



Installation and operating instructions ETS Plus

Electronic Trailer Stabilisation system

KNOTT)))

ETS Plus: Compact safety. Perfectly integrated.



13-pin plug
(Connection to towing vehicle)

Indicating device
2-colour LED

ETSPlus
Central unit with sensors and
brake application device

Installation and operating instructions for the ETS Plus are available to download from our site www.besser-knott.de in multiple languages!

Read operating instructions and act accordingly. Keep the operating instructions for general use. Observe safety precautions and warnings.



“Attention” indicates work which must be complied with exactly in order to prevent persons being injured or components being damaged.



Special information on improved handling during operation, checking, adjustment and care work.



Safety-relevant component
We recommend installation by a specialist workshop!

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Relationship to other equipment

Electronic Trailer Stabilisation System (ETS Plus) for fast-running Class O2 (up to 3,500 kg) passenger-car trailers with overrun brakes, mechanical overrun and transmission device and 13-pin trailer connector for towing vehicle.

Application scope

ETS Plus is a retrofittable safety system for trailers/caravans with a mechanical overrun braking system, which can be used in conjunction with both single and tandem axles.

It automatically detects critical oscillations and, if necessary, stabilises the vehicle-trailer combination through targeted brake intervention on the trailer.

A separate Technical Inspection Association (TÜV) approval is not required for the ETS Plus installation.

Technical data

Temperature range: –20°C to 65°C
 Power supply: 12 V on-board voltage (11 – 16 V DC)
 Current consumption: max. 15 A

Recommendation

As the achievable stabilisation effect on the vehicle-trailer combination is largely dependent on the effectiveness of the wheel brakes on the trailer, we recommend the use of wheel brakes with automatic adjustment, to ensure long-lasting and effective stabilisation of the trailer.

This automatic adjustment can also be retrofitted to the majority of our wheel brakes of types

- 20-4320 200 x 35 brake lever Backmat
 - 20-2425/1 200 x 50 brake lever Backmat
 - 25-2025 250 x 40 brake lever Backmat
- at any time.

Further information can be found on our website

www.knott.de

Safety instructions



ATTENTION – crushing hazard!

The power supply may only be connected **AFTER** installation.
Do not reach into the movement area of the ETS Plus central unit.

The ETS Plus may only be used in conjunction with KNOTT components!

The ETS Plus only works with trailers/caravans with a rigid drawbar.

After installing the ETS Plus, check the settings of the brake system according to the separate KNOTT adjustment instructions for the overrun braking system.

Fire hazard!

The continuous positive at the 13-pin socket outlet of the towing vehicle must be fused with at least 15 A and no more than 20 A. If the trailer socket outlet is fused higher, then a 15 A fuse must be retrofitted in the ETS Plus supply line.

A cable cross section of at least 2.5 mm² is required for all supply lines, to ensure proper functioning of the ETS Plus.

Before installing the ETS Plus, the 13-pin plug must be disconnected from the towing vehicle so that the system cannot be activated unintentionally.

The ETS Plus may only be connected to towing vehicles with a 12 V trailer socket outlet according to ISO 11446. Use of a 24 V power supply, as is common on lorries for example, can destroy the device.

The electrical connection between the vehicle and the trailer/caravan must function properly. This must be checked after installing the ETS Plus and each time before driving off.

Do not be tempted to take any safety risks due to the increased safety offered by ETS Plus. Always adapt your driving speed to the weather, road surface and traffic conditions.

As the achievable stabilisation effect on the vehicle-trailer combination is largely dependent on the effectiveness of the wheel brakes on the trailer, it is advisable to adjust your driving style. Overloading the brakes – including through the stabilisation intervention of the ETS Plus – can limit the effectiveness of the brakes. This is entirely the responsibility of the vehicle driver.

The driving stability of the trailer and the effectiveness of the ETS Plus are also highly dependent on the tyre pressure and the condition of the tyres.

The specified physical limits are not invalidated by the ETS plus. Keep this in mind on wet or slippery roads.

Trailers/caravans with a high centre of gravity can topple over before an oscillation arises. This too cannot be prevented by the ETS Plus.

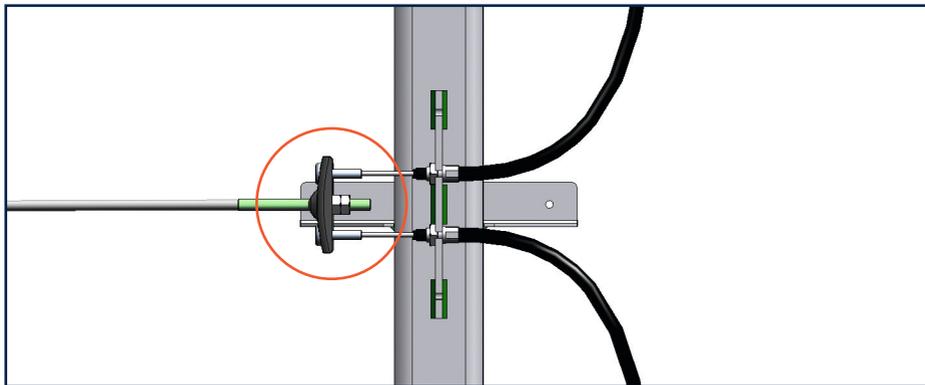
No improper modifications may be/have been carried out on the brake system. This could impair the function of the ETS Plus.

Installation

Selection of correct system configuration:

The ETS system ETS plus is suitable for retrofitting to trailers/caravans with single and tandem axles.

Trailer with single axle



Scenario I: Single axle with brake compensation balance

Trailer with tandem axle

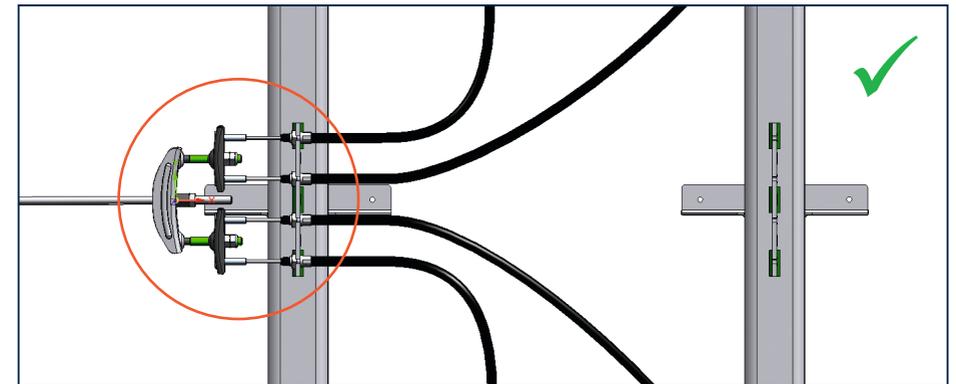


Installation and use of the ETS Plus is only possible on tandem trailers with central compensation – as shown on figure “Scenario II”. Unfortunately, ETS Plus cannot be used with tandem axles from the “DB” series either.

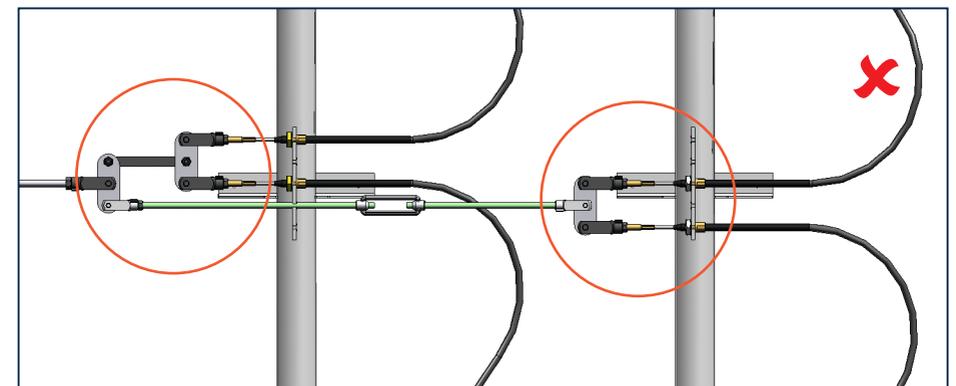
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If your vehicle has a tandem axle and axle-based brake compensation balances as shown on figure “Scenario III” – then you need to use KNOTT ETS02.



Scenario II: Tandem with central compensation



Scenario III: Tandem with axle-based brake compensation balances

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Before the start of installation, check whether the correct ETS Plus system is available for the trailer/caravan to be equipped.

In addition to checking the available axle configuration and correct wheel brakes, the range for the permitted total weight and also the required minimum kerb weight of the trailer/caravan must be checked.

Check the WEIGHT RANGE of the ETS Plus:

KNOTT-wheel brakes

Single axle and tandem trailer with central compensation	Weight range for trailers with a permitted total mass of	Required minimum kerb weight of the trailer	KNOTT wheel brakes (type designation on the rear of the wheel brake)
ETS Plus - 001	750 – 1000 kg	500 kg	16-1365, 20-4320
ETS Plus - 001	1000 – 1400 kg	750 kg	20-4320, 20-2425/1, 25-2025
ETS Plus - 002	1400 – 1800 kg	1000 kg	20-4320, 20-2425/1, 25-2025
ETS Plus - 003	1800 – 2400 kg	1400 kg	20-2425/1, 25-2025
ETS Plus - 004	2400 – 3500 kg	1800 kg	20-2425/1, 25-2025
ETS Plus - 005	650 – 900 kg	400 kg	16-1365, 20-4320
ETS Plus - 005	900 – 1200 kg	600 kg	20-4320, 20-2425/1, 25-2025
ETS Plus - 006	1200 – 1600 kg	900 kg	20-4320, 20-2425/1, 25-2025
ETS Plus - 007	1600 – 2100 kg	1200 kg	20-2425/1, 25-2025
ETS Plus - 008	2100 – 2700 kg	1500 kg	20-2425/1, 25-2025

AL-Ko - wheel brakes

Single axle and tandem trailer with central compensation	Weight range for trailers with a permitted total mass of	Required minimum kerb weight of the trailer	KNOTT wheel brakes (type designation on the rear of the wheel brake)
ETS PLUS - 101	750-1000 kg	500 kg	1637
ETS PLUS - 101	1000-1400kg	750 kg	2051; 2361
ETS PLUS - 102	1400-1800kg	1050 kg	2051; 2361
ETS PLUS - 103	1800-2400kg	1350 kg	2051; 2361
ETS PLUS - 104	2400-3500kg	1800 kg	2051; 2361
ETS PLUS - 105	600-900kg	450	1637
ETS PLUS - 105	900-1200kg	650	2051; 2361
ETS PLUS - 106	1200-1600kg	900	2051; 2361
ETS PLUS - 107	1600-2100kg	1200	2051; 2361
ETS PLUS - 108	2100-2700kg	1600	2051; 2361

Scope of delivery of KNOTT ETS Plus:

Item	Quantity	Designation
1	1	Operating and installation instructions
2	1	ETS Plus – central unit, complete
3	optional*1	ETS Plus – caravan consumer deactivation system
4	1	LED cable set
5	4	Washer (slotted)
6	1	Bracket for signal LED
7	1	Extension for brake linkage
8	1	Hexagonal screw M12x35-10.9 Geomet
9	1	Washer A13 – galvanized
10	1	Hexagonal nut M10 (for securing the extension)
11	2	Lock nut M12-10, galvanized
12	1	Lock nut M14-10, galvanized
13	1	Incidentals for assembly
14	optional*2	Centring sleeve
15	optional*2	Domed collar nut M10
16	optional*2	Securing nut M10 for domed collar nut M10
17	optional*3	Spacer plate



Item 2: ETS Plus – pre-assembled central unit

*1 See marking on box

*2 Only included with AI-Ko chassis version

*3 Only included with universal version



Before the start of installation, the parking brake must be set on the trailer and the wheels must be secured with wheel chocks.



To prevent the trailer from tipping up during installation, it should also be secured by coupling it to a towing vehicle or with the outriggers or with supports at the front and rear on the frame.

I) Installing the ETS Plus central unit

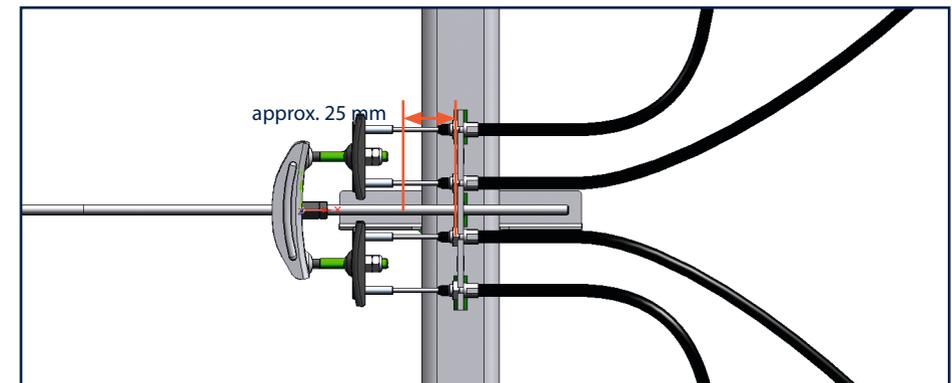
The trailer must be secured by means of wheel chocks and then the parking brake must be released.



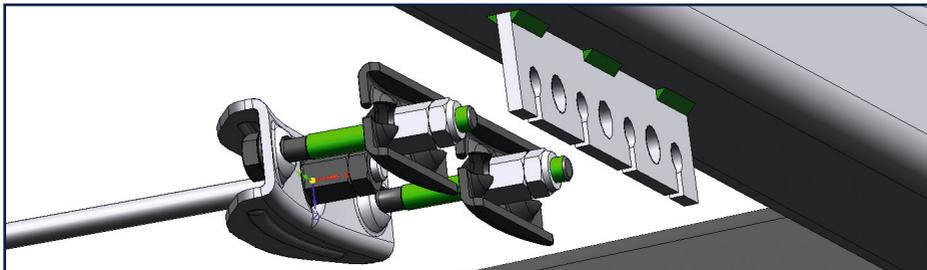
Before the start of installation, check whether the installation space provided on the axles is free from any third-party parts (such as spare wheel holders). If necessary, these must be removed after consulting the vehicle manufacturer.



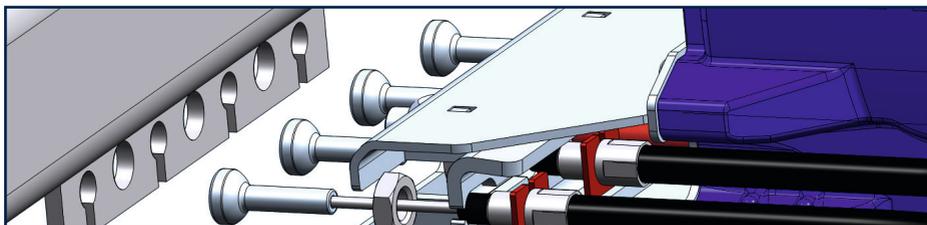
If the brake linkage protrudes through the bowden cable counter bearing, it must be shortened so that it ends approximately 25 mm before the counter bearing.



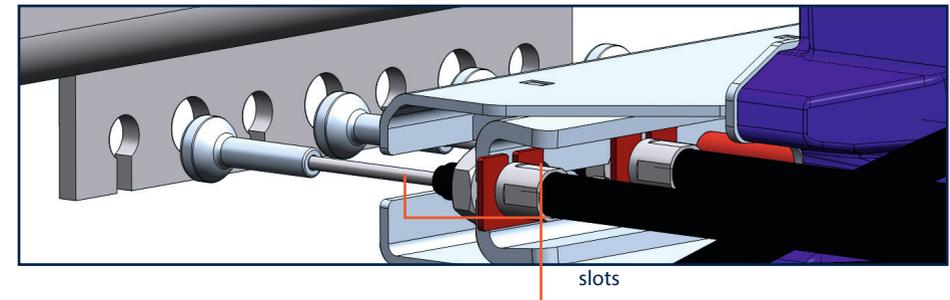
-  Retrofit any suspension of the longitudinal linkage so that the weight of the linkage does not rest on the wheel brake bowden cables.
-  In the case of a trailer/caravan with tandem axles, the ETS Plus central unit must be secured to the front axle
-  Please check the suspension of the brake linkage. This should be suspended at least every 1500 mm towards the chassis/floor.
-  Then the wheel brake bowden cables and the brake compensation balance of the brake linkage must be disconnected and the wheel brake bowden cables must be removed from the bowden cable counter bearing of the axle.



Pre-assemble the wheel brake bowden cables with slotted washer (shown in red) in the bowden cable counter bearing on the ETS Plus central unit as shown in the following figure.

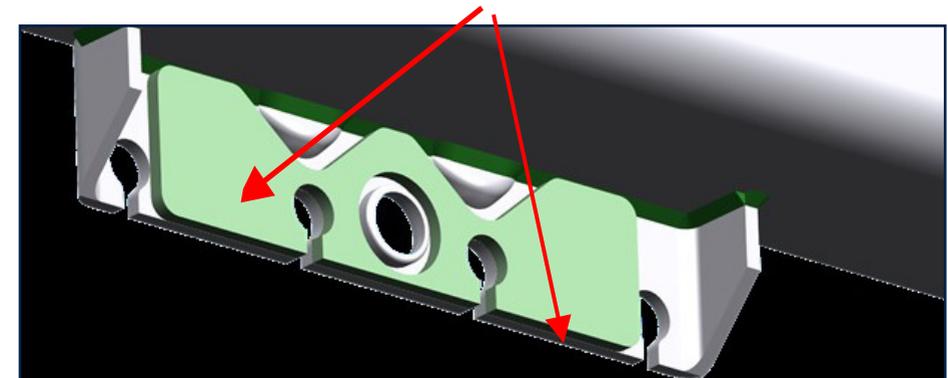


-  The bowden cables must be positioned in the oblong holes according to the hole spacing of the bowden cable counter bearing of the axle and then the bowden cable nuts must be tightened with 40 +5 Nm.

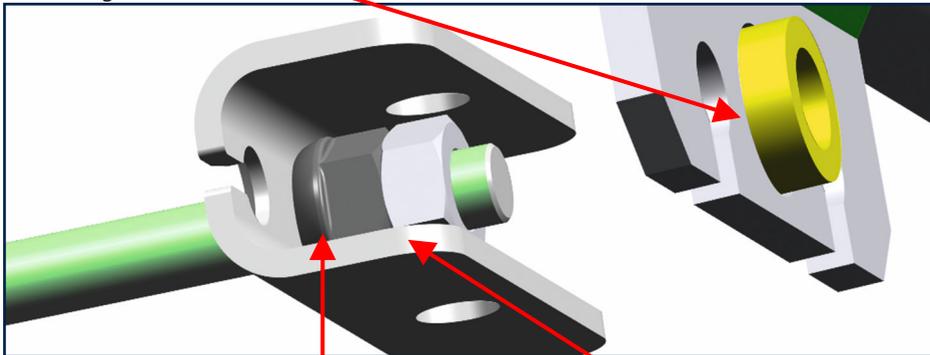


-  When doing so, ensure that the slots in the washers (2 x or 4 x) are positioned perpendicularly to the slot in the bowden cable counter bearing.
-  Fit the preassembled ETS Plus central unit with bowden cables onto the bowden cable counter bearing and place the self-locking M12 nut and washer onto the fixing bolt and tighten with 80 +5 Nm.

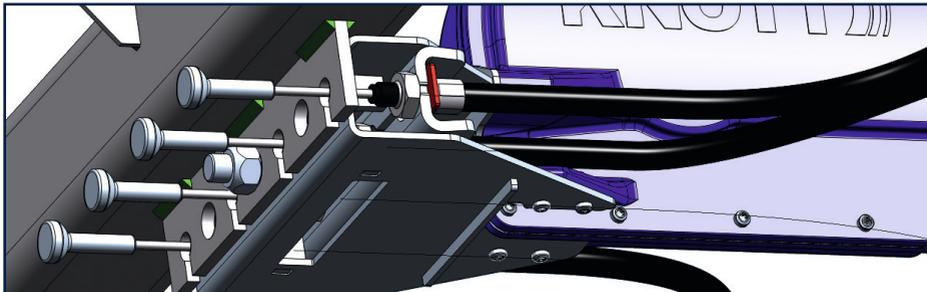
Before fitting the pre-assembled ETS-Plus, check whether the Bowden cable counter bearing is flat or has raised bumps. If the bowden cable counter bearing features raised bumps, then the spacer plate supplied must be inserted into the bowden cable counter bearing as shown.



 ONLY when fitting to a chassis with Al-Ko axles, must the provided centring sleeve (shown in yellow) be inserted in the centre hole of the bowden cable counter bearing.



ONLY when fitting to a chassis with Al-Ko axles, must the domed collar nut fitted by the manufacturer be replaced with the domed collar nut provided and secured with a M10 nut with 45 +5 Nm. The threaded rod should protrude around 5 mm beyond the securing nut. Fit the preassembled ETS Plus central unit with bowden cables onto the bowden cable counter bearing and place the self-locking M12 nut and washer onto the fixing bolt and tighten with 80 +5 Nm.

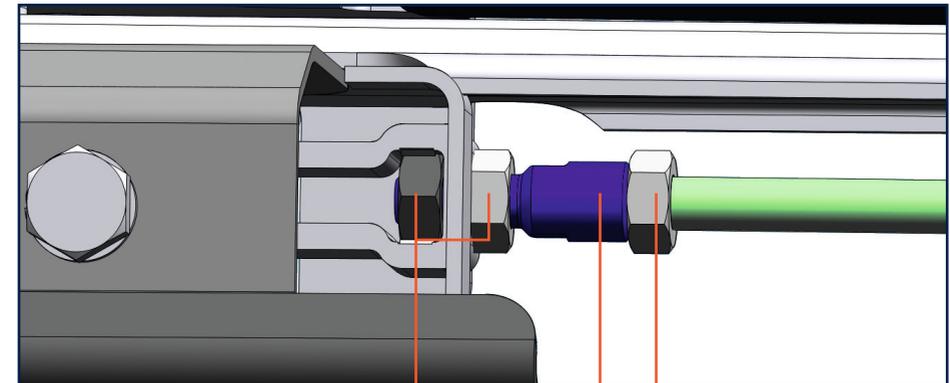


 To do so, hold the bolt head with a flat spanner through the slot in the base plate.

Finally, re-mount the brake linkage.



Should it turn out that the length from the brake linkage is no longer sufficient to connect the wheel brake bowden cables to the brake compensation balance, then the supplied extension (shown in blue here) must be mounted as indicated between the brake linkage and the fork head on the overrun coupling. Minimum screw-in depth 15 mm each

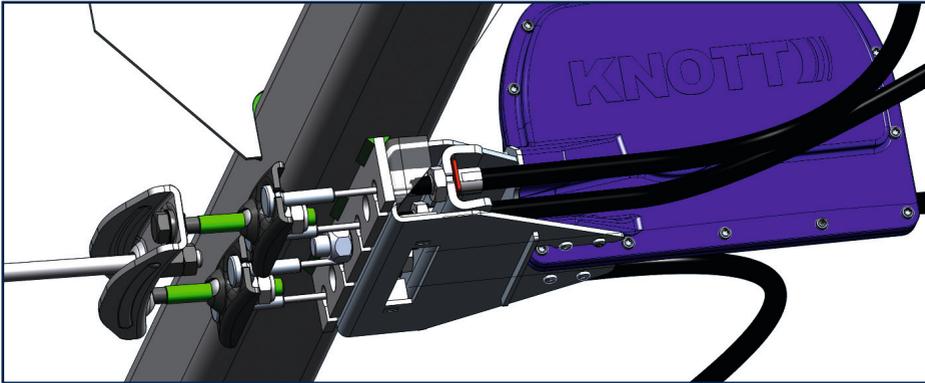


Hexagonal nut secured

M10/M10 extension

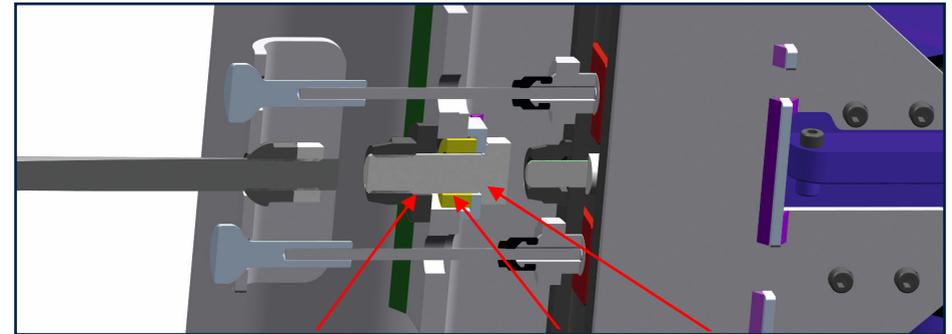
Hexagonal nut secured

-  If the rear end of the brake linkage hits the axle after fitting the extension, then the linkage must be shortened again according to the instruction on page 14.
-  The screw connection between the brake linkage and the extension as well as between the extension and the fork head must be secured with the hexagonal nuts. (Tightening torque: 45 +5 Nm)
-  Finally, the brake linkage must be set so that it is play-free again, but without pre-tension.
-  To correctly set the brake system/the brake linkage, please see our adjustment instructions for our overrun braking system. Alternatively, an instruction video can also be found at: <https://www.knott.de/trailertechnik/info-downloads>



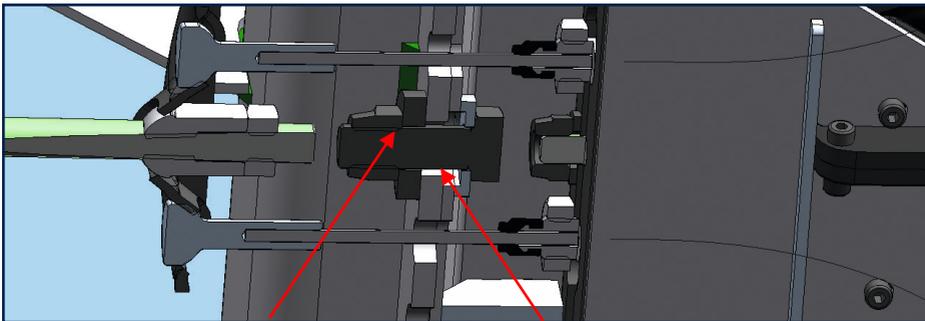
Fully mounted brake linkage with ETS Plus central unit on Knott axle

Fully mounted ETS Plus on Al-Ko axle (view partially cropped)



Lock nut M12 Washer Centring sleeve
Tightening torque 80 +10 Nm

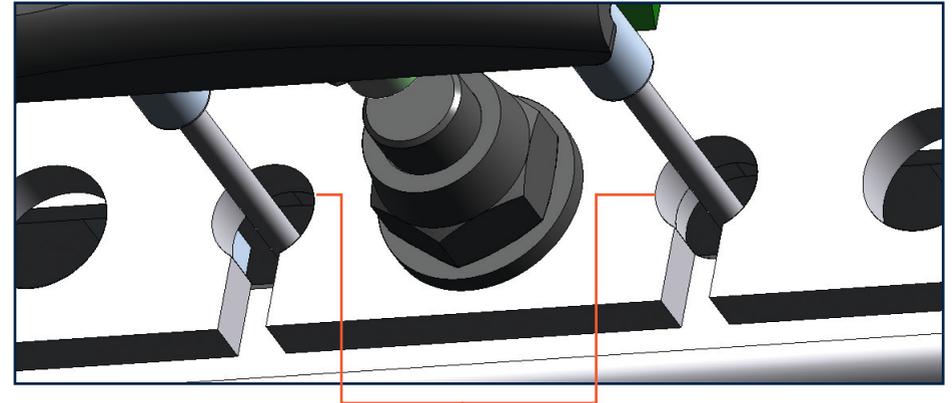
Fully mounted ETS Plus on Knott axle (view partially cropped)



Lock nut M12 Washer
Tightening torque 80 +10 Nm



Finally, it is essential to check that the wires of the bowden cables run cleanly and without contact through the holes in the counter bearing.



The wires must have at least a 2 mm space all around from all interfering edges. If necessary, check that the bowden cable sheaths on the ETS Plus central unit have been fitted so they are correctly aligned or, in extreme cases, the holes on the bowden cable counter bearing must be expanded.

II) Electrical installation/fitting the cable harness

During the electrical installation, it must be ensured that the cables are professionally routed and correctly connected.



We recommend that the electrical connections are made by a specialist.

Fire hazard!



Do not connect the ETS Plus without a fuse (min. 15 A, max. 20 A)!
Never connect the ETS Plus directly to a car battery!

The ETS Plus may only be supplied with a nominal voltage of 12 V.
(Minus to earth) – do not connect to 24 V on-board supply systems!

The trailer must be unplugged prior to installation and de-energised. If necessary, additional batteries in the trailer must be disconnected in advance.

Only use the cables provided!

Do not route cables over sharp-edged corners!
Use edge protection!

Do not route cables near devices with temperatures which exceed 50 °C.

The cables must be cleanly fastened on the trailer chassis or the body every 30 cm with cable ties or cable clamps.



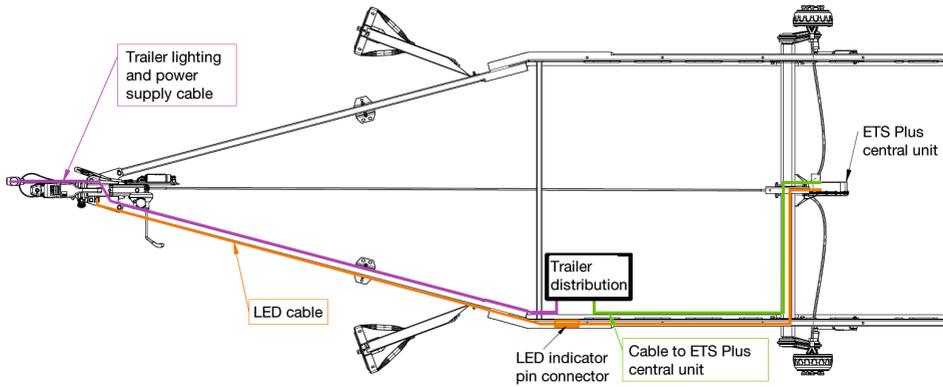
- 1) Route the ETS Plus cable from the ETS Plus central unit to the junction box on the trailer.
- 2) If the junction box is in the trailer, then the cable must be routed through the trailer floor.
 - a) See the operating instructions supplied by the trailer manufacturer.
 - b) The position of the cable feedthrough must be clarified with the trailer manufacturer.
- 3) Drill a hole in a suitable position in the trailer floor (min. diameter 28 mm). Before doing so, make sure that there are no installations or load-bearing parts in or under the trailer floor in the area of the hole.
- 4) Insert the ETS Plus cable and seal with a suitable sealant.

For the remaining cabling, there are two versions, depending on whether it is necessary to deactivate additional consumers inside (e.g. for a caravan) or not.

A) ETS Plus version for general trailers without caravan consumer deactivation

5) Connect the cable on the junction box according to the following instructions.

NOTE: The junction boxes and the wire colours are NOT standardised!
See the operating manual of the trailer/caravan manufacturer for the function of the respective wires. 13-pin/12 V connection diagram



- 6) Connect the LED cable to the "ETS Plus" cable using the pin connector.
- 7) The red litz wire from the "ETS Plus" cable must be connected to the continuous positive (pin 9).
- 8) The black litz wire from the "ETS Plus" cable must be connected to the earth continuous positive (pin 13).
- 9) The LED cable with the pre-mounted indicating LED must be routed to the front and the LED installed according to section III "Installing indicating device (LED)".

i The cables must be cleanly fastened on the trailer chassis or the body every 25 cm with cable ties or cable clamps.

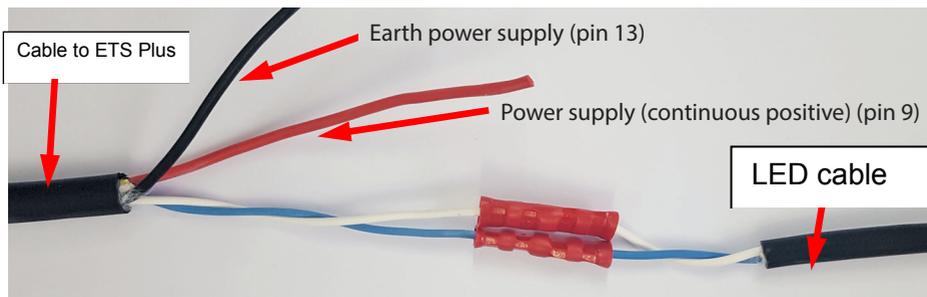
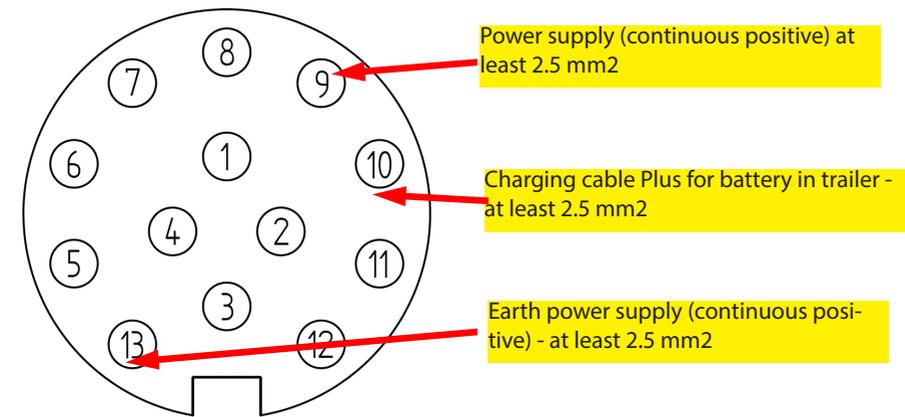


Figure: ETS Plus cabling without caravan consumer deactivation system



Power supply (continuous positive) at least 2.5 mm²

Charging cable Plus for battery in trailer - at least 2.5 mm²

Earth power supply (continuous positive) - at least 2.5 mm²



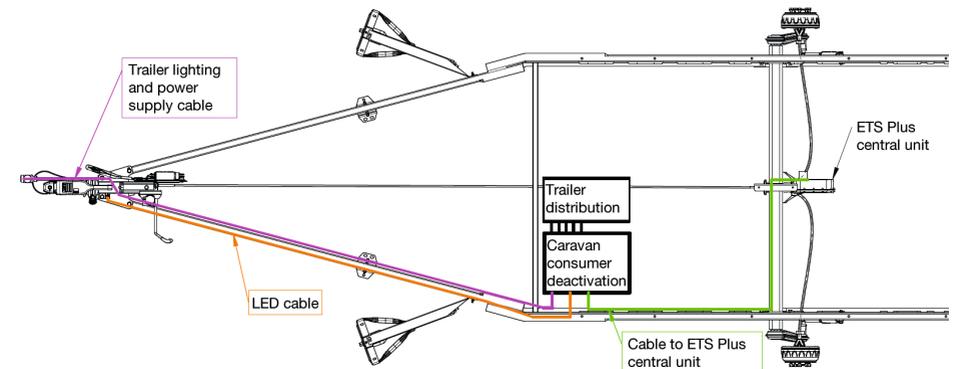
View from behind of the screw pins on the plug

The earth cables must not be connected in a conductive way.

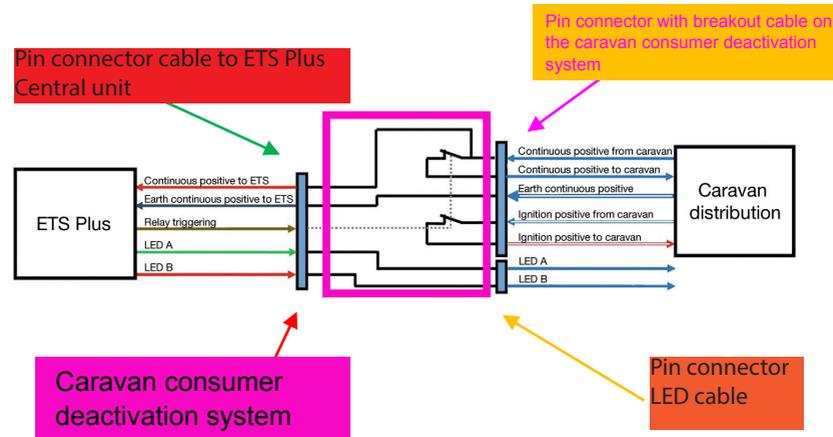
B) ETS Plus version for caravan trailers with caravan consumer deactivation

5) Connect the cable on the junction box according to the following instructions.

NOTE: The junction boxes and the wire colours are NOT standardised! See the operating manual of the trailer/caravan manufacturer for the function of the respective wires. 13-pin/12 V connection diagram



6) Connect the caravan trailer deactivation system between the cable for the trailer lighting/power supply and the trailer distribution according to the circuit diagram.



7) Route the LED cable to the front to the pre-mounted LED on the trailer drawbar according to the "Installing indicating device (LED)" section.

8) Following successful installation, insert the 2-pin cable in the caravan consumer deactivation system.

i The cables must be cleanly fastened on the trailer chassis or the body every 30 cm with cable ties or cable clamps.

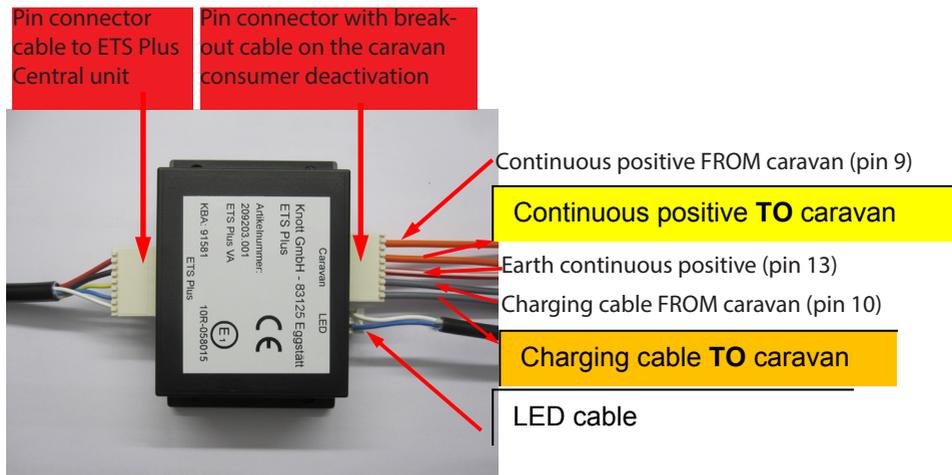
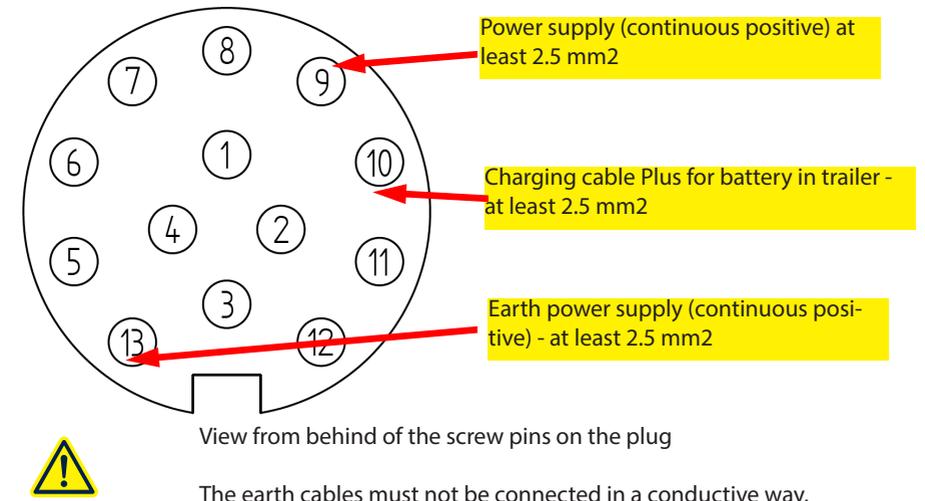


Figure: ETS Plus cabling with caravan consumer deactivation system



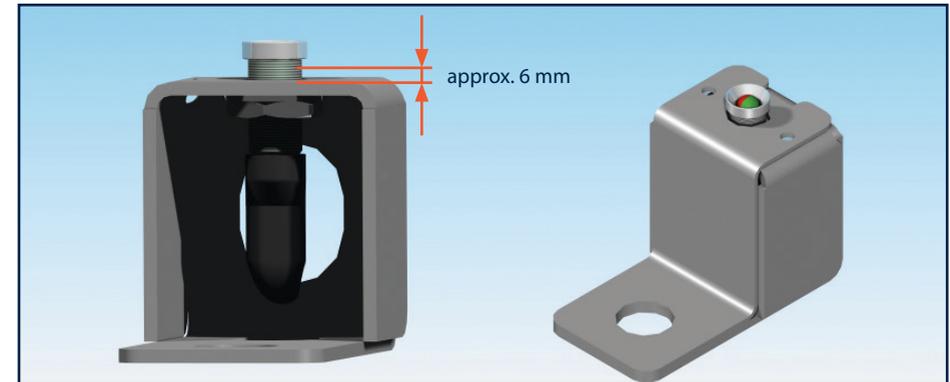
III) Installing indicating device (LED)

The indicating LED must be fastened in a highly visible location at the front on the trailer drawbar so that it is in the field of view on the control elements of the overrun coupling during coupling.

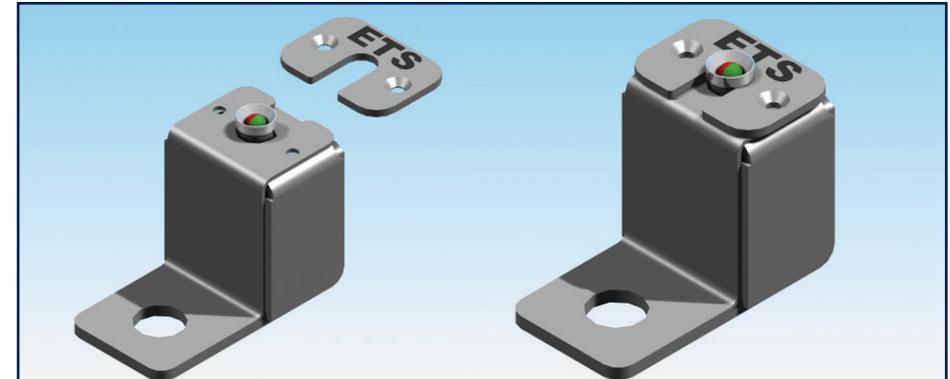
Two possible installation cases must be differentiated here:

- 1) Drawbar without cover hood
- 2) Drawbar with cover hood
 1. Installation on drawbar without cover hood

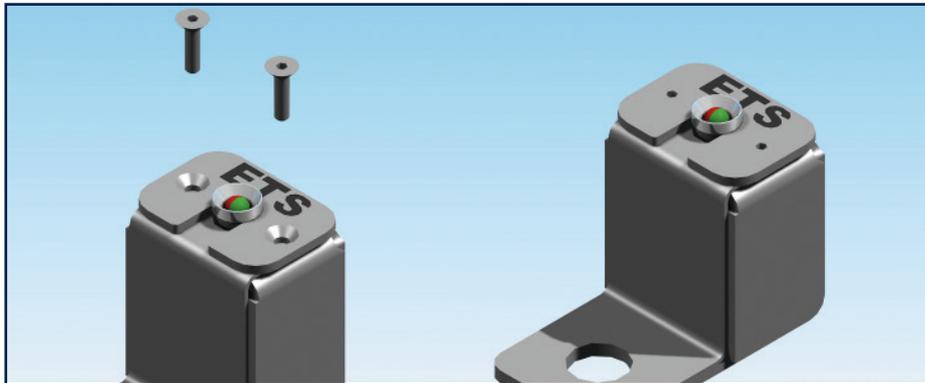
The indicating LED must be installed in the bracket provided beforehand.
 For this purpose, the LED must be inserted in the bracket until the LED protrudes approx. 6 mm at the top. Then slide on the side cover plate.



Next, slide on the cover plate with the marking.

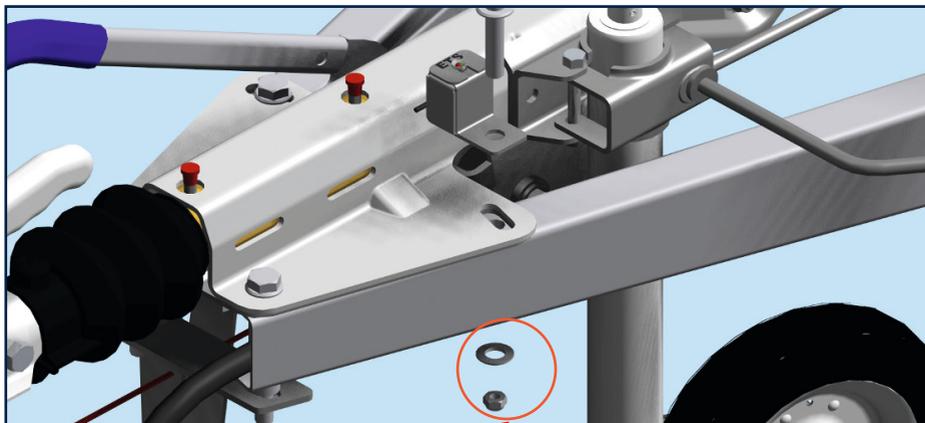


Now screw on the entire package with the two countersunk head screws provided.



The indicating LED is now securely mounted in the bracket and can now be screwed to the overrun coupling.

To do so, the left, rear bolt of the bolting group between the overrun coupling and towbar must be unscrewed. Then the indicating device must be screwed to the overrun coupling and the towbar, as shown in the figure below.



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A new lock nut must always be used when screwing on! (part of the scope of delivery, item 7 + 8)



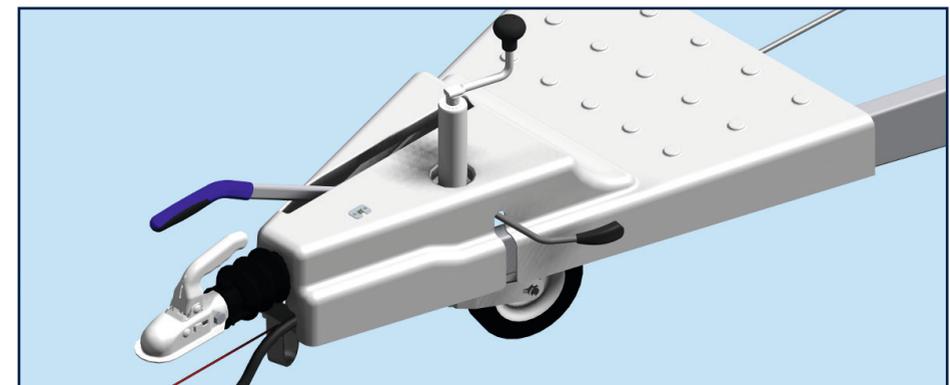
The tightening torque of the bolting group must be checked with a torque spanner before driving off.

Bolt	Strength class	Tightening torque
M12	8.8	80 Nm
M12	10.9	115 Nm
M14	8.8	125 Nm
M14	10.9	180 Nm



The cable of the indicating device must be routed in the towbars/frame parts to the ETS Plus central unit and fastened with cable clamps every 30 cm.

2. Installation on drawbar with cover hood

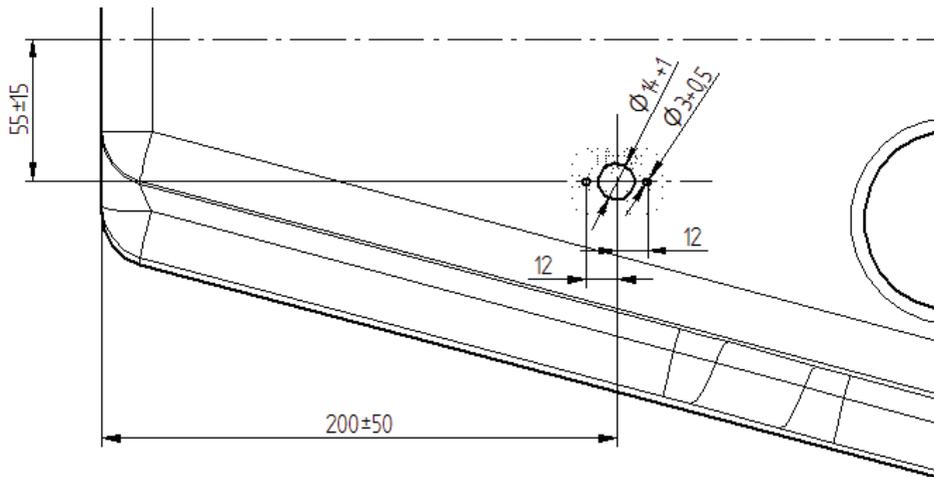


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When installing the indicating device in the cover hood, only the marked cover plate of the bracket provided is required.

At the start of the installation, first the cover hood must be removed in accordance with the trailer manufacturer's specifications.

Now two 3–3.5 dia. holes and one 14 dia. hole must be drilled in the removed hood in accordance with the drawing below.



i To mark the drilling positions, e.g. with a pencil, it is advantageous to use the marked cover plate of the indicating device (drawn with a dotted line) as a template.

Then the indicating LED is guided into the 14 dia. hole so that it protrudes upward by approx. 4 mm.

The fastening nut on the LED must first be loosened by a few turns for this purpose.

Then the retaining plate on the upper side of the hood is pushed over the threaded extension of the indicating LED.

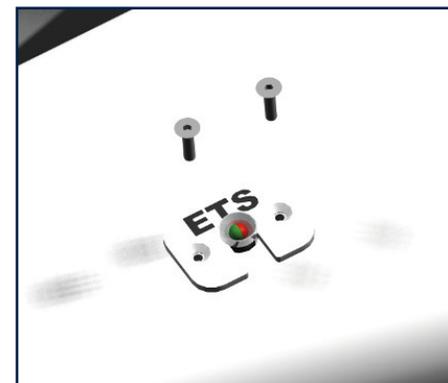
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Next the fastening nut of the indicating LED must be tightened on the underside with 5 +3 Nm.

Then the two M3 fixing bolts can be inserted through the retaining plate and the hood from the top.

These must then be provided with the washers and the lock nuts. Following this the screwing group can be tightened hand-tight.



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Completely installed indicating LED
seen from underside



Completely installed indicating LED
seen from top

IV) Final tests



Following installation, the system must be subjected during commissioning to the following functional testing:



Caution – crushing hazard.

During the self-test, the brakes are briefly applied for one test. Do not reach into the brake linkage or the other moving parts.

Connect the 13-pin plug to the towing vehicle and switch on the ignition on the towing vehicle.

The system now runs a self-test. During this, it briefly tensions the brake linkage. At this point, the indicating LED flashes green (quickly).

Following a successful test, the indicator must switch to a steady green light.



Should the red LED light up instead of the green LED (steady) then the indicating LED is probably wired the wrong way round.

Afterwards, the function of the lighting equipment on the trailer/caravan as well as the function of the electrical consumers on/in the trailer must be checked. Check the LED of the ETS indicating device on the trailer drawbar and evaluate in accordance with page 41 of the operating instructions.

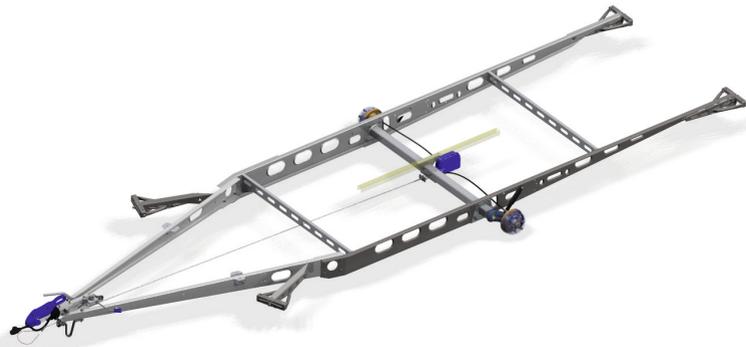
ATTENTION:

If the power supply is interrupted and restored within 15 minutes, the ETS Plus detects a loose connection and suppresses the self-test for approximately 15 minutes.

Based on the 2-colour indicating LED, the respective state of the system can be observed in accordance with the operating instructions.

- 1) A test drive must be conducted while paying particular attention to the function of the overrun braking system and the automatic reverse function.
- 2) Following the test drive, the temperature of the wheel brakes must be checked at the brake boss for conspicuously high temperatures over 180°C, like those which could, for example, be caused by insufficiently released wheel brakes (hot-running brakes).
- 3) Should the service brake require an overrun distance of more than 60 mm during forward driving, then the brake system must be adjusted again according to the adjustment instructions.

Function



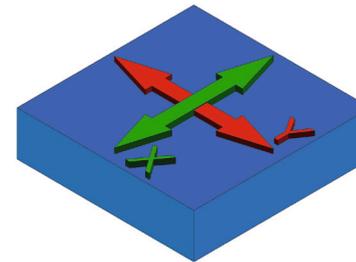
Important design features:

- Trailer as autonomous system
- Interfaces reduced to ball hitch and 13-pin connector (max. contact loadability 15 A)
- Consistent separation of brake system and stabilisation
- Conventional mechanical overrun braking system as fallback level
- Fail-safe concept, i.e. in case of a system failure, no negative effect on the trailer braking behaviour
- Driver is notified of important states via signalling device

OBJECTIVE:

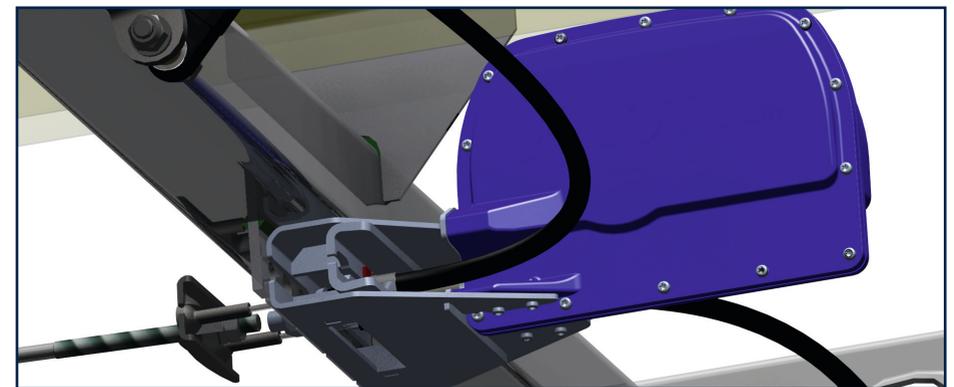
To assist the driver in critical situations with active stabilisation interventions and thereby prevent accidents

An X/Y acceleration sensor mounted in the ETS Plus central unit indicates the current acceleration in both directions. The computer uses this to determine the current driving stability state of the trailer.



2-axial acceleration sensor

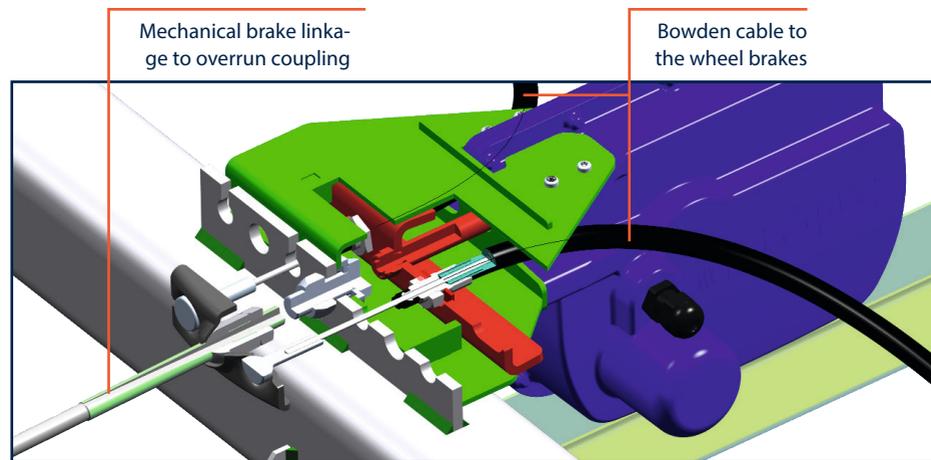
The core component of the system is the central unit mounted on the axles, which contains the motor for the brake application as well as the X/Y acceleration sensor.



ETS Plus central unit mounted on the axle beam

If the control computer detects an unstable vehicle state, then the motor pushes the bowden cable sheaths backwards via a gear with toothed rack, thereby applying the mechanical wheel brakes.

The application of the wheel brakes results in gentle braking of the trailer, the vehicle/trailer combination is straightened and the trailer is thereby stabilised.



Detailed view of the ETS Plus central unit on the bowden cable counter bearing of the axle

The resulting, light braking jerk of the trailer along with an optionally available wireless remote indicator for inside the towing vehicle inform the driver about the intervention and urge them to adopt a more appropriate driving style.

Once the vehicle-trailer combination is stabilised, the toothed rack of the ETS Plus central unit is returned to its idle position.

If the power supply fails, the ETS Plus central unit is powerless. The return springs of the wheel brakes immediately pull the bowden cable a step back and release the brakes. The bowden cable sheaths push the ETS Plus central unit fully into the initial position, at the latest when the driver next triggers the brakes.

Even so, the trailer brake system remains fully functional without any restrictions, because the wheel brakes are connected to the mechanical overrun coupling via a linkage.

The diagram of the entire system provided below is intended to illustrate all relationships shown again. Once again, note the strict separation of the mechanical overrun braking system from all control circuits.

To round off the safety concept, it should be added that the control computer has a sophisticated safety concept and monitors the correct functioning itself.

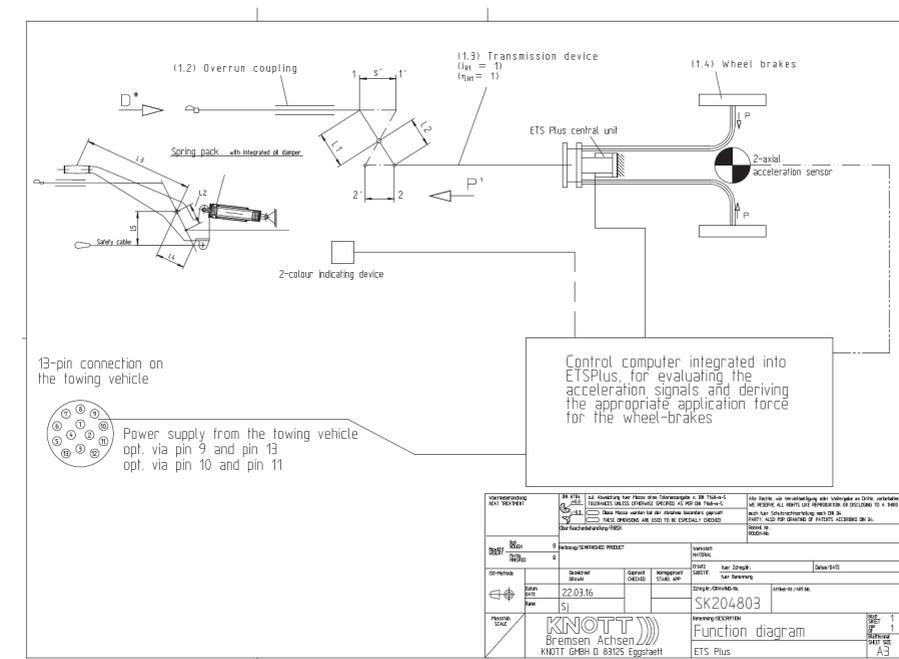


Figure: Diagram of the retrofittable ETS brake system

Operation

Components for operator: 13-pin plug (completely assigned as per ISO11446)
Optical signal generator (2-colour red-green LED)



ATTENTION:

The use of an adapter plug between the 7-pin socket on the towing vehicle and 13-pin plug on the trailer is not permissible in conjunction with this system! If used, the ETS Plus would remain inactive.

Coupling

- Couple the trailer to the towing vehicle
- Hook in the breakaway cable
- Release the parking brake or remove the wheel chocks
- Check the 13-pin plug for damage and dirt and check its condition – clean or repair if necessary
- Connect the 13-pin plug
- Check the light-emitting diode (LED) of the ETS system

The system starts a self-test.

During the self-test, the LED flashes green (quickly) and if the system is ready to operate, it changes to GREEN (steady) after approximately 3 seconds.

The vehicle-trailer combination is ready to drive when the LED is lit up in GREEN or flashing in GREEN.

Decoupling

- Secure the trailer against rolling by actuating the parking brake or with wheel chocks
- Raise the drawbar with the jockey wheel and open the ball coupling
- Unhook the breakaway cable
- Disconnect the 13-pin plug on the towing vehicle. We recommend the use of a separate parking outlet to protect the plug against dirt and damage.

Driving operation

If an instability is detected, the ETS Plus actuates the wheel brakes, straightens and slows the vehicle-trailer combination until a stable driving state is reached again. During this intervention, the green indicating LED flashes (quickly) so that the intervention is also indicated visually.



If the ETS Plus has to intervene frequently within a short period, for example due to an inappropriate driving style, this can lead to the wheel brakes/ETS Plus overheating. The ETS Plus will then switch itself off temporarily until the wheel brakes and the ETS Plus have cooled down sufficiently.



During this temporary deactivation period, the LED flashes green slowly to warn the driver to adopt a more careful and moderate driving style.

Maintenance and cleaning:

A visual inspection of the trailer must be conducted at regular intervals.

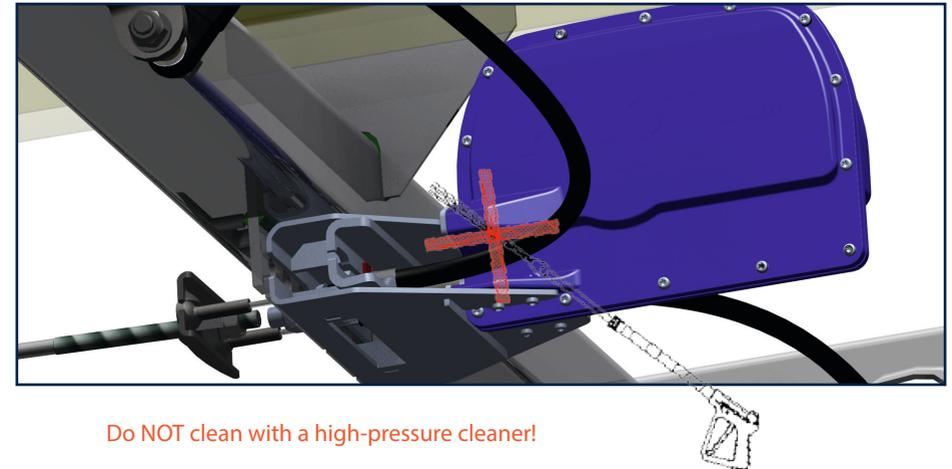
The socket outlet on the towing vehicle is to be consciously closed off when not in use.

When the trailer is parked, the 13-pin plug should be kept in a parking outlet.

Do not clean the pin connectors and the ETS Plus system with a high-pressure cleaner!

Visual inspection

Checking of the trailer connector for corrosion and/or missing contacts. Check the ETS Plus central unit and the compensation balance on the bowden cable counter bearing for high levels of dirt and clean if necessary.



Do NOT clean with a high-pressure cleaner!

Short operating instructions for KNOTT ETS Plus

Before the start of driving:

- Couple trailer
- Connect 13-pin trailer plug to towing vehicle
- Hook in breakaway cable of overrun brake
- Release parking brake or remove chocks
- Check lighting on trailer
- Check light-emitting diode (LED) of ETS Plus on trailer drawbar

The ETS Plus starts a self-test once it is coupled (green flashing – quickly).

After approximately 3 seconds the LED changes to green – the vehicle-trailer combination is now ready to drive.

If the LED does not change to a steady green light, then carry out troubleshooting according to the following page.

Display	ETS status	Result	Help
GREEN (continuous) XXXXXXXXXX	ETS Plus active	Everything is OK	–
GREEN flashing (quickly) 150 ms on 150 ms off X_X_X_X_X_X_	ETS Plus brake inter- vention or self-test	Continued driving possible	–
GREEN flashing (brief pulse) 50 ms on 5000 ms off X____X____	ETS Plus in energy- saving mode	Driving off possible	After approximately 3 seconds of driving, the system wakes up and is ready for operation
GREEN flashing (slowly) XXX__XXX__	ETS Plus system/ brakes too hot	Continued driving possible	Careful continued driving After approximately 120 sec- onds of cooling, system is fully ready for operation again
LED lights up or flashes RED	ETS Plus faulty	Continued driving possible	Troubleshoot according to table on following page
LED does not light up	ETS Plus inactive	Continued driving possible	<ul style="list-style-type: none"> • Check whether continuous positive present • Disconnect 13-pin trailer cable from towing vehicle. Visually check the plug and contacts • Wait approx. 60 seconds • Connect 13-pin trailer cable to towing vehicle

Display	Status	Result	Help	Display following self-help	Status
<p>RED flashing 1x red – pause _X_____</p>	<p>Electrical fault in the ETS Plus supply e. g., loose connection or voltage too low</p>	<p>Continued driving possible Sensible driving style!</p>	<p>Check the cabling, in particular the pin connectors to the towing vehicle</p> <p>Disconnect the system for 20 minutes, wait and re-connect</p>	<p>Turns green (steady light)</p> <p>Electrical check at a specialist workshop</p>	<p>Everything is OK</p> <p>ETS Plus inactive Continued driving possible, visit a specialist workshop</p>
<p>RED flashing 2x red – pause _X_X_____</p>	<p>Mechanical fault on ETS Plus e. g. no brake cable connected, brakes heavily worn, system incorrectly fitted</p>	<p>Continued driving possible ensible driving style!</p>	<p>Visually check the ETS Plus installation along with the entire brake system</p> <p>Check the brake system settings</p> <p>Disconnect the system for 20 minutes, wait and re-connect</p>	<p>Turns green (steady light)</p> <p>Does not turn green</p>	<p>Everything is OK</p> <p>ETS Plus inactive Continued driving possible, visit a specialist workshop</p>
<p>RED flashing 3x red – pause _X_X_X_____</p>	<p>Fault in ETS Plus central unit</p>	<p>Continued driving possible Sensible driving style!</p>	<p>Disconnect the system for 20 minutes, wait and re-connect</p>	<p>Turns green (steady light)</p> <p>Does not turn green</p>	<p>Everything is OK</p> <p>ETS Plus inactive Continued driving possible, visit a specialist workshop</p>
<p>LED does not light up</p>	<p>ETS Plus inactive</p>	<p>Continued driving possible Sensible driving style!</p>	<ul style="list-style-type: none"> • Disconnect 13-pin trailer cable from towing vehicle. • Visual inspection • Check whether continuous positive available on socket outlet • Connect 13-pin trailer cable to towing vehicle 	<p>Restart the troubleshooting using this table</p>	<p>alles OK</p> <p>Continued driving possible, visit a specialist workshop</p>

Troubleshooting table
When problems occur which cannot be eliminated using this table, a specialist workshop must be visited.



Kraftfahrt-Bundesamt
DE-24932 Flensburg

ALLGEMEINE BETRIEBSERLAUBNIS (ABE)

nach § 22 in Verbindung mit § 20 Straßenverkehrs-Zulassungs-Ordnung (StVZO) in der Fassung der Bekanntmachung vom 26.04.2012 (BGBl I S.679)

Nummer der ABE: 91581*01

Gerät: Stabilisierungseinrichtung für Anh

Typ: ETS Plus

Inhaber der ABE und Hersteller: Knott GmbH
DE-83125 Eggstätt

Für die oben bezeichneten reihenweise zu fertigenden oder gefertigten Geräte wird dieser Nachtrag mit folgender Maßgabe erteilt:

Die sich aus der Allgemeinen Betriebserlaubnis ergebenden Pflichten gelten sinngemäß auch für den Nachtrag.

In den bisherigen Genehmigungsunterlagen treten die aus diesem Nachtrag ersichtlichen Änderungen bzw. Ergänzungen ein.



Kraftfahrt-Bundesamt
DE-24932 Flensburg

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Nummer der ABE: 91581*01

Die Stabilisierungseinrichtung für Anh, Typ ETS Plus, dürfen auch zum An(Ein)bau an(in) die in den beiliegenden Prüfunterlagen aufgeführten Kraftfahrzeuge unter den angegebenen Bedingungen feilgeboten werden.

Im Übrigen gelten die im beiliegenden Nachtragsgutachten der TÜV SÜD Auto Service GmbH, München, vom 28.02.2017 festgehaltenen Angaben.

Flensburg, 19.04.2017
Im Auftrag



Frederik Maß

Anlagen:

Nebenbestimmungen und Rechtsbehelfsbelehrung
1 Nachtragsgutachten Nr. 16-00372-CX-GBM-01

Country	Company	Phone	www
D	KNOTT GmbH	+49 9402 9317-0	www.knott.de
I	KNOTT S.p.A.	+39 051 6516445	www.knott.it
GB/IRL	KNOTT-Avonride Ltd.	+44 1283 531541	www.knottuk.com
USA	KNOTT Brake Company	+1 330 948 0144	www.knottbrake.com
SK	KNOTT spol. s.r.o.	+421 33 69025-11	www.knott.sk
P	KNOTT Sp. zo.o.	+48 61 2876000	www.knott.pl
RO	KNOTT Frâne Osii S.R.L.	+40 21 255 1679	www.knott.ro
A	KNOTT Handelsges. m.b.H.	+43 1 714 2222	www.knott.at
HU	Autoflex-Knott Kft.	+36 76 481515	www.autoflex.hu
FIN	Autoflex-Knott OQ	+358 955 2250	www.autoflex.fi
E	Autoflex-Knott Ibérica	+34 942 369187	www.autoflexiberica.com
DK	Bevola A/S	+45 57 660640	www.bevola.dk
F	Éts. Paillard S.A.	+33 1 64104880	www.paillard.fr
IL	Moshe Wingold Ltd.	+972 29 994501	www.weingold.co.il
NL/B/L	Protempo B.V.	+31 2437 11711	www.protempo.nl
N	Svako A/S	+47 67 060600	www.svako.no
RUS	OOO TD Autoflex-Knott Ltd.	+7 495 9685810	www.autoflex-knott.ru
CH	Willy Erny AG	+41 5233 72121	www.erny.ch
S	AB Ernst H. Rydahls	+46 54 856200	www.rydahls.se
TR	Teknom Otomotiv Ltd.	+90 532 2354093	www.teknootomotiv.com.tr

Proof of origin:

Knott GmbH
Bremsen – Achsen

Obingerstraße 15
83125 Eggstätt, Germany

Tel. +49 8056 906-0
Fax. +49 8056 906-106

info@knott.de
www.knott.de



Knott GmbH
Bremsen – Achsen

Obingerstraße 15
83125 Eggstätt
Germany

Tel. +49 8056 906-0
Fax. +49 8056 906-106

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www.knott.de