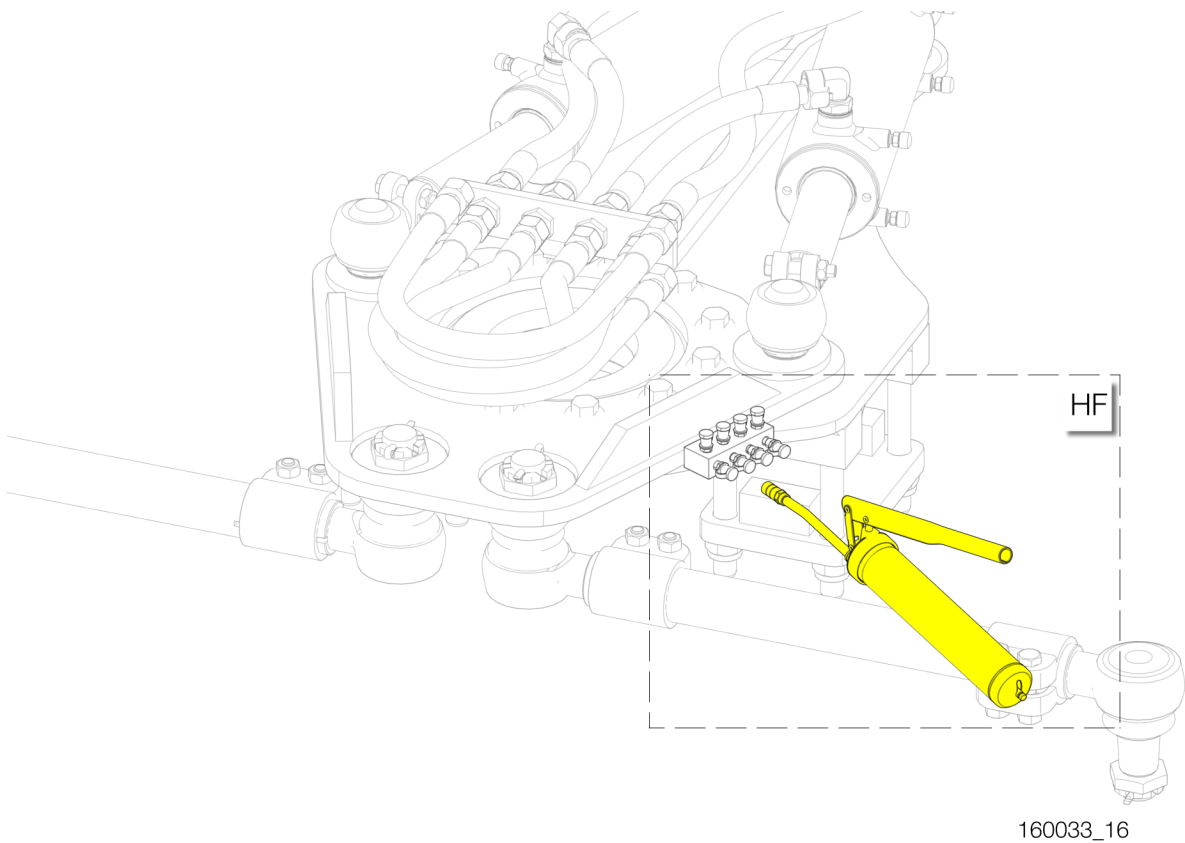
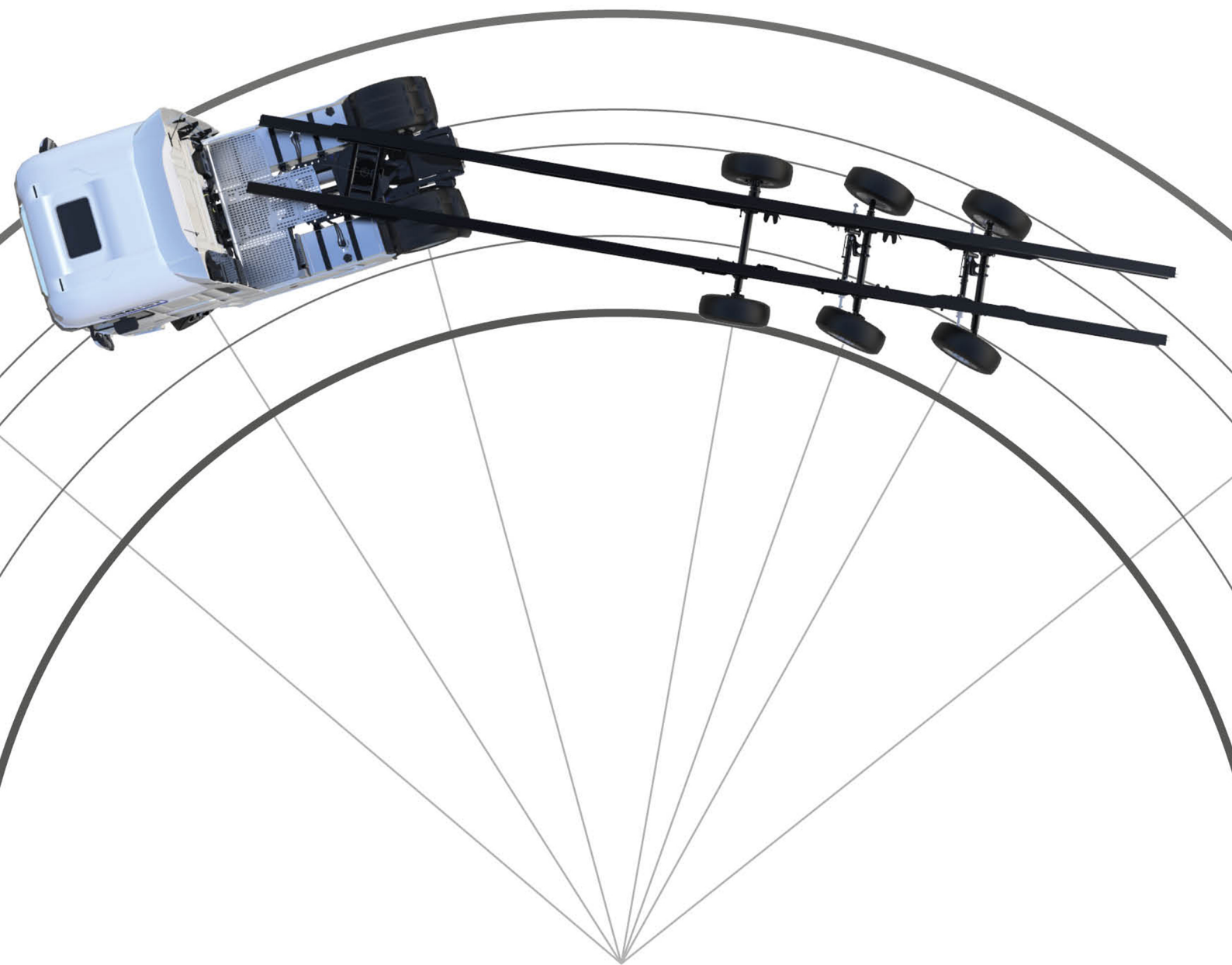


Figure 10-3

Excellent manoeuvrability



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